

STUDY

Requested by the ITRE committee



# The emergence of non-personal data markets

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Policy Department for Economic, Scientific and Quality of Life Policies  
Directorate-General for Internal Policies

Authors: Olga BATURA, Axel WION, Sofia Noelle GONZALEZ,  
J. Scott MARCUS, Ilsa GODLOVITCH, Lukas WIEWIORRA,  
Peter KROON, Serpil TAS and Nico STEFFEN.

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## **Abstract**

The European Union has taken a distinctive stance in facilitating the unrestricted movement of non-personal data, all the while upholding data privacy and security standards. However, there is still a requirement to ensure equitable conditions for data sharing. This research scrutinises the current legal framework within the EU, highlighting persistent obstacles and proposing potential strategies for implementation.

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### **AUTHORS**

Olga BATURA, VVA Brussels  
Axel WION, VVA Brussels  
Sofia Noelle GONZALEZ, VVA Brussels  
J. Scott MARCUS, Bruegel  
Ilsa GODLOVITCH, WIK  
Lukas WIEWIORRA, WIK  
Peter KROON, WIK  
Serpil TAS, WIK  
Nico STEFFEN, WIK

### **ADMINISTRATOR RESPONSIBLE**

Kristi POLLUVEER

### **EDITORIAL ASSISTANT**

Irene VERNACOTOLA

### **LINGUISTIC VERSIONS**

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To contact the Policy Department or to subscribe for email alert updates, please write to:

Policy Department for Economic, Scientific and Quality of Life Policies

European Parliament

L-2929 - Luxembourg

Email: [Poldep-Economy-Science@ep.europa.eu](mailto:Poldep-Economy-Science@ep.europa.eu)

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## LIST OF ABBREVIATIONS

<b>AI</b>	Artificial intelligence
<b>API</b>	Application programming interface
<b>B2B</b>	Business to Business
<b>B2C</b>	Business to Consumer
<b>B2G</b>	Business to Government
<b>CAGR</b>	Compound annual growth rate
<b>CSA</b>	Coordination and support action
<b>DB</b>	Deutsche Bahn AG
<b>DGA</b>	Data Governance Act
<b>DMA</b>	Digital Markets Act
<b>DSA</b>	Digital Services Act
<b>EHDS</b>	European Health Data Space
<b>EIB</b>	European Investment Bank
<b>ERP</b>	Enterprise Resource Planning
<b>EU</b>	European Union
<b>GDPR</b>	General Data Protection Regulation
<b>GNSS</b>	Global Navigation Satellite System
<b>IDC</b>	International Data Corporation
<b>IoT</b>	Internet of Things
<b>IT</b>	Information Technology
<b>NAP</b>	National access point
<b>PSD2</b>	Payment Services Directive
<b>REACH</b>	Registration, Evaluation, Authorisation and Restriction of Chemicals (Regulation)
<b>SMEs</b>	Small and medium-sized enterprises
<b>SWOT</b>	Strengths, Weaknesses, Opportunities and Threats
<b>US</b>	United States



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## EXECUTIVE SUMMARY

### Background

The European Commission's Data Strategy aims to create a single market for data, open to data from across the world, where personal and non-personal data, including sensitive business data, are secure. The EU Regulation on the free flow of non-personal data allows non-personal data to be stored and processed anywhere in the EU without unjustified restrictions, with limited exceptions based on grounds of public security. The creation of multiple common sector-specific European data spaces aims to ensure Europe's global competitiveness and data sovereignty. The Data Act proposed by the Commission aims to remove barriers to data access for both consumers and businesses and to establish common rules to govern the sharing of data generated using connected products or related services.

### Aim

The aim of the study is to provide an in-depth, comprehensive, and issue-specific analysis of the emergence of non-personal data markets in Europe. The study seeks to identify the potential value of the non-personal data market, potential challenges and solutions, and the legislative/policy measures necessary to facilitate the further development of non-personal data markets. The study also ranks the main non-personal data markets by size and growth rate and provides a sector-specific analysis for the mobility and transport, energy, and manufacturing sectors.

### Key Findings

#### Main findings from the case studies

The data economy in the **transport and mobility sector** is one of the five fastest growing and is expected to expand to nearly €25 billion annually by 2025. Data includes dynamic information from sensors about ongoing movements as well as details of events such as accidents or traffic jams and static information about road layout, parking, and fuelling areas etc. Data use in this sector has been driven by growing demand for safer, more efficient, and sustainable mobility, as well as progress towards connected modes of transport and the proliferation of connected devices. However, challenges arise because of the high proportion of personal data in the mobility sector, and the wide variety of actors involved with differing standards.

The European **energy sector** is a dynamic sector that is characterised by a large number of agents and stakeholders. These include energy producers, distributors, regulators, and technology providers on the supply side as well as a wide variety of commercial and residential consumers. Leveraging non-personal data could enable more efficient energy systems, improved asset management, and optimised energy generation and consumption, as well as facilitating the integration of renewable energy sources into the grid and supporting the development of innovative solutions for energy storage to address gaps in supply. Various data platforms have emerged for the energy sector. However, most of these are still in their early stages of implementation and have not reached widespread usage.

As it is a critical and interconnected sector, characterised by large players in certain market segments, some experts have suggested that in addition to incentives, data sharing mandates may be necessary in certain cases (e.g. to require data sharing between grid operators and energy storage providers), while taking into account proportionality.

The **manufacturing sector** could reap significant benefits from increased data sharing, including improved efficiency in processes and equipment use and the development of new use cases, as well as faster and more localised supply chains. Many companies already take advantage of self-produced data. However, the use of third party data in the manufacturing sector is not yet widely exploited – in particular by SMEs, which make up a very high proportion of actors in this sector. Challenges include lack of IT knowledge in particular amongst smaller firms, a lack of interoperability between the different systems used to steer machines, and a lack of acceptance of standards in some cases where they do exist. Questions can also arise around data ownership and confidentiality. Experts in the field call for continued support for initiatives such as GAIA-X and related ecosystems such as manufacturing dataspace, standardisation, and initiatives such as digital product passports to help the sector achieve its full potential.

### **Recommendations**

The sharing of non-personal data is limited in part because the data in some sectors are not sufficiently digitised, and also because SMEs in the EU are not sufficiently digitised. Measures to promote digitisation are in place in some sectors (notably transport, energy, and health), but are likely to be needed in other sectors.

More needs to be done to provide positive incentives (and to mitigate disincentives) for organisations to share their digitised non-personal data.

Given that personal data is often mixed in with ostensibly non-personal data, some form of safe harbour is needed in order to protect organisations from legal liability to the extent that they have attempted in good faith to anonymise their data, in line with recognised best practice. Detailed guidance at EU level is likely to be needed.

In light of the numerous distinct EU measures that seek to promote the sharing of personal data, and the risk of overlaps and of gaps, further study is needed to ensure that there is legal clarity as to the compensation that an organisation can expect to receive for sharing its non-personal data. Additional measures are likely to be needed in specific, justified cases – either additional compensation, or else obligations to share non-personal data.

There is a need for extensive development and implementation of standards in order to achieve full and meaningful portability and interoperability of non-personal data. Horizon Europe has launched numerous Coordination and Support Actions (CSAs) in preparation for later sector-specific standardisation, but these actions alone are not likely to ensure (1) that the stakeholders actually agree on usable standards, and (2) that they actually implement the standards that have been agreed on. The relevant provisions of the Data Act appear to provide a useful model of standardisation that could potentially be applied on a much broader scale.

The lack of skilled data specialists and regulatory staff, and the limited data literacy of employees are over-arching problems that are already addressed to some extent through existing EU and Member State initiatives; however, there is likely to be a need for more focus on data literacy in education, in vocational training, and in up-skilling and re-training.

Cybersecurity continues to be a problematic issue for all digitised industry, and is clearly relevant to the sharing of non-personal data; however, we have not identified cybersecurity risks associated with the sharing of non-personal data that have not been covered by the existing legislation.

There is a risk that competition problems could arise as regards the sharing of non-personal data; however, we have not identified threats that cannot be addressed by means of EU competition law in conjunction with the Digital Markets Act and the Data Act.

## 1. INTRODUCTION

### 1.1. Objectives and scope of the study

This study aims to deliver an in-depth, comprehensive, and issue-specific analysis of the emergence of non-personal data markets. It seeks to describe the potential value of the non-personal data market in Europe and identify potential challenges and solutions with the aim of providing guidance to Members of the European Parliament and other policymakers. This study includes an analysis of:

- the emergence of non-personal/industrial data markets;
- the ongoing development of the non-personal/industrial data economy;
- the current or predicted barriers to entry to data markets by public and private operators, including SMEs;
- potential challenges arising from mixed data sets in industrial environments;
- anticompetitive practices; and
- legislative/policy measures necessary to facilitate the further development of the non-personal data markets.

### 1.2. Brief background on non-personal data markets

The **data market** refers to the exchange of digital data as products or services, from the extraction and development of raw data. It is defined by the cumulative value of the demand for data. This cumulative value goes beyond the market of big data and analytics and its corresponding technologies (data visualisation, machine learning, predictive analysis, etc.), and includes the value generated by information and IT services, data-related research, and businesses. The data market in Europe has been expanding and is expected to continue to grow in light of recent technological advancements in artificial intelligence (AI) and machine learning as well as growing demand for data-driven insights and decision making across industries such as healthcare, finance, public administration, manufacturing, energy, mobility and the Green Deal.

The recent proliferation of available data and data analytics should provide significant potential for both private and public institutions to boost growth and productivity. Organisations in the US that implemented data-driven decision-making are thought to have obtained 5-6% higher output and productivity<sup>1</sup>. This increase in productivity was coupled with investments in information technology (IT), further illustrating the importance of technical and data literacy when discussing the potential of the European data economy.

The application of data analytics and IT has also supported municipalities in their goals to improve public services and energy sustainability. For example, a digitised municipality can enable data

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<sup>1</sup> Brynjolfsson, E., Hitt, L. M. and Kim, H. H., 'Strength in Numbers: How Does Data-Driven Decisionmaking Affect Firm Performance?', 2011, [https://papers.ssm.com/sol3/papers.cfm?abstract\\_id=1819486](https://papers.ssm.com/sol3/papers.cfm?abstract_id=1819486).

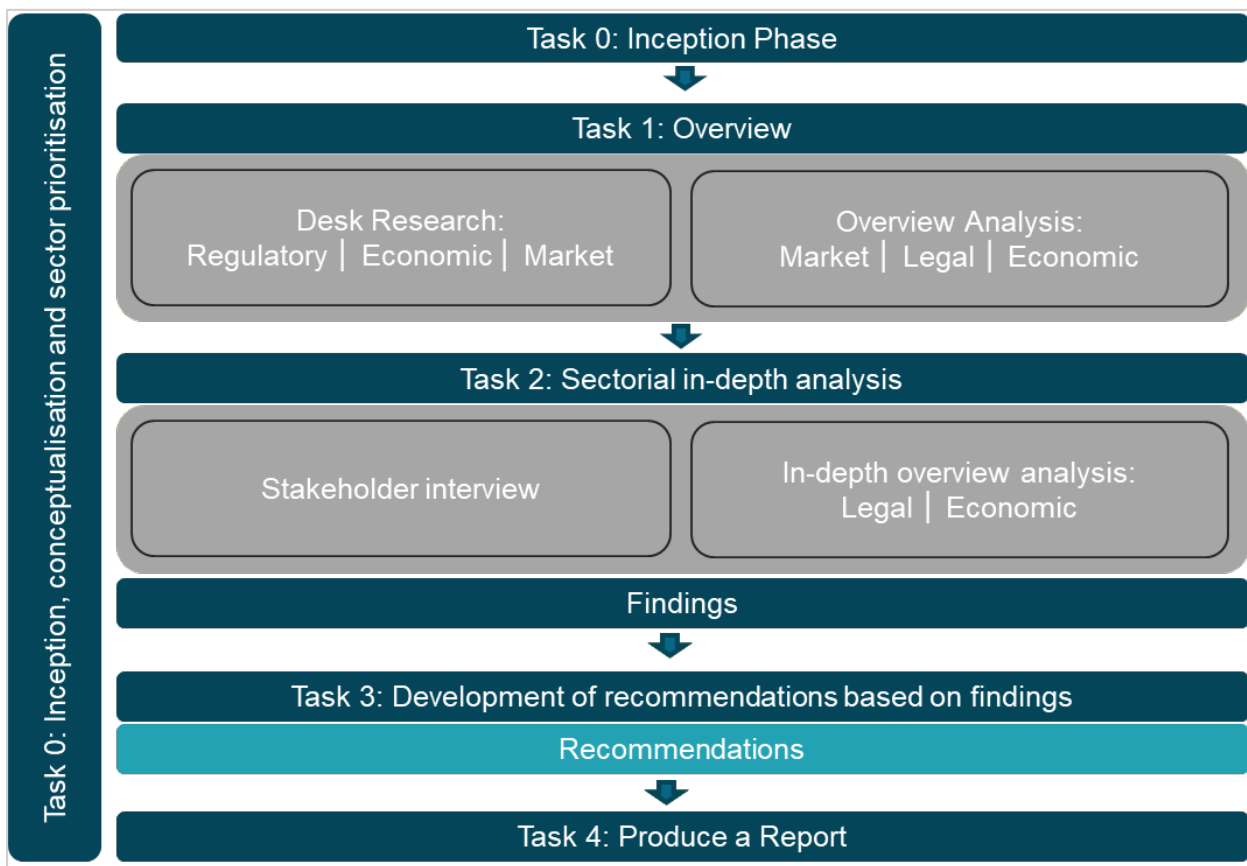
exchange of information such as energy flows between providers and users and use this data to increase the efficiency of energy usage and storage.

Another example is the generation and analysis of data from metering-devices, traffic systems and domestic appliances that can lead to a more efficient use of the city’s resources. Public administration is experiencing the largest amount of growth in the data market<sup>2</sup>.

### 1.3. Methodology

The following figure provides an overview of how the analysis was structured. It was divided into five tasks, which were performed sequentially:

Figure 1: Framework of the analysis and project plan



Source: Authors’ own elaboration, 2023.

The authors have relied on extensive desk research (i.e., listed under References) and stakeholder consultation for the in-depth case studies.

<sup>2</sup> European Data Market Monitoring Tool, IDC, 2022.

## 2. EMERGENCE AND ONGOING DEVELOPMENT OF THE NON-PERSONAL/INDUSTRIAL DATA ECONOMY

### KEY FINDINGS

- Non-personal data refers to electronic data that does not contain any information that can be used to identify a natural person (e.g., weather data, stock prices). Personal data can become non-personal as a result of effective application of data anonymisation techniques (i.e., randomisation or generalisation);
- Key sectors such as finance, mining, manufacturing, professional services, and public administration are expected to benefit greatly from non-personal data in the next five years. Agriculture, health, mobility, and utilities will experience similar growth in relative values, but will remain marginal in absolute values;
- Broader use of non-personal data can support economic growth, improve public services, promote new businesses, and support decarbonisation.

The following section aims to provide a qualitative as well as quantitative overview of European non-personal data markets. The assessment of the value of data, including the measurement of both data itself and the data sharing market, is important to determine its impact on economic growth and evaluating the benefits and returns on investments in the data economy. However, measuring the value of data presents a significant challenge due to the inherent nature of data (lack of traceability, lack of access, non-rivalrous nature, and other reasons) and its complex role within the economy.

The study has relied on the work done by the European Data Market Monitoring Tool when it comes to the market quantification. It is part of a three-year project conducted by the European Commission, the Lisbon Council, and International Data Corporation (IDC) to define better metrics for assessing the European data economy. The goal of the project is to measure the size and potential of the market and evaluate Europe's position within it (e.g., number of data workers, the value of data-related products and services, etc.).

### 2.1. Concept of non-personal data

The term **“non-personal data”** is defined negatively in relation to the term **“personal data”**. According to Article 2 (1) of the Regulation on the free flow of data<sup>3</sup>, non-personal data are ‘electronic data other than personal data’. The General Data Protection Regulation (GDPR)<sup>4</sup> gives a broad definition to personal data: “any information relating to an identified or identifiable natural person”, while “an identifiable natural person is one who can be identified, directly or indirectly, by reference to an identifier such as a name, identification number, location data, an

<sup>3</sup> Regulation (EU) 2018/1807 of the European Parliament and of the Council of 14 November 2018 on a framework for the free flow of non-personal data in the European Union, OJ L 303, 28.11.2018.

<sup>4</sup> Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC, OJ L 119, 04.05.2016.

online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person” (Article 4 (1) GDPR).

Hence, the **main distinctive features of personal data** by comparison to non-personal data are:

- 1) that they refer to a **natural** person (i.e., not a legal person) and
- 2) that they can directly or indirectly **identify**<sup>5</sup> such a natural person.

Personal data can become non-personal as a result of application to them one of the **data anonymisation techniques** (i.e., randomisation or generalisation)<sup>6</sup>. Through these techniques, identification of the natural person is supposed<sup>7</sup> to be removed. Scholars note that the standard of identifiability<sup>8</sup> of the GDPR is uncertain, especially considering that the anonymisation of personal data can often be reversed<sup>9</sup>. This – in combination with the broad definition of personal data by the GDPR – leads some scholars to argue that all data associated with individuals can be personal data<sup>10</sup>.

The Regulation on the free flow of data provides some examples of what should be clearly understood as non-personal data under the current legal framework. These examples refer to data that are not associated with individuals from the onset. Recital 9 of this Regulation lists ‘aggregate and anonymised datasets used for big data analytics, data on precision farming that can help to monitor and optimise the use of pesticides and water, or data on maintenance needs for industrial machines’ as non-personal data.

## 2.2. Emergence and development of data economy

The **data economy** can be defined as the accumulated value of wealth generated by all forms of data usage. This encompasses (but is not limited to) the value of digital data and data-related research alongside the value associated with cloud computing services, the application and sharing of data analytics in industry and manufacturing, the storage and analysis of publicly available forms of data for the application of climate related issues, and value and revenue generated in the economy from the creation of new jobs due to the ever expanding data market.

<sup>5</sup> Finck, M., Pallas, F., ‘They who must not be identified—distinguishing personal from non-personal data under the GDPR’, *International Data Privacy Law*, 10:1, 2020, pp. 11–36, <https://doi.org/10.1093/idpl/iz026>.

<sup>6</sup> Article 29 Data Protection Working Party, *Opinion 05/2014 on Anonymisation Techniques*, WP216, 2021, [https://ec.europa.eu/justice/article-29/documentation/opinion-recommendation/files/2014/wp216\\_en.pdf](https://ec.europa.eu/justice/article-29/documentation/opinion-recommendation/files/2014/wp216_en.pdf).

<sup>7</sup> Many studies have been conducted on the effectiveness of anonymisation techniques coming to the conclusion that full anonymisation is often not possible. See, for example, Langarizadeh, M., Orooji, A., Sheikhtaheri, A., *Man vs the machine: Effectiveness of Anonymization Methods in Preserving Patients’ Privacy: A Systematic Literature Review*, *Stud Health Technol Inform.*, 2018, pp. 80–87, <https://arxiv.org/abs/2303.12429>; Ortega-Fernandez, I., Martinez, S. E. K., Orellana, L. A., *Large Scale Data Anonymisation for GDPR Compliance*, in Soldatos, J., Kyriazis, D. (eds.), *Big Data and Artificial Intelligence in Digital Finance*, Springer, Cham., 2022, [https://doi.org/10.1007/978-3-030-94590-9\\_19](https://doi.org/10.1007/978-3-030-94590-9_19).

<sup>8</sup> Finck, M., Pallas, F. (2020), op cit.

<sup>9</sup> Ohm, P., ‘Broken promises of privacy: responding to the surprising failure of anonymization’, *UCLA Law Review*, 57, 2010, pp. 1700–1777, <https://www.uclalawreview.org/pdf/57-6-3.pdf>.

<sup>10</sup> Purtova, N., ‘The law of everything. Broad concept of personal data and future of EU data protection law’, *Law, Innovation and Technology* 10:1, 2018, pp. 40–81, DOI: [10.1080/17579961.2018.1452176](https://doi.org/10.1080/17579961.2018.1452176); Sør, S. O., Jørgensen, R. F. & Mai, J. E., ‘What is the ‘personal’ in ‘personal information’?’, *Ethics and Information Technology*, 23, 2021, pp. 625–633, <https://doi.org/10.1007/s10676-021-09600-3>.

Therefore, the data economy measures all revenue generated because of data application, exchange, skills and storage, and is broader than the data market. The value of the European data economy has been estimated to reach €500 billion in 2022. This value was expected to increase to €640 billion in 2025, with enterprises realising the full potential benefits of the improved use of data<sup>11</sup>.

The emergence and development of the non-personal/industrial data economy in the European Union has been fuelled by different trends. The digitisation of industry and manufacturing is considered as the main catalyst for the European Commission's decision to focus on a Europe-wide data strategy, having in mind the end objective of strengthening the European digital economy<sup>12</sup>. The European data strategy has defined a governance framework for industrial data trading, emphasising the fundamental need of non-personal data sharing for the European digital economy. Several regulatory elements (i.e., Digital Markets Act, Digital Services Act) have already been implemented to further unlock commerce in industrial data, allowing firms to obtain data that they are best placed to use, the Data Act being still finalised. These EU initiatives aim to unlock the potential of data-driven innovation and drive growth in the European digital economy by focusing on promoting data collaboration, ensuring the free flow of non-personal data, and creating a single market for data. For example, the European Health Data Space study has proposed rules and mechanisms for ensuring the people's right to access and exchange health data, and providing a consistent, trustworthy, and efficient set-up for the use of health data for research, innovation, policy-making, and regulatory activities<sup>13</sup>.

### 2.3. Market quantification

The market overview for the main eight sectors covered by the study has considered elements from the European Data Market Monitoring Tool<sup>14</sup>. This platform provides information on the European data economy, including market size, trends, and key players. It aims to support evidence-based policy-making and help businesses make informed decisions in the data market. The market quantification analysis has focused on four main indicators: the share of data monetisation (i.e., the value of the sale of data assets between organisations), the number of data suppliers, the number of data professionals and the yearly estimated data economy. The following table provides an overview of the results for the main sectors covered in this study.

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<sup>11</sup> European Data Market study 2021-2023, available at: <https://digital-strategy.ec.europa.eu/en/library/results-new-european-data-market-study-2021-2023>.

<sup>12</sup> Economist Impact, *The future of Europe's data economy*, 2022, available at: [https://impact.economist.com/perspectives/sites/default/files/ei233\\_msft\\_futuredata\\_report\\_-\\_v7.pdf](https://impact.economist.com/perspectives/sites/default/files/ei233_msft_futuredata_report_-_v7.pdf).

<sup>13</sup> Marcus, J. S. et al., *The European Health Data Space*, 2022.

<sup>14</sup> Ibid 11.



Table 1: Overview of key data points from the European Data Market Monitoring Tool

Sector/ EU Data Space	Share of Data Monetisation		Number of data suppliers		Number of Data Professionals (000s)		Data EUR (Bn) Economy	
	2020	2025	2020	2025	2020	2025	2020	2025
Agriculture	0.3%	0.2%	27	83	35	44	2,471	3,131
Finance	28.8%	23.4%	4,621	13,022	609	769	100,500	144,498
Health	3.9%	3.9%	3,101	9,207	518	668	17,269	25,703
Mining, Manufacturing	22.5%	22.8%	21	347	745	945	90,100	127,738
Professional services	15.9%	14.9%	67,958	103,218	1,385	1,820	39,230	60,816
Public Administration	5.9%	7.9%	n/a	n/a	395	485	50,601	89,734
Mobility	4.3%	4.5%	117	412	197	244	16,798	25,090
Utilities	2.6%	2.8%	261	883	92	113	16,782	32,628

Source: European Data Market Monitoring Tool, IDC 2022.

To better understand market trends across these eight sectors, it is important to consider both the 5-year growth trend, and to rank values based on the sector gross value-added contribution to the EU economy, doing so will allow to provide relative estimations rather than absolute figures. The following table provides refined elements considering the CAGR (compound annual growth rate) and the 2025 ranking of each sector.

Table 2: CAGR and 2025 ranking of sectors based on the gross value added in the EU

Sector/EU Data Space	Share of Data Monetisation		Number of data suppliers		Number of Data Professionals		Data Economy	
	2025 ranking*	CAGR	2025 ranking*	CAGR	2025 ranking*	CAGR	2025 ranking*	CAGR
Agriculture	8th	-7.79%	7th	25.18%	8th	4.68%	8th	4.85%
Finance	2nd	-4.07%	2nd	23.02%	3rd	4.78%	2nd	7.53%
Health	6th	0.00%	3rd	24.31%	4th	5.22%	7th	8.28%
Mining, Manufacturing	1st	0.27%	6th	75.24%	2nd	4.87%	1st	7.23%
Professional services	3rd	-1.29%	1st	8.72%	1st	5.61%	4th	9.16%
Public Administration	4th	6.01%	8th	n/a	5th	4.19%	3rd	12.14%
Mobility	5th	0.91%	5th	28.63%	6th	4.37%	6th	8.35%
Utilities	7th	1.49%	4th	27.60%	7th	4.20%	5th	14.22%

Note: \*"2025 ranking" columns consider the 2025 value reached by the sector, corrected by the gross value added of each sector for the year 2022 based on Eurostat data.

Mining and manufacturing is definitely a strategic sector when it comes to the use of non-personal data (i.e., biggest sector in the EU when it comes to Data Economy and the share of data monetisation). The number of data suppliers was very limited considering the size of this sector and it is expected that their number will skyrocket in the upcoming five years (75% CAGR).

Finance is a key sector when it comes to non-personal data. Despite a small decline in the share of data monetisation, this sector is expected to experience similar growth on average. The Finance sector is one of the most developed when it comes to the use of non-personal data, also having a lot of potential (i.e., highlighted by the 2-3 ranking on the four criteria).

The professional services sector is quite familiar with the use of non-personal data. This sector has the highest number of data suppliers and data professionals, and a steady growth is expected in the upcoming years.

Public administrations are expected to benefit clearly from a broader use of non-personal data. The sector will not be one of the major ones, even in 2025. One of the highest growths in CAGR will be experienced in the share of data monetisation (+6%) and the EU Data Economy (+12%).

Agriculture will be the sector expected to benefit the least, compared to other sectors included in the analysis, from non-personal data. Monetisation is expected to decline by 0.1% (from 0.3% in 2020 to 0.2% by 2025). However, the growth when it comes to the number of data suppliers and the number of data professionals is aligned with other sectors.

The health sector is expected to grow significantly in the upcoming five years when it comes to the use of non-personal data. The share of monetisation is expected to remain stable, however the other indicators might grow at a similar pace to other sectors.

The mobility sector is expected to grow in its usage of non-personal data in the upcoming five years. It will enjoy the second highest growth in CAGR when it comes to the number of data suppliers.

Utilities (incl. the energy market) will experience a similar growth rate to the mobility sector. The use of non-personal data will be expanded, and it is expected that utilities will have the highest growth rate in CAGR contributing to the EU Data Economy.

All main non-personal data markets have been ranked by their size, growth rate and potential growth by 2025. It is worth noting that non-personal data has significant socio-economic value, and that the EU should harness the potential opportunities and challenges to optimise the return for the society.

### 3. POLICY AND LEGAL FRAMEWORKS FOR NON-PERSONAL DATA

#### KEY FINDINGS

- In recent years, numerous policy measures and legal acts have been adopted and proposed to boost the EU data economy and create a common European data market. The existing measures cover data access, compensation models, rights and obligations of data holders and data users and other issues both in general and in application to specific sectors;
- The 2018 Regulation on the free flow of data provides a general framework for sharing of non-personal data. It is flanked by several sectoral measures (e.g., Open Data Directive and Data Governance Act (both – for public sector data), Payment Services Directive, REACH Regulation, General Food Law Regulation, Regulation on Motor Vehicles, Electricity Directive) that create special conditions for data sharing in some but not all sectors of economy;
- Several legal acts aim to balance specific legitimate interests of data holders and data users. The former are in particular protected by the Trade Secrets Directive (i.e., trade secrets and know-how) and the Database Directive (i.e., investments in data collection, verification, maintenance and accuracy). The latter are protected against potential abuse of market power by dominant undertakings by EU competition law, Digital Markets Act and Platform-to-Business Regulation;
- The European Strategy for Data seeks to foster the creation of common European Data Spaces and, via them, enhance the use of non-personal data. Initial steps to the creation of data spaces are implemented via Horizon Europe, and additional regulatory frameworks are being developed (e.g., EHDS Regulation); and
- Internet-of-Things data will be covered by the European Data Act – a horizontal legislation covering a range of issues from access to data, mandatory business-to-government sharing in exceptional circumstances and contractual imbalances in data sharing contracts, to cloud switching, international transfers of non-personal data and interoperability.

#### 3.1. Policies to enable free flow of non-personal data

Non-personal data can be applied in a variety of sectors, such as energy (utilities), mobility, environment, health, food security, finance and transport systems, to name a few. To unlock the full value of non-personal data for society and the economy, it is crucial that a framework for the free flow of data and access of such data by public as well as private entities is in place. The accessibility of these data has the potential to stimulate innovation in the private sector and increase efficiency in the public sector.

The **Regulation on the free flow of data** that entered into force in 2018 has become the main legal framework governing various activities with non-personal data.

This concise legal instrument aims to ensure the free flow of non-personal data within the EU (i.e. free movement of data). Article 4 of this Regulation prohibits data localisation requirements by EU Member States, unless related to public security. Although there are no specific requirements for data porting (i.e. moving data between different locations or applications), Article 6 of the Regulation on the free flow of data encourages the development of self-regulation in the form of codes of conduct<sup>15</sup>.

To foster the **creation of a secure single market for personal and non-personal data**, the European Commission adopted a European strategy for data in 2020<sup>16</sup>. The use of data can empower businesses, support their growth, innovation and competitiveness, contribute to the development of all economy sectors and improve health and wellbeing, environment, governance transparency and public services. The European Commission organises its work to realise this vision through four priorities:

- 1) enabling framework for governance of common EU data spaces;
- 2) availability of high-quality public sector data for re-use;
- 3) incentivising horizontal data sharing within and across sectors, and
- 4) potential establishment of data pools for data analysis and machine learning.

The work on the creation of **common European Data Spaces** (listed in Table 3) outlined in the European strategy for data has been progressing supported by the EU funding through the Digital Europe Programme, Horizon Europe and the Recovery and Resilience Facility. In addition, a multi-country project in European Common Data Infrastructure and Services is to be created for this purpose, supported by Important Projects of Common European Interest to implement Next-Generation Cloud Infrastructure and Services, and a European Digital Infrastructure Consortium to implement the common European data spaces<sup>17</sup>. The European Parliament resolution on a European strategy for data<sup>18</sup> supported the Commission's intention to create these data spaces, and suggested that the concept be applied to other sectors besides those listed. Following this initiative, data spaces for media and cultural heritage were added.

<sup>15</sup> A few examples of such codes of conduct are EU Cloud Code of Conduct (CoC), available at: <https://eucoc.cloud/en/about/about-eu-cloud-coc>; CISPE Code of Conduct for cloud infrastructure service providers, see <https://www.codeofconduct.cloud/the-code/>. There is also a EU Code of conduct on agricultural data sharing by contractual agreement, available at: [https://fefac.eu/wp-content/uploads/2020/07/eu\\_code\\_of\\_conduct\\_on\\_agricultural\\_data\\_sharing-1.pdf](https://fefac.eu/wp-content/uploads/2020/07/eu_code_of_conduct_on_agricultural_data_sharing-1.pdf) and Code of Conduct on Data Sharing in Tourism: <https://www.ectaa.org/Uploads/documents/Code-of-Conduct-on-Data-Sharing-in-Tourism-Final.pdf>.

<sup>16</sup> Communication from the Commission, *A European strategy for data*, COM(2020) 66, 19.02.2020.

<sup>17</sup> Commission Staff Working Document on Common European Data Spaces, SWD(2022) 45, 23.02.2022, pp. 10-11.

<sup>18</sup> European Parliament resolution of 25 March 2021 on a European strategy for data (2020/2217(INI)), OJ C 494, 08.12.2021.

Table 3: Overview of the common European Data Spaces

Common Data Space	Stated Purpose
Agriculture	To improve the competitiveness and sustainability of the agriculture sector through the collection and application of relevant data at farm level
Energy	To create a robust network of secure data sharing to facilitate a move towards sustainable energy solutions as well as encouraging innovative solutions within the energy sector
Financial	To stimulate sustainable finance, an integrated market, market transparency and access to finance for European businesses through data sharing
Green Deal	To support the Green Deal’s actions on climate change through access of relevant data, ‘Destination Earth’ and ‘GreenDealData4All’ initiatives will cover concrete actions
Health	A health data space will enhance the prevention, detection and curing of diseases, improve the effectiveness of healthcare and help to make informed data-based decisions due to health data accessibility
Industrial/ manufacturing	To encourage competitiveness within the European Union’s industries and apply the use of non-personal data to increase productivity
Mobility	To support the development of an intelligent transport system in Europe through the development and application of mobility data
Public administration	This data space will improve transparency and accountability of public spending, support public services and fight corruption on a local and national level
Skills	The creation of a European skills data space to bridge gaps in the labour market affected by skill shortages
Open science <sup>19</sup>	Bringing together institutional, national and European stakeholders to develop an inclusive research data and services ecosystem in Europe
Media <sup>20</sup>	Integration of state-of-the-art tools and services needed for the management and processing of data for printed and online press, radio, and audiovisual services and the audiovisual entertainment sector (cinema, TV, video streaming, video games and innovative formats)
Cultural heritage <sup>21</sup>	Accelerating digital transformation of cultural heritage sector and boosting the digitisation of cultural assets and reuse of high-quality data

Source: Authors’ own compilation based on Commission Staff Working Document on Common European Data Spaces, SWD(2022) 45, 23.02.2022.

<sup>19</sup> European Council conclusions on the European Open Science Cloud, 9291/18, 29.05.2018.

<sup>20</sup> Communication from the Commission, Europe’s Media in the Digital Decade: An Action Plan to Support Recovery and Transformation, COM(2020) 784, 03.12.2020.

<sup>21</sup> Commission Recommendation of 10.11.2021 on a common European data space for cultural heritage, C(2021) 7953, 10.11.2021.

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## 3.2. Current legal framework

In addition to the already named Regulation on the free flow of data and the GDPR, some other legal acts are of relevance for the use of specific types of non-personal data.

The re-use of **data that were publicly funded (public sector data)** is governed by the Directive on open data and the re-use of public sector information<sup>22</sup> and the Data Governance Act (DGA)<sup>23</sup>. The Open Data Directive provides for minimum harmonisation of national rules and practices related to the re-use of such data with the aim to address barriers to such re-use and facilitate the unlocking of public service data for innovation. One of the main obstacles – especially for smaller companies and start-ups – is the cost. Under Article 6 of the Open Data Directive, re-use has to be free of charge, and only marginal costs may be recovered for the reproduction, provision and/or dissemination as well as anonymisation of the data. Articles 13-14 introduce the notion of high-value datasets – datasets that have a high commercial potential, such as mobility and geolocalisation data, meteorological observation data, radar data, air quality and various statistics. Such high-value datasets must be also available free of charge, in a machine-readable format, provided via the application programming interface (API) and as a bulk download. The European Commission prepared the lists of the relevant high-value datasets and developed arrangements for their publication and re-use<sup>24</sup>.

The DGA complements the Open Data Directive and establishes conditions for the re-use of data held by public sector bodies and protected on grounds of commercial or statistical confidentiality, intellectual property rights of third parties, or personal data protection. The DGA does not create an obligation to allow the re-use of such protected data but lays out harmonised conditions under which the re-use of such data may be allowed. Article 5 DGA contains a detailed list of requirements, such as technical safeguards by public sector bodies to ensure privacy and confidentiality, and principles of re-use (i.e., compliance with proportionality, non-discrimination, objective justification, and respect for intellectual property rights). Article 4 DGA prohibits concluding exclusive agreements for the re-use of protected data. Article 6 DGA allows the charging of fees for re-use, but they must be transparent, non-discriminatory, proportionate, objectively justified and not restrictive on competition.

The DGA introduced a new model for data sharing: data intermediation service providers (Chapter III DGA). It is expected that they will function as neutral third party to link data holders and (interested) data users. The neutrality of data intermediation service providers would increase trust of the said parties, therefore they must refrain from processing the entrusted data for their own purposes. Furthermore, they are responsible for guaranteeing fair, transparent, and non-discriminatory procedures for data access, including pricing.

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<sup>22</sup> Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on open data and the re-use of public sector information (recast), OJ L 172, 26.06.2019.

<sup>23</sup> Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724, OJ L 152, 03.06.2022.

<sup>24</sup> Commission Implementing Regulation (EU) 2023/138 of 21 December 2022 laying down a list of specific high-value datasets and the arrangements for their publication and re-use, OJ L 19, 20.01.2023.

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To ensure compliance, data intermediaries are obligated to notify their operations to a competent national authority, which will oversee their activities.

Last but not least, Chapter IV DGA also introduces a legal framework for data altruism – voluntary and free-of-charge sharing of data generated by companies and individuals to be used for objectives of general interest. Public registries of data altruism organisations will be maintained, and a common European data altruism consent form is developed. The form allows easy provision and withdrawal of consent and, thus, is expected to facilitate data collection and give more certainty to researchers and companies that may be interested in such data. The European Commission will develop a Rulebook specifying relevant information, security and technical requirements.

**Data generated in certain sectors** of economy may be subject to additional sets of rules, under the applicable sectoral legislation. For example, certain **payment-related data** are subject to the Payment Services Directive (PSD2)<sup>25</sup>. While personal payment-related data are naturally subject to the GDPR, payment service providers also collect statistical data on fraud, transactions and performance, historical data and others. Such data are exchanged with the competent national authorities and the European Banking Authority and European Central Bank<sup>26</sup>. The PSD2 is currently under revision<sup>27</sup> with the aim to boost the sharing of non-personal data, such as business entities or financial product (contract) features. It creates a legal obligation to share non-personal data upon customer's request and mandates the technical feasibility of access and sharing for all types of data within the scope of the new legal act.

Some **chemicals-related data** also have their own regime of access. The REACH Regulation<sup>28</sup> creates a system of admission of chemical substances to the EU market. It requires that chemical substances are registered and, in specific cases, authorised prior to being put on the market. In the process of registration and authorisation, the manufacturer or importer of a substance must submit to the European Chemicals Agency a comprehensive dossier with specified information about the substance (see Article 10 of the REACH Regulation for the list of information). Many data included are non-personal data (e.g., physicochemical, toxicological, ecotoxicological, etc.). Article 25-30 of the REACH Regulation contain rules on data sharing with the purpose of avoidance unnecessary testing on animals. Under Article 27 of the REACH Regulation, information on previously registered substances can be requested from the previous registrant by the new

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<sup>25</sup> Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC, OJ L 337, 23.12.2015.

<sup>26</sup> See, for example, Article 96 (6) of the Payment Services Directive.

<sup>27</sup> Proposal for a Regulation of the European Parliament and of the Council on a framework for Financial Data Access and amending Regulations (EU) No 1093/2010, (EU) No 1094/2010, (EU) No 1095/2010 and (EU) 2022/2554, COM(2023) 360, 28.6.2023.

<sup>28</sup> Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, OJ L 396, 30.12.2006.



registrant. Under Article 30 of the REACH Regulation, data produced by testing on animals must be shared. Sharing of other relevant data is also encouraged.

**Data related to the risk assessment in the food chain** are also subject to a special transparency regime<sup>29</sup>. Novel food or food additives that are put on the EU market must be notified or, in certain cases, authorised to ensure that they are safe for consumption<sup>30</sup>. Similarly to the requirements of the REACH Regulation, such submissions also involve comprehensive dossiers containing a lot of non-personal data. Under Article 38 of the General Food Law Regulation, all scientific data, studies and other information supporting applications as well as related scientific outputs of the responsible authority and scientific opinions of experts must be disclosed to the public (unless restricted by intellectual property rights, data protection requirements and data exclusivity rules).

Other legislation that contains rules of sharing of certain types of non-personal data includes the EU Regulation on **Motor Vehicles**<sup>31</sup> and EU **Electricity** Directive<sup>32</sup>.

The current legal framework imposes **obligations with regard to data use on certain types of market players**. For instance, to level the digital playing field, Article 7 (3) of the Platform-to-Business Regulation<sup>33</sup> requires providers of **online intermediation services and search engines** to disclose in their terms and conditions any differentiated treatment they give to their business users in relation to data access. Article 9 of the same Regulation specifies all the particularities of data access that must be laid out in the terms and conditions of the providers of online intermediation services.

In an attempt to curb the market power of very large platforms and to prevent abusive competition practices, Article 6 (1) of Digital Markets Act (DMA)<sup>34</sup> prohibits **gatekeepers**, in competition with their business users, from using any data (i.e. including non-personal) that is not publicly available and that is generated or provided by those business users in the context of their use of the gatekeeper's services. At the same time, the gatekeeper must provide a business user with an access to all data provided or generated by this user in the context of its use of the

<sup>29</sup> Introduced by Regulation (EU) 2019/1381 of the European Parliament and of the Council of 20 June 2019 on the transparency and sustainability of the EU risk assessment in the food chain and amending Regulations (EC) No 178/2002, (EC) No 1829/2003, (EC) No 1831/2003, (EC) No 2065/2003, (EC) No 1935/2004, (EC) No 1331/2008, (EC) No 1107/2009, (EU) 2015/2283 and Directive 2001/18/EC, OJ L 231, 06.09.2019.

<sup>30</sup> Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety (General Food Law Regulation), OJ L 031, 01.02.2002.

<sup>31</sup> Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC, OJ L 151, 14.06.2018.

<sup>32</sup> Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (recast), OJ L 158, 14.06.2019.

<sup>33</sup> Regulation (EU) 2019/1150 of the European Parliament and of the Council of 20 June 2019 on promoting fairness and transparency for business users of online intermediation services, OJ L 186, 11.07.2019.

<sup>34</sup> Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828, OJ L 265, 12.10.2022.

gatekeeper's services (Article 6 (10) DMA). Such access must be free of charge, effective, high-quality, continuous and in real time.

Another set of rules that may be applicable to non-personal data – or, rather, to datasets as a whole – is **intellectual property law**.

Some non-personal data or datasets may fall under legal protection as a **trade secret or know-how**. According to Article 2 of the Trade Secrets Directive<sup>35</sup>, data may qualify as know-how and trade secrets if they meet three criteria:

- 1) the data are secret, meaning not generally known or readily accessible to those who normally deal with the kind of data;
- 2) the data hold commercial value due to their secrecy, and
- 3) reasonable steps have been taken to maintain data secrecy.

Although the Trade Secrets Directive has not been amended to account for big data and the data economy<sup>36</sup>, its application to certain non-personal data may be within the realm of possibility (e.g. to data generated in closed, controlled environments). It would be more challenging to apply the listed criteria for trade secrets in cases where multiple entities are involved in data collection along a value chain, and the determination of responsibility for maintaining secrecy becomes difficult. Additionally, establishing a direct link between the secrecy of data and its commercial value is complex, as the value often becomes apparent through applied data analytics, such as inferences and correlations with other data<sup>37</sup>.

Another possibility is the **sui generis protection as a database**. The sui generis protection of a database can be granted where an "investment of considerable human, technical and financial resources" was made by the database creator (Article 7 (1) Database Directive)<sup>38</sup>. The Court of Justice of the EU clarified that such protection aims at the investment in the data collection, its verification, maintenance and monitoring its accuracy, not in data creation as a by-product of another economic activity<sup>39</sup>. The 2018 evaluation of the Database Directive<sup>40</sup> emphasised the growing challenge of differentiating between data creation and data acquisition, especially when 'systematic categorisation of data' is performed by the data-collecting entity, such as industrial robots. To further clarify this situation and codifying the existing case law, Article 35 of the

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<sup>35</sup> Directive (EU) 2016/943 of the European Parliament and of the Council of 8 June 2016 on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure, OJ L 157, 15.06.2016.

<sup>36</sup> Wiebe, A., 2017, 'Protection of industrial data – a new property right for the digital economy?', *Journal of Intellectual Property Law & Practice* 12: 1, pp. 62–71, see <https://doi.org/10.1093/jiplp/jpw175>.

<sup>37</sup> Drexl, J., 2017, *Designing Competitive Markets for Industrial Data: Between Propertisation and Access*, JIPITEC 8:4, pp. 257–292: See [https://www.jipitec.eu/issues/jipitec-8-4-2017/4636/JIPITEC\\_8\\_4\\_2017\\_257\\_Drexl](https://www.jipitec.eu/issues/jipitec-8-4-2017/4636/JIPITEC_8_4_2017_257_Drexl).

<sup>38</sup> Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases, OJ L 77, 27.3.1996.

<sup>39</sup> *Fixtures Marketing Ltd v. Oy Veikkaus Ab*, C-46/02, ECLI:EU:C:2004:694; *Fixtures Marketing Ltd v. Svenska Spel Ab*, C-338/02, ECLI:EU:C:2004:696; *British Horseracing Board Ltd v. William Hill*, C-203/02, ECLI:EU:C:2004:695 and *Fixtures Marketing Ltd v. OPAP*, C-444/02, ECLI:EU:C:2004:695.

<sup>40</sup> Commission Staff Working Document. Evaluation of Directive 96/9/EC on the legal protection of databases, SWD(2018) 146, 25.04.2018, p. 36.

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proposed Data Act<sup>41</sup> (see more below) states that sui generis protection does not apply to databases containing data obtained from or generated by the use of a product or a related service (e.g., sensors, machines).

### 3.3. Future legislative developments

On 23 February 2022, the European Commission proposed the European Data Act. The proposed legislation seeks to remove barriers to the circulation of data collected by Internet-of-Things (IoT) products by regulating the rights and obligations of all the economic actors involved. The goal is to increase data availability, create a single market for data that will allow data to flow freely within the EU and across sectors, and facilitate data sharing among various players across all economic sectors, such as business to consumer (B2C), business to business (B2B), and business to government (B2G)<sup>42</sup>.

Overall, the proposal for a European Data Act covers the following main elements:

- mandatory access to data (generated by connected devices, held by those that are subject to data sharing obligations by law) by consumers, businesses and public authorities;
- data sharing when small and medium-sized enterprises (SMEs) are involved; and
- data processing services (switching, international transfer of non-personal data and interoperability).

It is a horizontal piece of legislation, covering different aspects relating to data sharing, ranging from access to data generated by connected devices, mandatory B2G sharing in exceptional circumstances and contractual imbalances in data sharing contracts, to cloud switching, international transfers of non-personal data or interoperability.

Considering the highly sensitive topic and the discussion on the type of data that should be covered, EU lawmakers settled for non-personal data collected by IoT products, excluding any data that results from the processing and inferring of 'complex proprietary algorithms', which for instance, combine metrics from different sensors<sup>43</sup>.

In May 2022, the European Commission proposed the first Regulation on a data space: the regulation on the European Health Data Space (EHDS Regulation)<sup>44</sup>. This data space and the Regulation will cover personal (e.g., patients' data) and non-personal data (e.g., pathogen data). It will allow competent bodies within the EU to link health datasets, expand primary use of health data (e.g., for patients' care) and promote secondary use of data for innovation, scientific and policy-making purposes. Non-personal data seem to be especially relevant for secondary use, based on the types of data considered for it in Article 33 EHDS Regulation.

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<sup>41</sup> Communication from the Commission. Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data, COM(2022) 86, 23.02.2022.

<sup>42</sup> Escribano, B. and Fontanals, S., *The Data Act: new EU rules for data sharing*, EY, 2022, see [https://www.ey.com/en\\_es/law/the-data-act-new-eu-rules-for-data-sharing](https://www.ey.com/en_es/law/the-data-act-new-eu-rules-for-data-sharing).

<sup>43</sup> Bertuzzi, L., 'EU lawmakers formalise position on the Data Act in plenary vote', *Euroactiv*, 14.03.2023, see <https://www.euractiv.com/section/data-privacy/news/eu-lawmakers-formalise-position-on-the-data-act-in-plenary-vote/>.

<sup>44</sup> Proposal for a Regulation of the European Parliament and of the Council on the European Health Data Space, COM(2022)197, 03.05.2022.

Secondary data users may reuse health data only for the purposes listed in Article 34 EHDS Regulation, while certain uses are prohibited (Article 35 EHDS Regulation). The access to health data will be organised via a specially designated national body (or bodies) that shall make publicly available and easily searchable conditions for secondary use of health data (Articles 36-37 EHDS Regulation).

With regard to non-personal data, a few special provisions are included regarding data sharing and transfer. Data holders must ensure unrestricted access to non-personal data for all users through trusted open databases (Article 41 (6) EHDS Regulation). Such trusted open public databases shall have robust, transparent, and sustainable governance arrangements and a transparent model of user access. Non-personal data can be made accessible to users from third countries under certain conditions. Article 62 EHDS Regulation states that all reasonable technical, legal and organisational measures shall be taken to prevent transfer of non-personal data abroad if this would contradict EU law or national law of an EU Member State. Even higher precautions should be taken regarding non-personal data that was created by applying anonymisation techniques, especially if there is a risk of re-identification (Article 61 EHDS Regulation).

## 4. CASE STUDIES

### KEY FINDINGS

- **Standardised data exchange mechanisms** are needed to reduce the costs and complexity of data sharing. This applies to all sectors, but different challenges arise in different sectors (e.g., the large number of different initiatives relating to transport, which is relatively mature regarding data gathering, and the large variety of potential data inputs in manufacturing);
- There is a need to **demonstrate / facilitate the development of use cases** and support the IT knowledge base of companies when it comes to the benefits of utilising data sharing. This is a particular issue for manufacturing where SMEs constitute a large portion of the market;
- The **combination of personal and non-personal data** (and the conversion/anonymisation of personal data) can be challenging and/or costly, and thereby limit engagement in data sharing, in particular for smaller companies, or increase the price for data and thereby limit its use;
- There may be a **risk of exploitation / control over data** in the energy sector by larger companies / monopolies and in transport if major car manufacturers impose a solution on the market. Risks associated with control over essential data have not (yet) been raised as a concern in manufacturing, which is a diverse industry, but could arise as the market matures in areas dominated by large players.

Attention is needed to ensuring **confidentiality and security of data storage** in particular when it comes to platforms which rely on generic cloud infrastructure.

Private companies and public institutions face several **legal uncertainties** regarding access to and use of data, as well as to how and to what extent the GDPR applies when data is disclosed to others.

In this chapter we provide more detail regarding three industrial use cases for data sharing to illustrate the development of non-personal data markets in specific sectors. These cover the transport and mobility sector (see Section 4.1), energy (see Section 4.2 **Error! Reference source not found.**) and manufacturing (see Section 4.3). In each case, we consider (i) the size and evolution of the market, the types of data and use cases involved; (ii) opportunities and challenges; and (iii) measures to facilitate the utilisation of data sharing in the sectors considered.

## 4.1. Case study of the European mobility and transport sector

### 4.1.1. Overview of non-personal data markets in the transport and mobility sector

The transport and mobility sector refers to all industrial branches that facilitate public and private passenger as well as freight transport<sup>45</sup>. In this case study we primarily focus on ground transportation services. The sector is characterised by a multitude of different players and stakeholders. These include among others vehicle manufacturers, mobility and fleet operators, hardware and software developers, connectivity, and data providers as well as government agencies<sup>46</sup>.

In recent years, data use in the industry has evolved significantly due to the growing demand for safer, more efficient, and sustainable mobility. Data generation and use in the sector has also been stimulated by progress towards increasingly connected modes of transportation and the proliferation of user devices equipped with a variety of embedded sensors and trackers as well as decreasing costs of data storage, improved computing power, ubiquitous wireless connectivity and the development and application of AI and Big Data analytics that enable the collection, transmission, storage and processing of a constant stream of data<sup>47</sup>. In 2022, the value of the data economy in the mobility sector has been estimated to amount to some €18.79 billion<sup>48</sup>. By 2025, this is forecast to expand to €24.78 billion. Overall, the data economy in the transport and mobility sector is one of the five fastest growing, overtaking sectors such as education, construction, and agriculture<sup>49</sup>.

The data required and collected in the sector is diverse and largely depends on the player or the service and business model being deployed. In general, data can be divided into dynamic and static data.

<sup>45</sup> Cornet, A., Mohr, D., Weig, F., Zerlin, B., Hein, A.-P., *Mobility of the future – Opportunities for automotive OEMs*. McKinsey & Company, 2012, [https://www.mckinsey.com/~media/mckinsey/dotcom/client\\_service/automotive%20and%20assembly/pdfs/mobility\\_of\\_the\\_future\\_brochure.ashx](https://www.mckinsey.com/~media/mckinsey/dotcom/client_service/automotive%20and%20assembly/pdfs/mobility_of_the_future_brochure.ashx); Fujitsu, *Mobility Industry Grows as Service-Oriented Business*, Fujitsu Blog, 2020, <https://corporate-blog.global.fujitsu.com/fgb/2020-06-09/mobility-industry-grows-as-service-oriented-business/>; Remane, G., Hanelt, A., Hildebrandt, B. and Kolbe, L. M., *Changes in Digital Business Model Types – A Longitudinal Study of Technology Startups from the Mobility Sector*, AMCIS 2016 Proceedings, 23, 2016.

<sup>46</sup> Neckermann, L., *Out-Of-This-World Valuations? It's Just A New Mobility Universe*, Neckermann Strategic Advisors, 2023, <https://www.neckermann.net/2020/08/03/out-of-this-world-valuations-its-just-a-new-mobility-universe/>.

<sup>47</sup> Wehde, A., *Data trusts in the mobility sector*. Copenhagen Legal / Tech Lab blog, <https://legaltechlab.sites.ku.dk/2022/06/15/data-trusts-in-the-mobility-sector-alexander-wehde/>, 2022; European Environmental Agency, 2022, *Transport and environment report 2022, Digitalisation in the mobility system: challenges and opportunities*, 2022, <https://www.eea.europa.eu/publications/transport-and-environment-report-2022/transport-and-environment-report/view>; Remane, G., Hildebrandt, B., Hanelt, A. and Kolbe L. M., *Discovering New Digital Business Model Types – A Study Of Technology Startups From The Mobility Sector*, PACIS 2016 Proceedings, 289; Torre-Bastida, A. I., Del Ser, Ja., Laña, I., Ildardi, M., Bilbao, M. N. and Campos-Cordobés, S., '2018, Big Data for transportation and mobility: recent advances, trends and challenges', *IET Intelligent Transport Systems*, 12 (8), 2018, pp. 742-755; European Commission, *Key technologies to boost the digitalisation of transport*, 2022, see <https://digital-strategy.ec.europa.eu/en/policies/technologies-digitalisation-transport>.

<sup>48</sup> Glennon, M., Kolding, M., Sundbland, M., La Croce, C., Micheletti, G., Raczko, N., Freitas, L., Moise, C. and Osimo, D., *European Data Market Study 2021-2023 – D2.4 Second Report on Facts and Figures*, Study for the European Commission, IDC, Lisbon Council, 2022, <https://digital-strategy.ec.europa.eu/en/library/results-new-european-data-market-study-2021-2023>.

<sup>49</sup> Ibid.

According to Article 2 (6) of Regulation (EU) 2022/670, dynamic data “means data that change often or on a regular basis”<sup>50</sup>. Thus, dynamic data refers to, for instance, data that depict the movement of various means of transportation and people and are often collected by the numerous sensors installed in vehicles, and other means of transportation or users' devices (e.g. mobile phone network data, Global Navigation Satellite System (GNSS) location data like e.g. Global Positioning System data, Bluetooth data)<sup>51</sup>. One notable example is Google's tracking data. According to Canzler & Knie (2023), Google's data in itself should provide an accurate portrayal of traffic flows and may even provide a precise depiction of individual mobility behaviour<sup>52</sup>.

Since movement data in general is considered personal data in its raw form, it must be anonymised and aggregated for data protection reasons which will result in some utility loss. Nevertheless, it is possible to derive detailed mobility patterns that are useful for various purposes - for example, for the development of intermodal mobility services or for the planning of transportation routes and infrastructures. The potential of and therefore demand for movement data is correspondingly high, as was also evident from the interviews with experts<sup>53</sup>.

Other, slightly less dynamic data provide information about temporary events such as accidents, obstacles, traffic jams, temporary slippery roads, etc.<sup>54</sup> Static data, however, “means data that do not change often or on a regular basis” (Art 2 (5) Regulation (EU) 2022/670<sup>55</sup>). These categories of data include, but are not limited to, street signs, road conditions and layout, parking, fuelling and charging stations, or public transportation timetable information.

Most of the data mentioned so far originate from the mobility sector, however there are also other data emerging that have an impact on mobility and transport but originate from other sources that are not directly related to the sector<sup>56</sup>. One example is social media data<sup>57</sup>.

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<sup>50</sup> Commission Delegated Regulation (EU) No 2022/670 of 2 February 2022 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide real-time traffic information services, OJ L 122, 25.4.2022.

<sup>51</sup> Canzler, W. and Knie, A., *The Future of Mobility – Winners and Losers and New Options in the Public Space*, Discussion Paper, SP III 2023-601, WZB Berlin Social Science Center, Germany, 2023; Mahajan, V., Kuehnel, N., Intzevidou, A., Cantelmo, G., Moeckel, R. and Antoniou, C., 'Data to the people: a review of public and proprietary data for transport models', *Transport Reviews*, 42 (2), 2022, pp. 415-440.

<sup>52</sup> Canzler, W. and Knie, A. (2023), op cit.

<sup>53</sup> We conducted interviews with three experts in the mobility sector primarily from academia and research. See also Kapp, A., *Collection, usage and privacy of mobility data in the enterprise and public administrations*. Proceedings on Privacy Enhancing Technologies 4, 2022, pp. 440-456; Canzler, W. and Knie, A. (2023) op cit.

<sup>54</sup> KPMG, *Automotive Data Sharing*, 2022. Co-financed by the Connecting Europe Facility of the European Union, Statens vegvesen.

<sup>55</sup> Commission Delegated Regulation (EU) No 2022/670 of 2 February 2022 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide real-time traffic information services, OJ L 122, 25.4.2022.

<sup>56</sup> Vlassenroot, S., Valgaeren, K. and Defreyne, P., *A mobility and transport data warehouse for Belgium: Meta-analyses on different aspects concerning the development of a data warehouses*, 22nd IST World Congress, Bordeaux, France, 2015, [https://www.researchgate.net/publication/287214786\\_A\\_mobility\\_and\\_transport\\_data\\_warehouse\\_for\\_Belgium\\_Meta-analyses\\_on\\_different\\_aspects\\_concerning\\_the\\_development\\_of\\_a\\_data\\_warehouses](https://www.researchgate.net/publication/287214786_A_mobility_and_transport_data_warehouse_for_Belgium_Meta-analyses_on_different_aspects_concerning_the_development_of_a_data_warehouses).

<sup>57</sup> Grant-Muller, S. M., Gal-Tzur, A., Minkov, E., Nocera, S., Kuflik, T. and Shoor, I., 'Enhancing transport data collection through social media sources: methods, challenges and opportunities for textual data', *IET Intelligent Transport Systems*, 9(4), 2015, pp. 407-417.



Not all the data that are collected in or are useful for the mobility sector are freely accessible. For example, data held by private entities may either be inaccessible to others or only made available in return for payment.

According to Mahajan et al. (2022), and an interviewed expert, such data, if sold, are often not affordable for everyone<sup>58</sup>. Nevertheless, there is also data that are made available free of charge either on a voluntary basis or due to legal obligations. The former are data provided free of charge by private companies, usually under specific licenses or with restrictions on use. The same analysis mentions Uber Movement data or data retrieved from Google's Directions API<sup>59</sup>. The latter derive from regulations such as the EU Regulation (EU) No. 886/2013<sup>60</sup> for safety-related traffic information, which regulate what data road operators and service providers must collect and share free of charge. Both public and private road operators and service providers are required by the regulation to share information on the following categories through individual and national access points and in accordance with data protection requirements: Temporary slippery road; Animal, people, obstacle, debris; Unprotected accident area; Short-term road works; Reduced visibility; Wrong-way driver; Unmanaged blockage of road; Exceptional weather conditions.

Alongside this, there is open data. For example, every country in the EU provides NAPs (National Access Points) that allow access to and exchange of mobility-related data under the ITS Directive<sup>61</sup>. However, there are differences between countries regarding the data that are available via NAPs. While all EU countries must provide static mobility data, each country is free to choose whether to provide dynamic mobility data as well<sup>62</sup>. The Annual NAP Report 2020 published by the European ITS Platform indicates that some data shared through NAPS are of poor quality<sup>63</sup>. The limited usability of this data is also stressed by one of the interviewed experts. Open data generally tends to lack usability<sup>64</sup>.

There are a number of European initiatives and projects in place with varying scopes, which can relate to specific use cases, or to the entire sector. These include among others the Mobility Data Space (Germany), iSHARE (Netherlands), and Smart Otaniemi (Finland)<sup>65</sup>. PrepDSpace4Mobility which is founded by the European Union also inventories and maps existing data ecosystems that

<sup>58</sup> Mahajan, V., Kuehnel, N., Intzevidou, A., Cantelmo, G., Moeckel, R. and Antoniou, C., (2022), op cit.

<sup>59</sup> Ibid.

<sup>60</sup> Commission Delegated Regulation (EU) No 886/2013 of 15 May 2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users, OJ L 247, 18.9.2013.

<sup>61</sup> National Access Points' list available at: <https://transport.ec.europa.eu/system/files/2022-11/its-national-access-points.pdf>.

<sup>62</sup> Schneider, P. and Koska, T., *Mobility Data for a Just Transition: The Case for Multimodal Platforms and Data-Driven Transportation Planning*, Policy Paper, Heinrich Böll Stiftung, Wuppertal Institut, 2023, <https://www.boell.de/en/2023/06/13/mobility-data-just-transition>.

<sup>63</sup> EU-EIP, 2021, Annual NAP Report 2020. A2 - Working Group NAP Monitoring & Harmonisation of National Access Points in Europe, <https://www.its-platform.eu/wp-content/uploads/ITS-Platform/AchievementsDocuments/NAP/EU%20EIP%20-%20National%20Access%20Points%20-%20annual%20report%202020.pdf>.

<sup>64</sup> Mahajan, V., Kuehnel, N., Intzevidou, A., Cantelmo, G., Moeckel, R. and Antoniou, C. (2022) op cit.

<sup>65</sup> Mertens, C., *Report - Workshop on the common European mobility data space*, European Commission, 2021, see [https://www.opendei.eu/wp-content/uploads/2022/03/REPORT\\_mobility\\_data\\_space\\_workshop\\_20211202\\_ETThimQr3s8IIITuXWq8i6aen\\_82314-1.pdf](https://www.opendei.eu/wp-content/uploads/2022/03/REPORT_mobility_data_space_workshop_20211202_ETThimQr3s8IIITuXWq8i6aen_82314-1.pdf).



collect and share mobility data across Europe. At present, they have already identified several hundred data ecosystems<sup>66</sup>.

#### 4.1.2. Opportunities and challenges associated with non-personal data

Access to and usage of data between the various players within the transport and mobility sector is an important prerequisite to support improved and new business models and mobility services. Use cases address urgent challenges such as increasing traffic congestion, the inefficient use of assets and infrastructures, and the need to reduce environmental impact<sup>67</sup>. The exchange of data can, for example, **foster environmentally friendly multimodal mobility**. It can also **improve the monitoring, planning and usage of infrastructure and resources in cities**<sup>68</sup>. According to a working paper from 2019, having data on passenger flow might allow for a more optimised allocation of vehicles, increasing their utilisation as well as tailoring timetables to the actual needs of users<sup>69</sup>. **Road and vehicle safety can be improved** as well when vehicle sensor data is shared between traffic participants, manufacturers and public institutions<sup>70</sup>. Ultimately, access to and usage of mobility data can **accelerate the development of autonomous vehicles**, for which a lot of training data is needed<sup>71</sup>. These are just a few of the many examples where data can contribute to pushing the mobility sector to the next level.

Approximately 57,791 data user companies and 218 data supplier companies were recorded in the transport and mobility sector for the year 2022<sup>72</sup>. The number of data providers increased significantly between 2021 and 2022, by around 38%<sup>73</sup>. In addition to numerous start-ups that have emerged in this sector, established companies such as BMW or Mercedes-Benz are also transforming their business models and offering services such as car sharing (ShareNow), cab services (FreeNow), parking services (ParkNow) and intermodal mobility platforms (moovel)<sup>74</sup>.

<sup>66</sup> Data Ecosystems Inventory available at <https://mobilitydataspace-csa.eu/inventory/>.

<sup>67</sup> European Environmental Agency, *Transport and environment report 2022 Digitalisation in the mobility system: challenges and opportunities*, 2022, see <https://www.eea.europa.eu/publications/transport-and-environment-report-2022/transport-and-environment-report/view>; Nur, K. and Gammons, T., 'The benefits of accessing transport data to support intelligent mobility,' in Coppola, P. and Esztergár-Kiss, D., *Autonomous Vehicles and Future Mobility*, Elsevier, 2019, pp. 93-111; World Economic Forum, *Designing a Seamless Integrated Mobility System (SIMSystem) - A Manifesto for Transforming Passenger and Goods Mobility*. White Paper, 2018,:

[https://www3.weforum.org/docs/Designing SIMSystem Manifesto Transforming Passenger Goods Mobility.pdf](https://www3.weforum.org/docs/Designing_SIMSystem_Manifesto_Transforming_Passenger_Goods_Mobility.pdf); Mertens, C. (2021), op cit.

<sup>68</sup> Mertens, C. (2021), op cit; Commission Staff Working Document accompanying the Communication from the Commission, Sustainable and Smart Mobility Strategy – putting European transport on track for the future, SWD (2020) 331, 09.12.2020, [https://www.opendei.eu/wp-content/uploads/2022/03/REPORT\\_mobility\\_data\\_space\\_workshop\\_20211202\\_ETThimQr3s8IIITuXWg8i6aenE\\_82314-1.pdf](https://www.opendei.eu/wp-content/uploads/2022/03/REPORT_mobility_data_space_workshop_20211202_ETThimQr3s8IIITuXWg8i6aenE_82314-1.pdf)

<sup>69</sup> Noussan, M., *Effects of the Digital Transition in Passenger Transport – an Analysis of Energy Consumption Scenarios in Europe*, Working Paper, Fondazione Eni Enrico Mattei, 2019, see [https://www.researchgate.net/publication/332339425\\_Effects\\_of\\_the\\_Digital\\_Transition\\_in\\_Passenger\\_Transport\\_-\\_An\\_Analysis\\_of\\_Energy\\_Consumption\\_Scenarios\\_in\\_Europe](https://www.researchgate.net/publication/332339425_Effects_of_the_Digital_Transition_in_Passenger_Transport_-_An_Analysis_of_Energy_Consumption_Scenarios_in_Europe).

<sup>70</sup> Mertens, C., (2021), op cit.

<sup>71</sup> Wehde, A. (2022), op cit.

<sup>72</sup> Glennon, M. et al (2022), op cit.

<sup>73</sup> Ibid.

<sup>74</sup> Remane, G., Hildebrandt, B., Hanelt, A. and Kolbe L. M., *Discovering New Digital Business Model Types – A Study Of Technology Startups From The Mobility Sector*, PACIS 2016 Proceedings, 289, 2016; Remane, G, Hanelt, A., Hildebrandt, B. and Kolbe L. M.,

In addition, major players from other sectors have entered the market, such as Google with its real-time navigation service (Google Maps), or other players such as Meta, Amazon or Microsoft that have invested in or acquired mobility services<sup>75</sup>.

There are three main types of **barriers** to data usability and access, which are strongly interrelated and mutually reinforcing. These are legal, technological, and economical barriers<sup>76</sup>. The legal barriers result from the rights and obligations that holders of personal and commercially sensitive data are subject to. A substantial proportion of data required in the transport and mobility sector is personal. However, these are subject to strict protection under the law. Personal data can only be processed and disclosed to third parties in a permanently anonymised and aggregated manner, considering the possibility that personal data could be strongly or irreversibly de-identified it will be thus no longer considered personal<sup>77</sup>. However, the process of anonymising mobility data is inherently challenging, and the risk of re-identification remains, especially as machine learning and AI technologies continue to advance<sup>78</sup>. In addition, aggregation and anonymisation can compromise the usefulness of the data. There is a trade-off between providing sufficient aggregation to protect privacy and maintaining sufficient level of granularity to ensure that the data remain useful<sup>79</sup>. This trade-off was also pointed out by interviewees.

In addition to the aforementioned technical problem of adequately anonymising and aggregating personal data, interoperability and portability, as well as the lack of standardisation in these areas, are key challenges for the exchange of any type of data. The transport and mobility sector consists of a variety of actors, all collecting data with different units of analysis, scales of measurement, time scales, etc.<sup>80</sup>. This inconsistency makes it difficult to aggregate data from different sources<sup>81</sup>. An agreement on common standards within the sector is needed to enable sharing of data. Even if widespread data collection and sharing is achieved, the lack of relevant skills in less tech-savvy companies and public institutions in analysing large amounts of data constitutes an obstacle preventing utilisation of the data available<sup>82</sup>. It is worth noting that the demand for data professionals remains high<sup>83</sup>.

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*Changes in Digital Business Model Types – A Longitudinal Study of Technology Startups from the Mobility Sector*, AMCIS 2016 Proceedings, 23, 2016.

<sup>75</sup> Remane, G; Hanelt, A.; Hildebrandt, B. & Kolbe L. M. (2016), op cit; CBInsights, *How Big Tech Is Tackling Auto & Mobility*, 2021, <https://www.cbinsights.com/research/facebook-amazon-microsoft-google-apple-auto-mobility/>.

<sup>76</sup> Fia, T., 'An Alternative to Data Ownership: Managing Access to Non-Personal Data through the Commons', *Global Jurist* 21:1, 2021, pp. 181-210; Mertens, C., (2021) op cit.

<sup>77</sup> International Transport Forum, *Reporting Mobility Data Good Governance Principles and Practices*, 2022, [https://www.oecd-ilibrary.org/transport/reporting-mobility-data\\_b988f411-en](https://www.oecd-ilibrary.org/transport/reporting-mobility-data_b988f411-en); Finck, M. and Pallas, F., 'They who must not be identified - distinguishing personal from non-personal data under the GDPR', *International Data Privacy Law*, 10(1), 2020, pp. 11-36; Metzger, A., *Digitale Mobilität – Verträge über Nutzerdaten*, Working Paper Series, Humboldt-Universität zu Berlin, 2019, <https://www.rewi.hu-berlin.de/de/lf/oe/rdt/pub/working-paper-no-1>.

<sup>78</sup> International Transport Forum (2022), op cit; D'Agostino, M., Pellaton, P. and Brown, A., 'Mobility Data Sharing: Challenges and Policy Recommendations', *UC Davis*, Issue Paper, 2019, <https://escholarship.org/uc/item/4gw8g9ms>.

<sup>79</sup> Kapp, A., *Collection, usage and privacy of mobility data in the enterprise and public administrations*. Proceedings on Privacy Enhancing Technologies, 2022 (4), pp. 440-456; D'Agostino, M., Pellaton, P. and Brown, A. (2019), op cit.

<sup>80</sup> Mertens, C. (2021), op cit; D'Agostino, M., Pellaton, P. and Brown, A. (2019), op cit.

<sup>81</sup> D'Agostino, M., Pellaton, P. and Brown, A. (2019), op cit.

<sup>82</sup> Ibid.; Mertens, C. (2021), op cit.

<sup>83</sup> Glennon, M. et al (2022), op cit.

Regarding rail transport, a recent development has taken place in Germany.

The Bundeskartellamt (i.e., Federal Cartel Office, Germany's national competition regulatory agency) has found that Deutsche Bahn AG (DB) has violated competition law by abusing its market power in relation to mobility platforms<sup>84</sup>.

DB has been ordered to change certain practices and contractual clauses, considering that the company's clauses are anti-competitive (i.e., more specifically, the advertising bans, vertical price specifications, far-reaching bans on discounts, and the withholding of a commission for carrying out the payment process have been highlighted as problematic elements). DB has also denied mobility platforms continuous and non-discriminatory real-time access to all the traffic data controlled by DB. Based on minimum competition-law standards, the Bundeskartellamt has imposed measures on DB to resolve the situation. Mobility platforms will be able to use DB-specific terms for online and app-store advertising without contractual restrictions, compensating mobility service providers for booking and payment processes, and supplementing rules for real-time data provision.

Economic concerns might arise when companies compete for the same users. If these companies were required to make their data available, each could investigate its main competitor's data and potentially gain a competitive advantage<sup>85</sup>. In order to convince organisations that compete to share some of their data voluntarily, it is necessary for there to be clear benefits to each party<sup>86</sup>. They must also be aware of potential use cases. The interviewees also point out that getting data into a format in which it can be used intuitively is costly and time-consuming for organisations. This is due in part to the lack of standards and makes private organisations more reluctant to provide access to data without adequate compensation<sup>87</sup>. Last but not least, personal and commercially sensitive data can become targets of cybercrime. As such, data can become a financial liability. Secure spaces and infrastructure are critical for the use and exchange of data.

#### 4.1.3. Measures to facilitate further development

In order to drive development in the mobility sector forward, the prevailing challenges need to be addressed. For example, **standardisation measures** are needed as they can help to reduce the costs and complexity of data sharing. In addition to the lack of conformity among private companies, the numerous EU-wide initiatives related to mobility data sharing are also employing different architecture models and standards. However, there are currently efforts by several open data initiatives trying to promote interoperability across initiatives<sup>88</sup>. Furthermore, the Commission is empowered (Articles 28-29 of the draft Data Act) if need be, to task European Standards Organisations to develop interoperability and portability standards that meet specified criteria, and to oblige operators of data spaces providers of data processing services to use

<sup>84</sup> Bundeskartellamt, *Open markets for digital mobility services – Deutsche Bahn must end restrictions of competition*, 2023, see [https://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2023/28\\_06\\_2023\\_DB\\_Mobilitaet.html](https://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2023/28_06_2023_DB_Mobilitaet.html).

<sup>85</sup> D'Agostino, M., Pellaton, P. and Brown, A. (2019), op cit.

<sup>86</sup> Mertens, C. (2021), op cit.

<sup>87</sup> D'Agostino, M., Pellaton, P. and Brown, A. (2019), op cit.

<sup>88</sup> Mertens, C. (2021), op cit.

standards that have been officially published. Harmonised and commonly accepted solutions to govern data exchange could promote stakeholder willingness to share data<sup>89</sup>.

In addition, legal uncertainties should be addressed. Private companies and public institutions face several legal uncertainties regarding access to and use of data, as well as to how and to what extent the GDPR applies when data are disclosed to others<sup>90</sup>. This has also been stressed by the interviewed experts and named by the European Commission as one of the drivers for the insufficient availability of data in the European economy in general<sup>91</sup>.

Ultimately, the value of using and sharing data should be communicated to businesses in a transparent way and through precise use cases. It would also be useful to strengthen the IT skills and knowledge of staff in relevant positions to derive value from data.

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<sup>89</sup> Dress, H., Kubitzka, D. O., Lipp, J., Pretzsch, S. and Langdon, C. S., *Mobility Data Space – First Implementation and Business Opportunities*. 27<sup>th</sup> ITS World Congress, Hamburg, Germany, 2021, see [https://www.researchgate.net/publication/351519610\\_Mobility\\_Data\\_Space\\_-\\_First\\_Implementation\\_and\\_Business\\_Opportunities](https://www.researchgate.net/publication/351519610_Mobility_Data_Space_-_First_Implementation_and_Business_Opportunities).

<sup>90</sup> Finck, M. and Mueller, M.-S., 'Access to Data for Environmental Purposes: Setting the Scene and Evaluating Recent Changes in EU Data Law', *Journal of Environmental Law*, 35, 2023, pp. 109–131.

<sup>91</sup> Communication from the Commission. Proposal for a Regulation of the European parliament and of the Council on harmonised rules on fair access to and use of data, COM(2022) 86, 23.02.2022; Commission Staff Working Document, Impact Assessment Report Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act), SWD/2022/34, 23.2.2022.

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## 4.2. Case study of the European energy sector

### 4.2.1. Overview of non-personal data markets in the energy sector

The European energy sector is a dynamic sector that is characterised by a **large number of agents and stakeholders**. These include energy producers, distributors, regulators, and technology providers on the supply side. Energy is also an indispensable input for nearly all commercial and personal activities worldwide, making the consumption side and interconnections with other sectors vital. Large energy providers play an important role in supporting other industries and making these more efficient. The energy sector's issues and data use cases therefore cannot be viewed in isolation, as they are intricately linked to the broader economy, environment, and society at large through use cases such as e-mobility, production scheduling or predictive maintenance.

Over time, data usage within the sector has experienced significant development due to technological advancements, digitalisation, and the growing demand for efficient and sustainable energy systems. The energy sector collects its own data through various sources, such as production facilities and monitoring devices. It also relies on third-party data from government agencies, market operators, weather services, and research institutions. The volumes and value of data generated in the sector are substantial due to the scale of operations and infrastructure involved. According to a report published by Allied Market Research, the use of big data in the energy sector generated \$9.51 billion in 2021, and is projected to reach \$36.76 billion by 2031, growing at a CAGR of 14.6% from 2022 to 2031<sup>92</sup>. However, at the disaggregate level, the field is very heterogeneous with different forms and types of data platforms, data marketplaces, data hubs and more. At this micro level, tangible numbers are not readily accessible or publicly available.

**Energy producers** are responsible for generating energy from various sources like fossil fuels, nuclear power, and renewables (such as solar, wind, hydro, biomass). These companies collect and analyse data to optimise their production processes, forecast energy demand, manage energy portfolios, and monitor the performance of their energy assets<sup>93</sup>.

**Energy distributors**, also known as grid operators or transmission system operators, play a crucial role in the transmission and distribution of energy across networks. These entities utilise data to ensure the reliable and efficient operation of the grid, manage congestion, balance supply and demand, and plan network expansions. They collect data on energy flows, grid conditions, and system stability to make informed decisions.

**Energy consumers** encompass households, businesses, and other entities that consume energy. With advancements like smart meters and IoT devices, consumers also have the potential to become more active participants in the energy sector.

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<sup>92</sup> Beesetty, Y. et al., *Big Data Analytics in Energy Market*, 2022, see <https://www.alliedmarketresearch.com/big-data-analytics-in-energy-market-A16980>.

<sup>93</sup> See e.g. Goncalves, C., Pinson, P. and Bessa, R. J., 'Towards data markets in renewable energy forecasting', *IEEE Transactions on Sustainable Energy*, 12(1), 2020, pp. 533-542.

They can use data to monitor and manage their energy consumption, optimise efficiency, and reduce costs. Real-time data collection and feedback empower consumers to make informed choices about their energy usage. Both interviewed experts<sup>94</sup> highlighted private households as an important potential growth area that could yield significant improvements in the overall energy system. Applications such as e-mobility, power-to-heat and rooftop solar add instances of flexible loads, storage capacities and even energy production, i.e., input, to the energy system and can thereby contribute to the decentralisation of the sector with more and more renewable energy assets and applications<sup>95</sup>.

**Regulatory bodies** at national and supranational levels also have a significant impact on the energy sector as a whole and on data collection and usage in particular. They collect and analyse data to monitor compliance with regulations, ensure fair competition, and promote energy market integration. Regulatory data includes market prices, capacity levels, network performance, and environmental data.

**Technology providers** develop and supply energy-related technologies such as smart grids, energy storage systems, advanced analytics platforms, and energy management software. These providers leverage data to design and optimise their products, improve energy efficiency, and enable the integration of renewable energy sources.

While some data, such as market prices, are widely shared and publicly available, other data, like infrastructure details or customer-specific information, are subject to stricter regulations, national security and privacy considerations. Within the area of data markets, different parties address different facets of the market ranging from data aggregation, data preparation and analysis, to actual data exchange in the form of data sharing or data marketplaces. The following table presents a collection of relevant examples of data platforms for the energy sector. However, most of these are still in their early stages of implementation and have not reached widespread usage, i.e., they are not yet extensively used in the day-to-day operations of the energy industry. According to the experts interviewed for this case study, the most relevant sources for third-party data are still traditional market data providers such as Bloomberg, as well as weather/meteorological data.

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<sup>94</sup> We are grateful to Antonello Monti (RWTH Aachen University) and Pierre Pinson (Imperial College London) for their valuable insights.

<sup>95</sup> See also Berkhout, V., Frey, C., Hertweck, P., Nestle, D., and Wickert, M., 'Energy Data Space', in *Designing Data Spaces: The Ecosystem Approach to Competitive Advantage*, Cham: Springer International Publishing, 2022, pp. 329-341.

Table 4: Types and examples of energy data platforms

Type	Name
Data exchange architectures	GAIA-X, IDS (International Data Spaces), EDA (Energy Data Exchange Austria), EDEF (Energy Data Exchange Framework in the Netherlands), OPEN DEI, FIWARE, Estfeed, Data Bridge Alliance, CIM Power System
Data hubs	Central Market System (CMS) aka ATRIA, Norway ElHub (Electricity Hub), Nord Pool, EPEX SPOT, ENTSO-E Transparency Platform, Open data repositories from DSOs (e. g. EDP in Portugal, ENEDIS in France)
Data marketplaces	Snowflake, re.alto, ElectriCChain
Data platforms	BD4NRG, BD4OPEM, PLATOON, SYNERGY

Source: Authors' own compilation, partly based on Lampathaki et al. (2022).

#### 4.2.2. Opportunities and challenges associated with non-personal data

Leveraging non-personal data can generally enable more efficient energy systems, improved asset management, and optimised energy generation and consumption. By harnessing the power of data analytics, energy companies can enhance operational performance, reduce costs, and enhance sustainability. Furthermore, non-personal data facilitates the integration of renewable energy sources into the grid, aiding the transition towards a decarbonised energy system. Data-driven insights enable better forecasting of renewable energy generation, management of intermittent energy supply, and the development of innovative solutions for energy storage and demand response. By fostering collaboration and standardisation to improve data sharing and interoperability through respective data strategies and legislation (cf. Chapter 3), Europe can become a leading force in particular with respect to data-driven energy innovation and the development of cross-border energy data markets.

However, access to high-quality and diverse data sources, along with the necessary computational and analytical capabilities, can be a challenge for smaller companies<sup>96</sup>. In the energy sector, barriers to entry in non-personal/industrial data markets and data exchange are exacerbated by the complexity and diversity of monitoring data generated from various types of equipment. Public operators may face challenges in sharing and using data due to a lack of standardisation and interoperability between different data systems, which is a particular challenge in this sector. The low data value density resulting from a significant amount of redundant data generated, e.g., due to reporting obligations at and from different sides of the value chain, can also make it difficult for both public and private operators to extract useful information. Private operators may also face high costs for data acquisition and management, which can be particularly challenging for smaller players. Access to data held by public operators or large monopolists may be limited due to the market structure and critical nature of the industry, further restricting the amount of available data and the ability to compete.

<sup>96</sup> See e.g. Bhattarai, B. P., Paudyal, S., Luo, Y., Mohanpurkar, M., Cheung, K., Tonkoski, R., and Zhang, X., 'Big data analytics in smart grids: state-of-the-art, challenges, opportunities, and future directions', *IET Smart Grid*, 2(2), 2019, pp. 141-154.



This may lead to a concentration of data ownership and the dominance of a few major players in the market.

The issue of mixed data sets and unclear boundaries between personal and non-personal data (see Section 5.2.4.) is particularly relevant in the energy sector. According to the interviewed experts, the most critical area for potential improvement and progress lies in the optimisation of energy usage through the utilisation of data from households. Another area of heterogeneity and a potential barrier stems from the varying national energy frameworks. One interviewee mentioned the example of the legal ownership of data collected at the household level which depends on the national legal framework. Here, the energy retailer, individuals themselves, or the system operator may be designated as the data owner, depending on the respective country.

#### 4.2.3. Measures to facilitate further development

Data models play a foundational role in facilitating B2B data exchange within the digital energy system's infrastructure, which comprises various devices, including appliances, electric vehicles, heating systems, heat pumps, and solar panels from different stakeholders.

However, as in many other sectors, the energy sector is subject to challenges with a lack of willingness to share data, a lack of consistency in data and legal issues relating to mixed data sets that make it difficult to achieve the degree of data exchange needed.

Improving standards and supporting data portability and interoperability in this space will be important in enabling smaller players to enter the market and compete with larger incumbents and to drive competition and innovation in this area, e.g., through new data platforms or innovative data-driven consumer services<sup>97</sup>.

While data owners, both consumers and businesses, should ideally be enabled and properly incentivised to share their data<sup>98</sup>, data sharing mandates may be necessary in certain cases, while considering proportionality on a case-by-case basis. For example, regulators could require energy companies to share data on their production costs, which would help to promote transparency and facilitate competition in the electricity market. Similarly, policymakers could require data sharing between grid operators and energy storage providers, which would help to promote the integration of renewable energy sources and improve the reliability of the grid. Data governance frameworks defining rights, responsibilities, and accountability, along with data trusts or cooperative models, enable secure sharing while protecting privacy.

According to the interviewed experts, a clear regulatory supporting framework will be crucial to enable data sharing in the energy sector, and to avoid the kind of power imbalances that currently exist in the consumer platform economy. While several initiatives and working groups (e.g. see

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<sup>97</sup> Dognini, A., Challagonda, C., Moro, E. M., Helmholtz, K., Madsen, H., Daniele, L., Schmitt, L., Temal, L., Genest, O., Calvez, P., Ebrahimi, R., Riemenschneider, R., Böhm, R., and Abbas, S. B., *Data Spaces for Energy, Home and Mobility*, RWTH Aachen University, 2022, see <https://doi.org/10.5281/zenodo.7193318>.

<sup>98</sup> Deutsche Energie-Agentur – the German Energy Agency (dena), *Die Datenökonomie in der Energiewirtschaft*, 2022, see <https://www.dena.de/newsroom/meldungen/2022/dena-analyse-datenoekonomie-in-der-energiewirtschaft/>.



Table 4) have already tried to propose solutions and steps towards improving data sharing, there is a risk that such actions may be dispersed and fragmented.

Particular focus will therefore need to be given to aligning the different stages of the energy sector and related sectors, including mobility (cf. 4.1). In 2022, the European Union initiated an "Action Plan"<sup>99</sup> aimed at digitalising the energy system with multiple objectives, including to promote connectivity and interoperability. The interviewed experts considered this Action Plan as the currently most relevant initiative within the sector.

Ensuring privacy and data protection while extracting value from, in particular but not limited to, mixed datasets could also benefit from guidelines on data protection, consent, anonymisation, and aggregation techniques. One interviewee also highlighted the continued need to improve digital literacy and awareness. Promoting awareness and understanding of non-personal data's potential benefits in the energy sector is crucial. Experimentation through pilot projects helps identify effective data-driven approaches, building expertise in non-personal data utilisation. Integrating social sciences and public consultation is key to addressing concerns and fostering trust when it comes to mixed or re-personalisable data sets. Improving digital literacy, especially among citizens and young people, empowers informed decision-making on data sharing and participation in data-driven initiatives.

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<sup>99</sup> Commission Staff Working Document accompanying the Communication from the Commission, *Digitalising the energy system - EU action plan*, SWD(2022) 341, 18.10.2022.

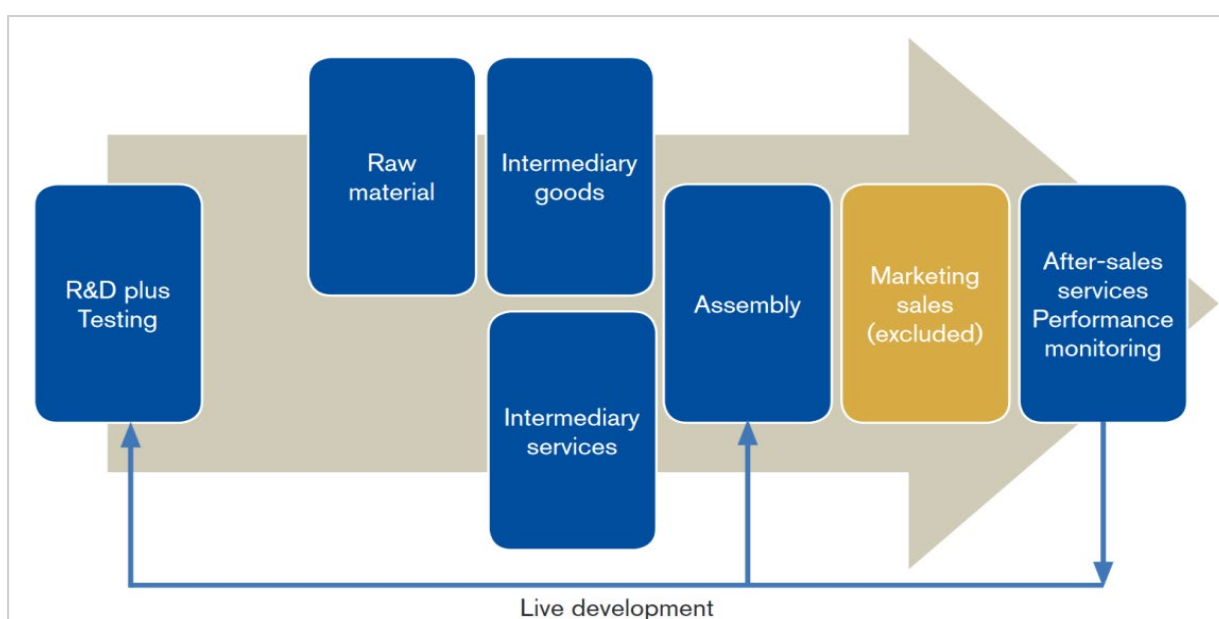
### 4.3. Case study of the European manufacturing market

#### 4.3.1. Overview of non-personal data markets in the manufacturing sector

Non-personal data on elements such as goods produced, production costs, components and suppliers, and energy consumed is required for automation processes when manufacturing physical goods. The potential to share and analyse such data can make a significant contribution to productivity in manufacturing by helping companies to optimise the utilisation of equipment and streamline overall production processes, as well as providing flexibility and increasing resilience against supply chain issues. The use of non-personal data in manufacturing is also essential to provide traceability and transparency on the components suppliers used.

Traditionally, manufacturing companies focused first on the data available within their company to optimise their own processes and their interaction with suppliers and customers (as illustrated in Figure 2).

Figure 2: Digitisation of manufacturing



Source: Kommerskollegium, *No Transfer, No Production – a Report on Cross-border Data Transfers, Global Value Chains, and the Production of Goods*, Stockholm: Kommerskollegium National Board of Trade of Sweden, 2015.

However, the importance of external data has increased and as noted in a 2018 study for the EU Commission<sup>100</sup>, **modern industry is a platform-based business** in which sectors or manufacturers establish their own technical solutions for data and information exchange. Data-driven industrial production is also referred to as Industry 4.0 in Germany or as the Industrial Internet Consortium in the US.

<sup>100</sup> Barbero, M., Cocoru, D., Graux, H., Hillebrand, A., Linz, F., Osimo, D., Siede, A. and Wauters, P., *Study on emerging issues of data ownership, interoperability, (re-) usability and access to data, and liability*, Final Report for the European Commission by Deloitte et al, Publications Office of the European Union, 2018, DOI: 10.2759/781960.

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According to the Second Report of the European Data Market monitoring tool<sup>101</sup>, the overall data market value in Europe is estimated to be around €73 billion in 2022 growing to €98.5 billion in 2025 and to €116.5 billion in 2030 (baseline scenario). The part for the 'Mining & Manufacturing' sector is estimated to be around €20.5 billion in 2025 which is around 21% of the overall European data market and second largest after Finance with just above 21%. This share is forecast to remain stable in the years to 2030 with an absolute growth of around 3%.

A majority of European manufacturing companies can be categorised as SMEs, many of which collect their own data in order to determine what production plans are the most efficient. Many of the manufacturing companies use Enterprise Resource Planning (ERP) systems from players such as SAP, which contain enormous amounts of non-personal data. However, according to interviewees, relatively few EU companies are actively engaged in data sharing.

As consequence, the number of European data suppliers in manufacturing is reported by the European Data Market study<sup>102</sup> to be relatively low (0,1% of all EU companies in 2025 or 692,114 companies), which may reflect limited involvement from the large number of SMEs. The number of data users in this segment is higher but remained at just 3.4% in 2025 of all EU companies. Researchers expect an increase for 2025/2030 in the proportion of companies using data of between 2.3% and 10%<sup>103</sup>. A more optimistic view is presented in a 2020 white paper from World Economic Forum and Boston Consulting Group which reports that nearly 75% of manufacturing managers which provided information for the study (likely larger firms) are considering data sharing over the complete value chain to improve their operations<sup>104</sup>. They list as main application domains for data sharing in manufacturing: enhanced asset optimisation, tracking, and tracing along the value chain to optimise the overall production process and to increase transparency on the inputs used.

Interviews with stakeholders in the manufacturing industry<sup>105</sup> highlight the importance of data related to operational control of machines used in factories. This data is **used to improve the overall equipment effectiveness**, which is a combination of machine and process efficiency. Product quality data is also important to collect because identifying linkages between machine data and quality data can support **machine learning models** that help to predict product quality, reduce scrap rates, improve ramp-up and automatically readjust process parameters. Non-personal data can also be used for **value chain optimisation** and to **develop new products and services**.

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<sup>101</sup> Glennon, M. et al (2022), op cit.

<sup>102</sup> Ibid.

<sup>103</sup> Ibid.

<sup>104</sup> WEF and BCG, *Share to Gain: Unlocking Data Value in Manufacturing*, 2020, <https://www.weforum.org/whitepapers/share-to-gain-unlocking-data-value-in-manufacturing>.

<sup>105</sup> We have spoken with representatives from German research institute Fraunhofer IOSB in Karlsruhe and technology initiative SmartFactory in Kaiserslautern.

Interviewees highlighted the following examples of new services that are being enabled by data sharing in the manufacturing sector:

- **Machine producers offer value added services** (for a monthly subscription) based on analysed data from companies using their machines (for example advising what is the optimal maintenance schedule considering a usage profile). In addition, a new business model 'pay what you use' is being tried, which requires usage data as well. This is however not the same as reselling the data; and
- "Manufacturing as a service" is developing with upcoming **online platforms for production orders**. As is done for instance by Xometry in the USA (3D printing of parts, sheet metal production, ship making production like drilling, milling, turning, etc.), Instawerk in Germany or Haizol in China. Customers upload their production order including 3D-geometry specifications onto one of these platforms, and the platform then selects the optimal supplier for the production order among the more than 4000 manufacturing companies. Platforms can also be involved in the financing of machines for their suppliers. These platforms create advantages for both customers and manufacturing suppliers by shortening the search time for customers and enabling a stable order portfolio for suppliers.

Similar new business models are also emerging in the automotive sector. One example is the outsourced car body press shop, a factory owned by Schuler & MunichRe, which is used by Porsche and others to remove capital intensive assets from their balance sheet<sup>106</sup>.

#### 4.3.2. Opportunities and challenges associated with non-personal data

Interviewees noted the following **opportunities for growth** that could be achieved if the market for non-personal data in manufacturing is exploited to its full potential:

- **Improvements in equipment efficiency and related process efficiency**: Such efficiencies could counteract the increasing shortage of skilled workers in Europe;
- The development of several '**use cases' based on non-personal data** such as the calculation of CO<sub>2</sub> footprint per product along the supply chain, as well as improvements in resilience due to better supplier management, traceability and the so called 'digital product passport', which provides detailed process and product data. Shared data can also enable applications that would otherwise not be possible<sup>107</sup>; and
- **Faster and more localised supply chains** (within 100 km) to counteract the challenge of reliance on non-European supplies. This could lower the CO<sub>2</sub> footprint as well as bringing back production to Europe.

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<sup>106</sup> Porsche, Schuler and Porsche establish joint venture for car body parts, 2018, see <https://newsroom.porsche.com/en/company/porsche-schuler-ag-joint-venture-smart-press-shop-body-parts-automation-press-systems-sports-car-production-future-16035.html>.

<sup>107</sup> WEF and BCG (2020), op cit.

As regards knock-on effects, a large study among US production companies<sup>108</sup> found that predictive analytics was the key driver of productivity gains from 2010 to 2015 with data-driven decision-making being linked to improvements in revenue-based productivity between 4 and 8%. Likewise, IDC's 2022 Data Management Survey<sup>109</sup> found that organisations with a high level of data intelligence experienced 40% higher financial improvements and 20% higher operational improvements in the last year than organisations with a low level of data intelligence.

IDC also credits data sharing with the potential to foster the emergence of hybrid (physical-digital) working models, and boost consumer digital demand, as well as supporting the digital industry ecosystem, and new digital business models.

As described before, interviewees note that there are a number of **factors that impede the development of markets for non-personal data** in the field of manufacturing:

- **Lack of IT knowledge** required to enable (secure) exchange of production data among industry actors. This can be particularly acute amongst SMEs which make up the majority of manufacturing companies, as they have limited personnel and focus on specific knowledge areas rather than on IT;
- **A lack of interoperability** between the different systems used to steer the machines in factories. For example, interviewees note that data mapping can be an issue. They note that standards have been developed for newer machines such as OPC UA, but capital-intensive production assets have a long depreciation time (15 years), which means that it may take time for these machines to enter into circulation;
- **A lack of acceptance of standards.** Standardisation has been developed for so called 'connectors', which are application programmable interfaces between manufacturing programs and dataspace linked to GAIA-X. These connectors standardise the administrative layer for non-personal data for certain standard processes. However, it can be a challenge to achieve buy-in to these connectors from the sector;
- **Questions around data ownership and confidentiality:** There are questions around what happens with the large amounts of data collected and the confidentiality of technical information when it is uploaded onto platforms which run on general cloud infrastructure. Questions also arise regarding the ownership of machine data, when certain functions are outsourced e.g. by a car manufacturer to a factory; and
- **Limited control over data usage.** Currently, if companies share data via a dataspace, there may be limited control regarding who uses it and where the data is transmitted. Control over usage is crucial to gain the trust of the industry and in relation to European data sovereignty as currently certain data spaces/ manufacturing platforms use general IT/ cloud infrastructure. GAIA-X related data spaces already have a system with personal ID and credential check via the data clearing house.

<sup>108</sup> Brynjolfsson, E. and McElheran, K., *Data in Action: Data-Driven Decision Making and Predictive Analytics in U.S. Manufacturing*, Rotman School of Management Working Paper No. 3422397, 2019, <http://dx.doi.org/10.2139/ssrn.3422397>.

<sup>109</sup> IDC, 2022, European Industry Acceleration Survey (n = 1,500).

In addition, WIK Consult (2020) notes that “The collection of and the exclusive control over specific data by some firms may give rise to competition concerns in terms of access to data (barriers to entry), but data as such is worthless if firms are unable to **extract knowledge** that they can use to improve and/or monetize their products and services. Thus, **data quality is a key competitive resource**”<sup>110</sup>.

From a wider geopolitical perspective, IDC et al. (2023)<sup>111</sup> also point out that industrial data sharing can raise threats to cybersecurity or provide insights to hostile third countries.

Interviewees have observed that the manufacturing market has a large number of players and do not consider that any are dominant. Although certain large ERP (enterprise resource planning software) suppliers like SAP are heavily involved in data collection, they do not control the data.

Looking at the automotive sector specifically, there are a few large players in the German market which have sought to gain acceptance of their Catena-X platform<sup>112</sup>. However, it is yet to be seen whether small and medium sized manufacturing companies accept this operating company for their domain.

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<sup>110</sup> WIK Consult, *European Data Economy: Between Competition and Regulation-Final Report*, 2020, paragraph 4.2.

<sup>111</sup> IDC and the Lisbon Council, *European Data Market study 2021-2023 - D2.5 Second report on policy conclusions*, 2023, see <https://ec.europa.eu/newsroom/dae/redirection/document/96294>.

<sup>112</sup> Catena-X has now a separate operating company (“Cofinity-X”) providing basic services to run the dataspace and in the future also the industrial app store.

### 4.3.3. Measures to facilitate further development

In the EU, there have been initiatives on so called 'data spaces' for the manufacturing sector, which aim to bring together companies holding and using data, to agree on data sharing and related rules for managing and controlling data, and to encourage industrial software providers to support the agreed data formats and semantics<sup>113</sup>. It is expected that GAIA-X will play an important role in establishing secure data spaces for sharing data in this context. In Germany, this has been complemented by initiatives like SmartFactory-X and Manufacturing-X<sup>114</sup>.

From the interviews it appears that the main message for politicians is to continue supporting existing initiatives such as GAIA-X and related ecosystems including specific manufacturing dataspace, standardisation, and initiatives such as digital product passports as these initiatives take time to mature and will likely fail if subsidies and/or support are withdrawn too early.

From a practical perspective, the manufacturing sector needs measures which address the challenges described before:

- **More use cases** to demonstrate to the owners of manufacturing companies that sharing non personal / machine related data can lead to a win-win situation. For example, the German organisation VDMA organises initiatives to convince entrepreneurs that data sharing is the way forward. Energy consumption and CO<sub>2</sub> emissions are such use cases which have underpinned the ongoing cooperation between Japan and other countries on sharing of machine related data;
- **Confidentiality issues:** The confidentiality of technical information to be uploaded on "manufacturing as a service" platforms which run on general cloud infrastructure has been raised as an issue. Interviewees note that more secure data spaces based on GAIA-X might be beneficial and that regulation in this respect might assist. In addition, some data may be competitively neutral, while other data may be competitively sensitive. A clear distinction will be needed in order to drive coherent policy; and
- **Semantic interoperability issues:** Exchanging data could be facilitated by providing for semantic interoperability in the context of data spaces. In Germany so called 'Administrative layers' have been developed which standardise the semantic level (which data field has which meaning) and data suppliers have to ensure that their input is in this format. This could help to avoid problems inherent with platforms like 'Adamos' and 'Axoom' which failed in part because they follow a proprietary approach.

**The IT knowledge-base of manufacturing companies, especially SMEs, should be strengthened** to enable (secure) exchange of production data. Even when standardised connectors/dataspace are used, the firms that contribute data still need to ensure that the input provided to dataspace is in a certain data format.

<sup>113</sup> See 6.1. Common European industrial (manufacturing) data space, Commission Staff Working Document on Common European Data Spaces, SWD(2022) 45, 23.02.2022.

<sup>114</sup> Follow-up of KoPa35c of which Catena-X is the lighthouse project.

From a higher-level geopolitical perspective, IDC et al. (2023)<sup>115</sup> also note that:

- An EU approach which preserves European values while allowing market-based freedom of action would provide a good balance between the US light approach and China's centralised approach; and
- The regulatory approach should keep the door open to technological innovation and support SMEs, which can benefit more from the opportunities offered by AI than well-established large companies<sup>116</sup>.

There is a need for the EU to position itself in the global sphere. The EU faces the choice of whether to act as a close ally to one side or the other (the US or China) in each major technological sphere, or as balancing between sides, which could enhance its global prominence.

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<sup>115</sup> IDC and the Lisbon Council (2023), op cit.

<sup>116</sup> A recently leaked Google memo about the future of AI details the astonishing progress being made in AI by small firms, which fiercely challenges the long-held assumption that AI would be dominated by a few, well-established and financially powerful big companies. See 'What does a leaked Google memo reveal about the future of AI?', *the Economist*, 2023, see <https://www.economist.com/leaders/2023/05/11/what-does-a-leaked-google-memo-reveal-about-the-future-of-ai>.



## 5. OPPORTUNITIES AND BARRIERS TO NON-PERSONAL DATA SHARING

### KEY FINDINGS

- Harvesting the benefit of non-personal data sharing will offer tangible opportunities for different stakeholders and the EU, ranging from economic growth to facilitating the green transition;
- The lack of commercial incentives, uncertainties surrounding the sharing of non-personal data, and the limited availability of data in machine-readable format are preventing a broader uptake and sharing of non-personal data;
- Other issues, for example resulting from mixed datasets, or anti-competitive practices and low data literacy in EU MS should also be addressed to ensure fair and inclusive opportunities for the society and EU economic operators.

### 5.1. Opportunities available for different stakeholders and the EU

Socio-economic opportunities for the EU have been clearly identified in the case studies and also well-researched in scholarly and other work<sup>117</sup>. It is worth highlighting the five major ones:

- **Facilitating the green transition:** Non-personal data can play a key role in facilitating the green transition by enabling the development of sustainable solutions and reducing the environmental impact of various sectors and industries (e.g., predicting weather patterns);
- **Ensuring our way of life and data privacy:** Separating personal data from non-personal data is expected to support a more transparent use of data, thus ultimately protecting individuals' privacy since it provides guidelines on what can be considered as non-personal vs. personal data;
- **Improving public services:** Non-personal data can be used to improve public services, such as education, healthcare, and transportation (e.g., optimising public transportation routes);

<sup>117</sup> Frontier Economics, *Beyond Personal Data: The Cost of Data Flow Restrictions to EU Companies*, 2020, <https://research.cccanet.org/reports/beyond-personal-data-cost-data-flow-restrictions-eu-companies/>; Martens, B., de Streeel, A., Graef, I., Tombal, T., Duch-Brown, N., *Business to business data sharing: an economic and legal analysis*, Digital Economy Working Paper 2020-05, European Commission, Seville, 2020, JRC121336, available at <https://joint-research-centre.ec.europa.eu/system/files/2020-07/jrc121336.pdf>; United Nations Conference on Trade and Development, *How to make data work for the 2030 Agenda for Sustainable Development*, Note by the UNCTAD secretariat, 2023, available at [https://unctad.org/system/files/official-document/tdb\\_e6d2\\_en.pdf](https://unctad.org/system/files/official-document/tdb_e6d2_en.pdf); Feasey, R., de Streeel, A., *Data sharing for digital markets contestability towards a governance framework*, CERRE, 2020, available at [https://cerre.eu/wp-content/uploads/2020/09/CERRE\\_Data-sharing-for-digital-markets-contestability-towards-a-governance-framework\\_September2020.pdf](https://cerre.eu/wp-content/uploads/2020/09/CERRE_Data-sharing-for-digital-markets-contestability-towards-a-governance-framework_September2020.pdf); European Parliament, *Boosting data sharing in the EU: what are the benefits?*, 2022, available at <https://www.europarl.europa.eu/news/en/headlines/society/20220331STO26411/boosting-data-sharing-in-the-eu-what-are-the-benefits>.

- **Fostering economic growth:** As highlighted in the previous section, non-personal data will contribute to economic growth (e.g., creating new jobs, developing new market and business opportunities, and increasing productivity); and
- **Enhancing research and innovation:** Non-personal data can be used to inform research and innovation in various fields, such as medicine, science, and technology (e.g., optimise crop yields, and improve agriculture sustainability).

## Box 1: An international market for non-personal data?

Sharing of non-personal data internationally with non-EU/EEA countries could potentially be beneficial for many of the same reasons as sharing of non-personal data within the EU, but it is less common, and poses any number of additional challenges.

A number of EU strategy documents and proposed legislative measures already note the potential benefits. For health data, for instance, there would be obvious benefits in sharing non-personal public health data (so-called secondary usage of health data) with other countries and regions including the United States, and the Commission's proposed Regulation for a European Health Data Space already envisions the possibility that "third countries or international organisations may become authorised participants" if they comply with basic EU rules, and if they provide reciprocal access to their own data (Article 52 of the proposed EHDS Regulation). In previous work for the Parliament, we specifically suggested that common EU data standards "might benefit from work that is already ongoing to create an International Patient Summary (IPS) based on the current version of [the Fast Healthcare Interoperability Resources (FHIR)] in order to have a basic set of data definitions that would be minimal and non-exhaustive, but still clinically relevant"<sup>118</sup>.

Finance is another area where the DGA has proposed to implement an EU Data Space, and another area where international cooperation could bring obvious benefits. In its Digital Finance Strategy document, the Commission committed "to continue working closely with our international partners, since the benefits of digital finance are best harnessed if their deployment is based on international principles and standards"<sup>119</sup>.

Unfortunately, many of the same factors that make it challenging to achieve sharing of non-personal data within the EU would be even more challenging in an international context. We would particularly highlight issues (1) with incentives, (2) with mixed datasets that may contain some personal data, and (3) with standards.

As far as incentives, we have noted throughout that many firms within the EU will not be motivated to contribute non-personal data, notably in cases where they believe that exclusive possession of the data confers competitive advantage. If it is challenging either to create sufficient incentives in the EU, or to create an obligation to contribute data in justified cases, it would be even harder for the EU to ensure that third countries do so for data contributed to EU data spaces.

Datasets that may contain some personal data, or for which anonymisation has not been totally effective, already pose a huge challenge for data sharing within the EU. This is true even though personal data can in principle be exchanged freely among EU/EEA countries (or third countries to which the EU has granted an adequacy decision, which is currently the case for the United States, United Kingdom, Japan, and a few others), provided that GDPR rules are complied with in addition to any relevant jurisprudence of the Court of Justice of the EU.

<sup>118</sup> Marcus et al. (2022).

<sup>119</sup> European Commission (2020).

Transfers of third country personal data into the EU are not restricted by EU law, but most transfers of EU personal data to third countries that do not already enjoy an adequacy decision will be prohibited in practice due to uncertainty about national security practices in the third country in light of the Schrems II decision<sup>120, 121</sup>.

Standards compliance already poses particular challenges within the EU in cases where different Member States or different stakeholders have implemented different, mutually incompatible standards. It is difficult to ignore the sunk investments in existing software and systems. The likelihood of this being the case between the EU and various non-EU/EEA third countries becomes that much higher.

## 5.2. Overview of barriers to entry to non-personal data markets

Notwithstanding the legal and policy initiatives currently in place at the EU level, the case studies and scholarly and other research point to a number of practical impediments to the free flow of ostensibly non-personal data. When it comes to non-personal data, there are currently no requirements in place to ensure even a basic level of data portability, even for widely utilised online services like cloud hosting providers. This is primarily due to the technical complexities and costs associated with implementing data portability, as different providers of similar services may store data in varying formats and structures. However, there are a number of provisions in the Data Act that seek to deal with this issue (e.g., mandating the European Standardisation Organisations to create European (harmonised) standards).

The subsections below discuss the identified barriers to entry to data markets in more detail.

### 5.2.1. Lack of commercial incentives

The organisations that hold the non-personal data of interest do so to satisfy their own business needs. In many cases, the non-personal data that they hold is viewed as providing commercial advantage relative to competitors. There can thus often be a clear commercial disincentive to making the non-personal data available to other firms, some of whom may be competitors. If the data holder firm could charge a price for the data that was sufficient to offset the cost of business that might be lost, it might still be motivated to make the data available; in many cases, however, this is impractical for some quite obvious reasons.

At the same time, providing the data is not costless, and in many cases is accompanied by possible legal risks, as we explain in the sub-sections that follow. For some firms, the reciprocal right to access the data of their competitors might make it worthwhile to share their data. We conjecture however that this is not the case for most large, incumbent firms. Taking all of this into account, we expect that a great many companies would not be inclined to share their data.

<sup>120</sup> Judgment of the Court of Justice of 16 July 2020, *Data Protection Commissioner v Facebook Ireland and Maximillian Schrems*, C-311/18, ECLI:EU:C:2020:559.

<sup>121</sup> Marcus (2020).

Doing so would tend to be associated with costs and risks that cannot be recovered in most cases.

The draft EHDS Regulation seeks to solve this problem by making the sharing of certain health data obligatory; however, the regulation is not yet implemented, and equivalent obligations or other solutions are not yet in place for other sectors.

### 5.2.2. Direct costs of sharing non-personal data and uncertainties

There might be a temptation to assume that, for a firm that is already collecting digital data, the cost of making it available to others is negligible. We do not believe that this is the case in practice. Aside from probably not very substantial costs of transmitting the data, there is a probably substantial cost to transform the data into an agreed-on data format for data sharing. In the general case, it is unlikely that data that was captured solely with internal use in mind will comply with whatever standards an industry sector might subsequently choose for data interchange. If a company's data happen through good luck to approximate the format required for interchange, then the costs might be modest; in the case that seems more likely to us, the cost of transforming the semantics of the data into a common format might be substantial.

In some cases, it might be necessary to manually code or re-code some of the data.

The process of creating sectoral standards for this data sharing (and then enforcing their use) is essential. This has been visible in the health sector, where the 2011 directive on the application of patients' rights in cross-border healthcare (the CBHC Directive)<sup>122</sup> only recommended but did not mandate using a standard for exchanging electronic health records<sup>123</sup> so as to ensure interoperability, with the result that not all Member States adopted the standard, which led to inability in practice to exchange data among market players in the Member States<sup>124</sup>.

The process of creating sectoral standards for data sharing is thus essential, but it is itself non-trivial. Sectoral experts will not necessarily know in advance exactly which data are likely to have value to multiple participants in the sector, and the needs of different market participants are likely to be very different. In the health data sector, this process has already been under way for many years, notably in the form of Horizon projects, but it is still far from complete<sup>125</sup>.

In addition, it is important to recall that the costs of data sharing are not limited to one-time costs. Data must be updated when circumstances change. Errors must be corrected. The organisation would need to do this anyway in order to use the data itself, but the cost of propagating changes in shared data will be in addition to any that would have been associated solely with the organisation's use of the data for its own purposes.

<sup>122</sup> Directive 2011/24/EU of the European Parliament and of the Council of 9 March 2011 on the application of patients' rights in cross-border healthcare, see <http://data.europa.eu/eli/dir/2011/24/oj>.

<sup>123</sup> Brynjolfsson, E., Hitt, Lorin M. and Kim, H. H., *Strength in Numbers: How Does Data-Driven Decisionmaking Affect Firm Performance?*, 2011, SSRN, see <https://ssrn.com/abstract=1819486> or <http://dx.doi.org/10.2139/ssrn.1819486>.

<sup>124</sup> *ibid.*

<sup>125</sup> European Commission, *A European strategy for data*, 19 February 2020, COM(2020) 66 final, see <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0066>.

Making the data available to third parties may broaden the opportunities to gain unauthorised access to the data, and may create new attack vectors beyond those that would have been available if the data were solely used internally. The degree to which this is a concern will vary greatly with the nature of the data being shared and with other specific circumstances, but the concern should not be underestimated.

Finally, a firm that chooses to provide data risks being subject to legal or regulatory penalties if it makes a mistake in doing so. For many companies, the easy decision is to avoid the risk by refusing to make data available, even if that implies ignoring some small rewards that might be associated with making the data available.

### 5.2.3. Limited data availability in machine readable format

The availability of data in machine readable format is a major barrier to entry. Many sectors are not fully digitised, meaning that their data is not yet available in digital format (e.g., construction, agriculture, some areas of public administration like customs, migration, and law enforcement)<sup>126</sup>.

In addition, some enterprises are reluctant to participate in the sharing and exchange of data due to competitiveness. The data generated within them may contain trade secrets or other sensitive information and enterprises may cite the potential presence of personal data within their data sets as a reason not to publish their data. There is also a lack of standardisation of data across the industry-data ecosystem and within organisations. Data exchange is only valuable if the data from different sources can be integrated by all potential data users. A lack of a common usage or storage model prohibits data exchange by willing participants. A large skilled workforce of data literate persons is required to develop a data-sharing infrastructure. Depending on the organisation, the value assigned to different types of data will vary. Data that may be valuable to one organisation may be of very little concern to another. This greatly diminishes an organisation's motivation to implement work power to standardise this seemingly unvaluable data for the purpose of data sharing and availability. This leads to fragmentation in the availability of data and reduces the value of the data market. Therefore a framework of data categories must be developed and provided to organisations on data sharing to better understand the value of the data they may possess, as well as the development of voluntary standards for shared data.

### 5.2.4. Specific challenges arising from mixed data sets in industrial environments

A mixed dataset contains both personal and non-personal data,<sup>127</sup> which represents a challenge for the market players that want to use them. Different legal regimes apply to the different types of data in such datasets. As explained in Article 2 (2) of the Regulation on the free flow of data, that Regulation applies exclusively to the non-personal data within a mixed dataset, while the GDPR applies to the personal data.

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<sup>126</sup> Stolton, S., 'Construction: The least digitised sector in Europe', *Euractiv*, 2019, see <https://www.euractiv.com/section/digital/news/construction-the-least-digitised-sector-in-europe/>; EIB – European Investment Bank, Who is prepared for the new digital age?, 2019, see <https://www.eib.org/en/publications-research/economics/surveys-data/eibis-digitalisation-report.htm>.

<sup>127</sup> See Section 2.2 of Communication from the Commission. Guidance on the Regulation on a framework for the free flow of non-personal data in the European Union, COM(2019)250, 29.05.2019.

In practice, distinguishing or separating the different parts of a dataset is challenging (and the dataset might lose its usefulness or value if the two were somehow to be separated). In such cases, when personal and non-personal data are "inextricably linked," the entire mixed dataset is subject to the full scope of the GDPR, even if personal data represents only a small portion of a mixed dataset<sup>128</sup>.

Considering that many datasets likely fall into the category of mixed datasets (in particular, because many datasets may contain a small portion of personal data), companies may find themselves in possession of significant amounts of data that they are unable or unwilling to share. Some companies, particularly smaller ones, may opt to err on the side of caution and refrain from sharing data when they suspect insufficient anonymisation or the presence of personal data that cannot be filtered out (e.g., due to the lack of expertise or high costs of doing so). Other companies may exploit the potential presence of personal data in datasets as a justification for withholding data from their competitors.

The Parliament's 2021 resolution<sup>129</sup> makes this clear by noting in paragraph 28 that "... personal and non-personal data, such as industrial data, [are] not always separable and can be difficult and costly to separate, with the result being that a large amount of data currently remains unused; recalls, in this context, that data sets in which different types of data are inextricably linked are always treated as personal data, including in cases where the personal data represents only a small part of the data set; urges the Commission and European data protection authorities to provide further guidance on the lawful processing of data and on practices on the utilisation of mixed data sets in industrial environments, while fully respecting the GDPR and Regulation (EU) 2018/1807 ...".

The difficulty of separating personal from non-personal data should not be underestimated. In an interview with a senior Airbus official a few years ago, we were told that they treat all e-mail between their US and EU staff as constituting personal data because it is impractical for them to rigorously distinguish between personal and non-personal data in practice.

As the Parliament's resolution notes, it may be permissible to share aggregated personal data if it has been effectively anonymised<sup>130</sup>; however, anonymisation is tricky, and it is not always fully effective<sup>131</sup>.

The consequences of this situation are similar to the status quo when non-personal data were not shared since the presence of mixed data in large numbers of datasets might largely render

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<sup>128</sup> Ibid.

<sup>129</sup> Escribano, B. and Fontanals, S. *The Data Act: new EU rules for data sharing*, EY, (ey.com), see [https://www.ey.com/en\\_es/law/the-data-act-new-eu-rules-for-data-sharing](https://www.ey.com/en_es/law/the-data-act-new-eu-rules-for-data-sharing).

<sup>130</sup> Bertuzzi, L., 'EU lawmakers formalise position on the Data Act in plenary vote', *Euractiv*, 14.03.2023, see <https://www.euractiv.com/section/data-privacy/news/eu-lawmakers-formalise-position-on-the-data-act-in-plenary-vote/>.

<sup>131</sup> European Commission, Final results of the European Data Market study measuring the size and trends of the EU data economy, 2017, see <https://digital-strategy.ec.europa.eu/en/library/final-results-european-data-market-study-measuring-size-and-trends-eu-data-economy#:~:text=According%20to%20the%20high%20growth%20scenario%2C%20the%20value%20of%20the,%E2%82%AC%20300%20billion%20in%202016>.



ineffective the numerous legislative measures that have been enacted in the hope of enabling sharing of non-personal data.

### 5.2.5. Anti-competitive practices

Anti-competitive practices are another area which could hamper the effective development of non-personal data markets. In the EU, Article 101 of the Treaty on the Functioning of the European Union prohibits anti-competitive agreements that restrict or distort competition within the internal market.

Competition concerns in non-personal data markets include potentially anticompetitive practices such as data hoarding, exclusive contracts, and illegal price discrimination. These practices could limit access to data and prevent smaller players from competing with larger companies. Barriers to entry may also include the high cost of acquiring and managing data, the lack of standardisation and interoperability of data, and the complexity and diversity of data generated from various equipment types. Some market operators may face challenges due to working with multiple stakeholders with different data systems and formats, while other market operators may face limited access to data held by public sector or large monopolists. SMEs may be particularly affected by these barriers to entry, as they may lack the resources and technical expertise to develop and manage data platforms.

The literature regarding anti-competitive issues in the context of industrial data notes that a key question in determining the potential for market power is whether ever-increasing returns to scale exist or whether these diminish when a firm has achieved a sufficiently large amount of data<sup>132</sup>. Returns to scale could in turn lead to increasing market entry barriers or exploitative behaviour, e.g. through charging high fees<sup>133</sup>. In a 2020 study regarding competition and regulation aspects of the European Data Economy, WIK noted that “economies of scale ... also apply to the processing and analysis of industrial data.” They concluded that transparency obligations and unrestricted access to public open data are suitable tools to effectively promote competition in the data economy<sup>134</sup>. Furthermore, according to Schepp & Wambach (2016), Mahnke (2015) and WIK (2020), it is not only the sheer amount of data that has an impact on competition, but also the timeliness of the data and what is done with the data as regards improving products.

High fixed costs for building computing capacity and recruiting and retaining experts for data analysis and other infrastructure lead to a scale effect, as the marginal costs of capturing and analysing additional data are comparatively low<sup>135</sup>.

<sup>132</sup> Lerner, A. V., *The Role of 'Big Data' in Online Platform Competition*, see <http://dx.doi.org/10.2139/ssrn.2482780>; Petit, N., Schrepel, T. *Complexity-minded antitrust*, *J Evol Econ* 33, 541–570 (2023), see <https://doi.org/10.1007/s00191-023-00808-8>.

<sup>133</sup> Krämer, J., and Schnurr, D., 'Big data and digital markets contestability: Theory of harm and data access remedies', *Journal of Competition Law & Economics*, 18(2), 2022, pp. 255-322; Scott Morton, F., Bouvier, P., Esrachi, A., Jullien, B., Katz, R., Kimmelman, G., Melamed, A. D. and Morgenstern, J., *Stigler Committee for the Study of Digital Platforms: Market Structure and Antitrust Subcommittee*, 2019, see <https://research.chicagobooth.edu/-/media/research/stigler/pdfs/digital-platforms---committee-report---stigler-center.pdf>.

<sup>134</sup> Paragraph 4.3.

<sup>135</sup> Ducci, F., *Natural Monopolies in Digital Platform Markets*, Cambridge University Press, 2020.



This represents a value chain perspective, which is subject to technological, legal, and behavioural barriers that can arise not only during the collection phase but also during the storage and analysis of information. The use of big data requires significant investments in research and development, both for the creation of algorithms and for the development of data processing infrastructure. This can lower innovation costs for further application areas by exploiting existing infrastructure, know-how, and (search) algorithms in this form<sup>136</sup>.

Data can serve as an innovative and leverage force for entering new markets. "Enveloping" is one of the leverage strategies that allows market participants to enter markets based on their experience or their reputation. Envelopment strategies can facilitate entry in particular for vertically integrated companies or conglomerates wherever network effects and switching costs create entry barriers for competitors<sup>137</sup>. In addition, the use of data on a large scale enables various efficiency gains (e.g., new types of products) but also might have negative effects on market structure by increasing market entry barriers or by leading to "winner-take-all" situations. Another concern is that large volumes of data could facilitate exploitative behaviour and allow companies to extract more surplus from consumers<sup>138</sup>.

Data-rich companies can also exploit their control of important data sources through discretionary, potentially exploitative, access conditions for competitors and downstream services, in addition to internal use and access restrictions on exclusive data<sup>139</sup>. Due to the non-rivalry nature of data, there is an opportunity to generate additional business value, which can simultaneously protect or even enhance competitive advantages through selective agreement choices<sup>140</sup>. Exploitative access restrictions or conditions can also be enforced through mutual agreements on the exchange of data.

### 5.2.6. Low data literacy

Implementing data sharing entails a range of direct and indirect costs. Implementing data sharing, and capitalising on it once it has been implemented, also depends on the availability of skilled knowledge workers, and these are in short supply today.

The results of the European Data Market Economy study<sup>141</sup> identified 368 000 unfilled data-worker positions in 2022. The skills gap is ever-increasing and is expected to grow to 552 000 by 2030. IDC research has shown that this lack of skills is already having a direct impact on the digital transformation of Europe across sectors.

<sup>136</sup> Krämer, J., and Schnurr, D., 'Big data and digital markets contestability: Theory of harm and data access remedies', *Journal of Competition Law & Economics*, 18(2), 2022, pp. 255-322.

<sup>137</sup> Steffen, N., Wiewiorra, L., and Kroon, P., *Wettbewerb und Regulierung in der Plattform- und Datenökonomie* (No. 481), WIK Diskussionsbeitrag, 2021.

<sup>138</sup> Scott Morton, et al., Stigler Committee for the Study of Digital Platforms: Market Structure and Antitrust Sub-committee, 2019.

<sup>139</sup> Krämer, J., Schnurr, D., and Broughton Micova, S., *The role of data for digital markets contestability: case studies and data access remedies*, Centre on Regulation in Europe asbl (CERRE), 2020, see <https://cerre.eu/publications/data-digital-markets-contestability-case-studies-and-data-access-remedies/>.

<sup>140</sup> Bhargava, H. K., Rubel, O., Altman, E. J., Arora, R., Boehnke, J., Daniels, K., and Pattabhiramaiah, A., 'Platform data strategy', *Marketing Letters*, 31, 2020, pp. 323-334.

<sup>141</sup> European Data Market SMART 2013/0063, see [https://digital-strategy.ec.europa.eu/en/library/final-results-european-data-market-study-measuring-size-and-trends-eu-data-economy#:~:text=According%20to%20the%20high%20growth%20scenario%2C%20the%](https://digital-strategy.ec.europa.eu/en/library/final-results-european-data-market-study-measuring-size-and-trends-eu-data-economy#:~:text=According%20to%20the%20high%20growth%20scenario%2C%20the%20).

IDC also measured the ability of European organisations to develop and implement learning and development initiatives (up-skilling) when it comes to information technology and found that only 6.4% of companies have developed such an approach for the future. Going forward there is a clear need to educate the work force during the university years so they enter the market with the skills needed to support the growth of the European data economy. For the medium term however, a serious lack of data literacy is likely to limit the EU's ability to harness the potential of a free-flowing market for non-personal data. Finally, given the speed at which technology is evolving, there is a growing need for lifelong learning.

### **5.3. Summary of the EU's strengths, weaknesses, opportunities and threats (SWOT) as regards the sharing of non-personal data**

Based on the analysis of the EU non-personal data markets, and the opportunities and barriers identified in this context, a SWOT analysis was conducted. The analysis presented in Table 5 below summarises the status quo of the non-personal data markets and the relevant socio-economic, legal and policy environment and is a preparatory step for the legal and policy recommendations listed in Chapter 6.

Table 5: Summary SWOT regarding sharing of non-personal data

	Positive	Negative
Internal	<p style="text-align: center;"><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• The EU has a strong technology base.</li> <li>• The EU has many trained professionals.</li> <li>• The industrial base in the EU is strong – the shift to services is less pronounced than in some other regions.</li> <li>• The shift to e-government in the EU is relatively strong.</li> <li>• The EU is able and willing to use industrial policy and regulation to achieve its ends.</li> </ul>	<p style="text-align: center;"><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Despite a strong technology base, the EU trails the USA and China in key areas.</li> <li>• The EU does not have the preeminent online platforms or cloud providers.</li> <li>• The EU has does not have enough trained professionals, and there is limited EU competence to fix this.</li> <li>• EU regulation of personal data inhibits data sharing, and non-personal data might not always exclude personal.</li> <li>• Standards for data sharing do not exist, and creating them is challenging.</li> <li>• Many different EU and national laws address data sharing, but they may not be fully mutually compatible (including in terms of compensation models).</li> <li>• Compensation models for data sharing do not necessarily provide enough incentive compared to costs and risks to promote firms to provide data, including (1) loss of exclusive control over commercially valuable data; (2) legal risk, especially where personal data might be mixed in; and (3) direct costs of gathering, curating and sharing data.</li> </ul>
Internal and external	<p style="text-align: center;"><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Modernisation of EU industry leads to even more non-personal data.</li> <li>• Growth of EU e-government leads to even more non-personal data.</li> <li>• Drive the creation of horizontal and sector-specific standards.</li> <li>• Measures at EU or Member State level to address the skills gap (but not in scope for this study).</li> <li>• Create legal certainty for compensation, and ensure that it is adequate for the most important use cases.</li> <li>• Where compensation could never be fully adequate, consider data sharing obligations in justified cases (e.g. health).</li> <li>• Create legal certainty where data may include some personal data.</li> </ul>	<p style="text-align: center;"><b>Threats</b></p> <ul style="list-style-type: none"> <li>• Threats to globalisation challenge our ability to share data, even with like-minded countries.</li> <li>• Growing concentration of online markets where the EU does not lead (cloud, online platforms, etc.).</li> <li>• If overall digitalisation in the EU were to stall, it would also inhibit the growth of availability of non-personal data.</li> <li>• Lack of effective action may be the greatest threat, inasmuch as it might freeze a status quo where too little non-personal data is shared, thus foregoing potential innovation and GDP growth.</li> </ul>

## 6. RECOMMENDATIONS

This chapter discusses possible legislative and policy solutions to address the existing and potential barriers listed in Section 5.2 and to facilitate the further development of non-personal data markets in the EU. The barriers identified are re-grouped into six categories of problems in order to better align them with the available EU policy instruments.

### Addressing insufficient data availability

As discussed above, due to the lag in digitisation, there is less electronic/digital data available in some sectors than in others, and larger companies are typically more digitised than smaller companies. The same applies to certain domains of public administration. The obvious solution to this problem is to increase the pace of digitisation by providing support to the lagging sectors, organisations and companies.

The EU has been diligently working on digitisation for more than a decade. The most recent comprehensive policy – Europe’s Digital Decade<sup>142</sup> – aims to foster digital transformation of businesses and public services by 2030. It is supported by a range of measures for specific sectors, such as energy<sup>143</sup>, mobility<sup>144</sup>, and health<sup>145</sup>, and a strategy to digitise SMEs<sup>146</sup>. Data spaces are in the process of being developed to provide the necessary infrastructure for secure data exchange. It remains to be seen how these measures will be implemented and what fruits they will bear. We recommend that specific concrete action plans and roadmaps as well as monitoring systems be developed for each of these policies, which would enable the European institutions to track progress towards the objectives and to spot problems in time to address them.

**Recommendation:** *Measures to promote digitisation are in place in some sectors (notably transport, energy, and health), but are likely to be needed in other sectors. It is recommended that instruments and tools should be developed for each policy enabling the European institutions to track progress towards the objectives and to identify problems in time to address them.*

### Need for improved data accessibility

Even where electronic/digital data are available, they may be not accessible due to legal uncertainty of data holders related to mixed datasets, unclear data ownership, lack of incentives for data sharing, or uncertainty as to the value of the data, especially compared to the costs of preparing data for sharing.

**Recommendation:** *More needs to be done to provide positive incentives (and to mitigate disincentives) for organisations to share their digitised non-personal data.*

<sup>142</sup> Communications from the Commission, 2030 Digital Compass: the European way for the Digital Decade, COM(2021) 118, 09.03.2021; Decision (EU) 2022/2481 of the European Parliament and of the Council of 14 December 2022 establishing the Digital Decade Policy Programme 2030, OJ L 323, 19.12.2022.

<sup>143</sup> Communication from the Commission, Digitalising the energy system – EU action plan, COM(2022) 552, 18.10.2022.

<sup>144</sup> Communication from the Commission, Sustainable and Smart Mobility Strategy – putting European transport on track for the future, COM(2020) 789, 09.12.2020.

<sup>145</sup> European Commission (2022), Proposal for a Regulation of the European Parliament and of the Council on the European Health Data Space, (COM(2022) 197 final).

<sup>146</sup> Communication from the Commission, An SME Strategy for a sustainable and digital Europe, COM(2020) 103, 10.03.2020.

The issue of mixed datasets needs to be addressed in order to resolve the main constraint, namely that such datasets may be subject to the GDPR regime when even only small amounts of personal data are (potentially) present.

As described in Section 5.2.4, this prevents companies from sharing their data because many datasets are in practice mixed, and personal data often cannot be filtered out and/or anonymised. A solution to this problem could be the introduction of a safe harbour regime for those companies that attempt in good faith, to the best of their technical abilities and following the state of the art, to separate personal data from mixed datasets and to anonymise them. Under such safe harbour regime, the company should not be held liable under the GDPR if it can show that it complied with the existing applicable standards for data quality and anonymisation.

**Recommendation:** *Given that personal data is often mixed in with ostensibly non-personal data, some form of safe harbour is needed in order to protect organisations from legal liability to the extent that they have attempted in good faith to anonymise their data, in line with recognised best practice. Detailed guidance at EU level is likely to be needed.*

To address other issues of concern related to the problem of data accessibility, EU policy-makers should work on creating clear and consistent compensation models for data sharing. This would directly address the issue of the lack of incentives and uncertainties about data value, and this would be applicable irrespective of the data ownership regime existing in national law.

Existing and proposed EU legislation already contains several different compensation models applicable to access to data (e.g. the obligation of gatekeepers to grant access to data in the DMA, versus the open data regime for public sector undertakings in the Open Data Directive). Unfortunately, these various models partially overlap and may even contradict each other in terms of their scope of application. It is necessary to carefully study overlaps and possible contradictions of these compensation models. While it is not feasible to have only one compensation model suitable for all, it is reasonable that compensation models are aligned and consistent with each other based on the objectives of data sharing they pursue (e.g. maximising secondary use of non-personal data versus improving access to data held by dominant undertakings). An investigation into potential overlaps and contradictions between the existing compensation models and into optimal compensation models is beyond the scope of this study, but it should be conducted by the relevant institutions that stand to gain from the results.

**Recommendation:** *In order to ensure legal clarity regarding the compensation that an organisation can expect to receive for sharing its non-personal data, further study is needed. This is due to the numerous distinct EU measures that seek to promote the sharing of personal data, which can lead to overlaps and gaps in the legal framework. Additional measures are likely to be needed in specific, justified cases – either additional compensation, or else obligations to share non-personal data.*

### **Fostering effective data integration**

Lack of interoperability is mainly caused by the lack of common standards related to data classifications and vocabularies, common data elements, formats and other issues. The EU has recognised the problem and has initiated some preparatory work to develop the necessary

standards. In particular, calls for Coordination and Support Actions (CSAs) were issued under Horizon Europe in relation to planned data spaces (see Table 3) and projects already awarded. One of the tasks of such CSAs is to conduct the necessary groundwork for standardisation. Furthermore, under Article 22 DGA, the European Commission is required to adopt delegated acts to establish a rulebook with, among other things, recommendations on relevant interoperability standards. Under Article 29 DGA, the European Commission must establish a European Data Innovation Board that would have a subgroup for technical discussions on standardisation, portability and interoperability. Under Article 30 DGA, the European Data Innovation Board is to advise the European Commission on questions of standardisation.

However, more intensive steps need to be taken to actually achieve the development of the standards that are needed. At the moment, the European Commission cannot request European standardisation organisations to develop the necessary standards. Article 28 of the draft Data Act would change this as regards the data generated by products (IoT): the European Commission would be empowered to issue mandates to the European standardisation organisations that call on them to draft harmonised standards to facilitate interoperability. It is recommended that the European Commission already now starts the preparatory work and consults with the European Data Innovation Board on what standards are required.

Many more standards will be needed. It is important that standards on interoperability more generally and also in application to various sectors that may have special requirements be developed. The European Commission can exercise its powers under Article 8 of the Regulation 1025/2012<sup>147</sup> to adopt an annual Union work programme for European standardisation with strategic priorities, and can include interoperability standards for data in this programme. Consultation with the European Data Innovation Board should be conducted as soon as possible to spell out these strategic standardisation needs.

**Recommendation:** Horizon Europe Coordination and Support Actions (CSAs) alone are not likely to ensure (1) that the stakeholders actually agree on usable standards, and (2) that they actually implement the standards that have been agreed on. The relevant provisions of the Data Act appear to provide a useful model of standardisation that could potentially be applied on a much broader scale.

## Cybersecurity

Cybersecurity remains a problematic issue for all digitised industry. Concerns about cybersecurity are raised regularly by various stakeholders, but the risks vary from sector to sector, depending on the types and value of the data transferred or processed and on the status of the industry (i.e. whether it constitutes critical infrastructure or not).

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<sup>147</sup> Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation, amending Council Directives 89/686/EEC and 93/15/EEC and Directives 94/9/EC, 94/25/EC, 95/16/EC, 97/23/EC, 98/34/EC, 2004/22/EC, 2007/23/EC, 2009/23/EC and 2009/105/EC of the European Parliament and of the Council and repealing Council Decision 87/95/EEC and Decision No 1673/2006/EC of the European Parliament and of the Council, OJ L 316, 14.11.2012.

Many instruments at the EU level already address cybersecurity risks in detail (e.g. Cybersecurity Act<sup>148</sup>, NIS Directive<sup>149</sup>), including sector-specific cybersecurity risks (e.g. PSD2).

The case studies that we conducted do not suggest that transfer of non-personal data introduces any new cybersecurity risks that have not been covered by the existing legislation.

It seems that the consistent and effective implementation and application of the existing measures need to be encouraged and monitored. In particular, both data holders and data users should be encouraged to adhere to the existing cybersecurity standards, not least by taking up the EU cybersecurity certification<sup>150</sup>. The European Commission has an opportunity to pass an implementing act making the European Cybersecurity Certification Scheme mandatory (Article 49 of the Cybersecurity Act).

**Recommendation:** *Cybersecurity continues to be a problematic issue for all digitised industry, and is clearly relevant to the sharing of non-personal data; however, we have not identified cybersecurity risks associated with the sharing of non-personal data that have not been covered by the existing legislation. No specific further action is required at this time.*

### Anti-competitive practices

The EU has strong competition law that is being rigorously and effectively applied by the European Commission. Competition law has a general horizontal application meaning that it applies to all sectors and all actors in the same way. It can be applied to any issues raised concerning anti-competitive practices in non-personal data markets. However, data and digital literacy of national competition authorities and national courts needs to be enhanced for an effective and consistent application of competition law rules to the data economy. The increasing importance of non-personal data is only one of many reasons why enforcers need increased data and digital literacy.

In addition, several special instruments were recently adopted (all mentioned in Section 3.3). The DMA aims to curb the market power of dominant digital undertakings and imposes on them certain obligations, including those related to access by competitors to data held by such dominant undertakings. The Platform-to-Business Regulation aims to increase transparency of the digital markets and practices of platforms and includes provisions related to data policies of platforms. Public undertakings that often are former monopolists and are still considered incumbents in their respective sectors are under the obligation to share their data under the open data regime as required by the Open Data Directive.

<sup>148</sup> Regulation (EU) 2019/881 of the European Parliament and of the Council of 17 April 2019 on ENISA (the European Union Agency for Cybersecurity) and on information and communications technology cybersecurity certification and repealing Regulation (EU) No 526/2013, OJ L 151, 07.06.2019.

<sup>149</sup> Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union, OJ L 194, 19.07.2016.

<sup>150</sup> See EU Cybersecurity Certification, see <https://certification.enisa.europa.eu/>; under the European Cybersecurity Certification Scheme, <https://www.enisa.europa.eu/publications/cybersecurity-certification-eucc-candidate-scheme-v1-1.1>.



**Recommendation:** *There is a risk that competition problems could arise as regards the sharing of non-personal data; however, we have not identified threats that cannot be addressed by means of EU competition law in conjunction with the DMA and the Data Act. No specific further action is required at this time.*

### Data literacy

The lack of skilled data specialists and the limited data literacy of employees is already being addressed by the EU within the framework of the Digital Education Action Plan 2021-2027<sup>151</sup> as a part of the European Skills Agenda<sup>152</sup>. Under the Strategic Priority 2 “Enhancing digital skills and competences for the digital transformation”, several actions should help to raise digital literacy, in particular Action 8 to update the European Digital Competence Framework to include data-related skills; Action 9 to develop a European Digital Skills Certificate; Action 10 to adopt a Council Recommendation on the key enabling factors for successful digital education and training<sup>153</sup>; and Action 12 to incentivise the development of advanced digital skills.

However, the measures mentioned are not data-specific (except for Action 8). They target digital skills in general without sufficiently specifying them, and without addressing data-related skills. Therefore, more specific recommendations and guidelines need to be developed for Member States to specifically promote data literacy within digital skills. It is important that the development of data skills is carried out not only in education, but also in vocational training, upskilling and re-training, and also as a part of Principle 1 “Education, training and life-long learning” of the European Pillar of Social Rights<sup>154</sup>.

**Recommendation:** *The lack of skilled data specialists and regulatory staff, and the limited data literacy of employees are over-arching problems that are already addressed to some extent through existing EU and Member State initiatives; however, there is likely to be a need for more focus on data literacy in education, in vocational training, and in up-skilling and re-training.*

<sup>151</sup> Communication from the Commission. Digital Education Action Plan 2021-2027 Resetting education and training for the digital age, COM(2020) 624, 30.09.2020.

<sup>152</sup> Communication from the Commission. European Skills Agenda for sustainable competitiveness, social fairness and resilience, COM(2020) 274, 01.07.2020.

<sup>153</sup> Proposal for a Council Recommendation on the key enabling factors for successful digital education and training, COM(2023) 205, 18.04.2023.

<sup>154</sup> Communication from the Commission, *Establishing a European Pillar of Social Rights*, COM(2017) 250, 26.04.2017.



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The European Union has taken a distinctive stance in facilitating the unrestricted movement of non-personal data, all the while upholding data privacy and security standards. However, there is still a requirement to ensure equitable conditions for data sharing. This research scrutinises the current legal framework within the EU, highlighting persistent obstacles and proposing potential strategies for implementation.

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