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DIVINE - DemonstratIng the Value of agri data sharIng for boostiNg data Economy in agriculture

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Glossary - Acronyms

ADSE	Agricultural Data Space Ecosystem
AI	Artificial Intelligence
Art.	Article
B2G	Business to Government
CAP	Common Agricultural Policy
DMA	Digital Markets Act
DSA	Digital Services Act
EAFRD	European Agricultural Fund for Rural Development
EAGF	European Agricultural Guarantee Fund
EC	European Commission
EEA	European Economic Area
EHDF	European Health Data Space
EU	European Union
EUR	Euro
FAIR	Findable, Accessible, Interoperable, and Reusable
F2F	Farm to Fork
GDP	Gross Domestic Product
GDPR	General Data Protection Regulations
GHG	Greenhouse Gases
GI	Geographic Indication
IACS	Integrated Administration and Control System
IFS	Integrated Farm Statistics
IoT	Internet of Things
IPR	Intellectual Property Rights
MS	Member State
R&I	Research & Investment
SAIO	Statistics on Agriculture Input and Output
SME	Small-Medium Enterprise
SoTA	State of The Art
WP	Work Package

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Executive summary

The following report presents a comprehensive analysis of agri-data-sharing governance models, policies, and regulations, with a specific focus on the legislative system at the European level. The objective is to provide a thorough understanding of the existing regulations and documents that govern data sharing, processing, and treatment within the agricultural sector.

To achieve this objective, a careful examination of the legislative landscape in Europe was conducted. The selected regulations and documents were chosen based on their relevance to the agricultural sector and their significance in defining the rules for data sharing. The analysis includes EU regulations and directives, as well as codes of conduct, EC Communications, and regulation proposals. With respect to the latter, continuous monitoring is crucial, as the proposals examined in this report may undergo changes and modifications during the development of DIVINE's data sharing platform.

By examining the existing agri-data-sharing governance models, policies, and regulations, this report provides valuable insights for DIVINE and other stakeholders in the agricultural sector. Understanding the legal and regulatory landscape allows for informed decision-making and the development of strategies that ensure compliance while maximizing the benefits of data sharing.

Structure

The report will be structured as it follows:

- CHAPTER I will introduce the report, explaining in detail what the purposes of WP6 and specifically 6.1 are as defined in the Grant Agreement, and will give a brief introduction on data governance (what it is, why it is relevant).
- CHAPTER II will introduce the SoTA analysis, and is separated in 5 different sections, each one dealing with a different kind of regulation sector (Section 1 focuses on Agricultural Regulation, Section 2 on Data Regulation, Section 3 on Agri-data Regulation, Section 4 includes all the documents not strictly pertaining to the other sections, and Section 5 includes the analysis of IACS and EHDS).
- CHAPTER III aims at clarifying and analyzing the links among all the documents listed in Chapter II and contains thus a mapping of the texts described. Also, it includes some definitions and key concepts related to (agri) data.
- CHAPTER IV shows a timeline of application of the studied regulation and includes the deadlines DIVINE needs to respect to deliver its reports.
- CHAPTER V analyses similar existing projects and applications exploiting agricultural data.
- Conclusion.
- References.

CHAPTER I - INTRODUCTION

WP6 - Development & integration of agri data sharing governance models, policies and regulations

Work Package 6 (WP6) has the responsibility of various crucial tasks related to data governance models and data sharing policies within agricultural settings in the DIVINE project. The primary objective of WP6 is to conduct a comprehensive analysis of existing approaches and regulatory requirements pertaining to agri data sharing. Furthermore, it aims to develop specific agri data-sharing governance models, policies, and regulations that are aligned with the project's goals. These models and policies will be integrated into the Agricultural Data Sharing Environment (ADSE), and a framework and guideline specifications for adopting agri data policies will be released. Moreover, the WP6 is in charge of assessing and monitoring the impact of the developed and adopted agri data-sharing governance models, policies, and regulations within DIVINE. This evaluation process will help gauge the effectiveness of the implemented measures and ensure their alignment with project objectives.

Task 6.1, which falls under WP6, focuses on analyzing the regulatory requirements related to agri data-sharing governance models, policies, and regulations. This task involves mapping out the current state-of-the-art (SoTA) data governance and data policies in the European Union (EU) and agricultural domains. The aim is to gain a comprehensive understanding of the existing data economy in agriculture, identifying its strengths and weaknesses. The task explores key issues concerning data governance in the digital transformation of agriculture, including the gathering, access, sharing, and utilization of agricultural data among stakeholders.

Data Governance

What is Data Governance?

In the digital age, organisations across various industries are generating and collecting massive amounts of data. This data has become a valuable asset that can drive business insights, enhance decision-making, and improve operational efficiency. However, the increasing volume, variety, and velocity of data also bring challenges related to data management, privacy, security, and compliance. This is where data governance plays a crucial role.

Defining Data Governance:

Data governance refers to the overall management framework, processes, policies, and procedures that govern the collection, storage, usage, quality, and security of data within an organisation. It encompasses the establishment of data-related roles, responsibilities, and accountability, along with the implementation of tools, technologies, and best practices to ensure the effective and ethical use of data[1]. Data governance aims to ensure that data is reliable, accessible, secure, and compliant with legal and regulatory requirements[2].

The Importance of Data Governance:

Data Quality and Consistency	Data governance ensures that data is accurate, consistent, and reliable. It establishes standards, guidelines, and processes for data

[1] https://www.sap.com/products/technology-platform/master-data-governance/what-is-data-governance.html

[2] https://www.ibm.com/topics/data-governance

	validation, cleansing, and enrichment. By maintaining high-quality data, organisations can make better-informed decisions, minimize errors, and improve operational efficiency[3].
Compliance and Risk Management	Data governance helps organisations adhere to regulatory requirements, industry standards, and data protection laws. It establishes policies and controls to ensure data privacy, security, and confidentiality. Compliance with data governance frameworks mitigates the risk of data breaches, legal penalties, reputational damage, and loss of customer trust.
Decision-making and Business Insights	Effective data governance provides a solid foundation for data-driven decision-making. It enables organisations to have a holistic view of data assets, understand data lineage, and ensure data accuracy and relevance. With trusted and well-governed data, organisations can derive meaningful insights, identify trends, and seize business opportunities.
Data Integration and Collaboration	Data governance promotes data integration and collaboration across departments and business units. It breaks down data silos, establishes data-sharing protocols, and encourages cross-functional collaboration. By enabling a unified view of data, organisations can improve communication, foster innovation, and drive efficiency in processes.
Data Security and Privacy	Data governance establishes security controls, access rights, and data protection measures. It helps organisations safeguard sensitive and confidential data, detect and prevent unauthorized access, and respond effectively to data breaches. With data governance, organisations can demonstrate a commitment to data privacy and build trust with customers and stakeholders.
Cost Optimization	Data governance reduces redundant and obsolete data, streamlines data storage, and optimizes data management processes. It minimizes data duplication, reduces storage costs, and improves data retrieval efficiency. By eliminating unnecessary data clutter, organisations can make more effective use of their data infrastructure and resources[4].

For all the above-mentioned reasons, implementing a data governance model in the DIVINE project is crucial. Ensuring compliance with laws and data governance practices, DIVINE can ensure that the project operates within the legal boundaries and safeguards the privacy and rights of individuals whose information is processed within the project. The establishment of clear and structured reports on data governance will promote transparency and trust within the project, which will foster farmers and stakeholders' collaboration and participation. Moreover, by establishing standards, processes, and validation mechanisms, DIVINE can ensure that the data used within the project is accurate, reliable, and consistent. This, in turn,

[3] https://www.techtarget.com/searchdatamanagement/definition/data-quality

[4] https://www.techtarget.com/searchdatamanagement/definition/data-governance#:~:text=Effective%20data%20governance%20ensures%20that,and%20drive%20business%20decision%2Dmaking.

leads to more reliable results and outcomes, enhancing the overall effectiveness of the project. Lastly, implementing data governance in DIVINE aligns with broader EU policy objectives. By promoting digital transformation, fostering innovation, and ensuring responsible data usage, the project demonstrates its commitment to EU priorities. This alignment enhances the project's credibility, increases its potential for collaboration and funding opportunities, and strengthens its impact on society.

CHAPTER II - SoTA ANALYSIS

The following pages will introduce the State of The Art (SoTA) analysis regarding the legislation which may have a relevant impact on DIVINE and affect its establishment. The report will consider both documents which are already in place, and legal texts which are currently under the form of proposals. By considering both aspects, a comprehensive understanding of the legal landscape can be achieved. In fact, the study of the present legislation is crucial for guaranteeing that the final product delivered by DIVINE adheres to all applicable legal requirements. Various aspects, such as data protection (GDPR) and data management, need to be taken into account. Additionally, by studying proposed legal texts, the SoTA analysis can anticipate potential changes in the legal framework. Proposed laws often address emerging issues, technological advancements, or societal concerns that may impact DIVINE. By assessing these proposals, the analysis can identify any upcoming legal obligations or changes that DIVINE may need to adapt to in the future. This proactive approach allows for better planning and preparation, ensuring that DIVINE remains compliant and avoids legal issues or penalties. Furthermore, a comprehensive analysis of both existing legislation and law proposals enables the identification of any gaps or areas for improvement. Existing laws may have limitations, loopholes, or outdated provisions that need to be addressed. By studying law proposals, the analysis can contribute to the refinement and improvement of the legal framework.

Regarding the subjects considered to develop the analysis, the main focus will be on the data protection and management, as well as agriculture and agricultural data management. The direction towards these topics derives from the fact that DIVINE aims at creating and promoting an Agri-data sharing platform – thus legislation regulating the data use, sharing and protection both in general and related to the agriculture sector play a vital role in the conception and architecture of DIVINE.

However, it is important to note that the previously mentioned analysis does not aim to exclude the consideration of further relevant legislation. The study of current legislation and law proposals is a dynamic process that must remain open to future developments. Therefore, if and when necessary, additional relevant legal texts will be incorporated into the analysis to ensure its completeness and accuracy.

Legislative frameworks are subject to constant evolution and revision as societal needs, technological advancements, and policy priorities change over time. New laws and regulations may be enacted to address emerging challenges or to enhance existing legal provisions. In the event that new legislation becomes applicable or is proposed during the development of the project, it will be carefully examined to determine its potential impact on DIVINE. These additional legal texts will be thoroughly studied and incorporated into the State of the Art analysis. This ensures that the final assessment of DIVINE's compliance with legal requirements remains comprehensive, up-to-date, and reflective of the evolving legal landscape.

The following chapter will be structured as it follows:

- *Section 1 – Framework:* Will discuss and analyse the context in which the platform created by DIVINE will need to be introduced, and more specifically illustrate the CAP and Farm to Fork strategies and objectives.
- *Section* 2 *– Data Regulation:* Will discuss and review the existing regulatory framework related to data, and more specifically how to properly process them, use them, share and treat them in the EU context. It is overall focused on general

technical data regulation. This section includes, among others, the GDPR, Data Act, Digital Markets and Services Act.

- *Section 3 - Legislative Analysis of the Agri-data Sector* which aims at analyzing the SoTA of the legislation related to the Agri-data sector. Here will be found the SAIO and IFS regulations as well as the COPA COGECA EU Code of Conduct on agricultural data sharing by contractual agreement.
- *Section 4 - Other Relevant Documents and Communications in the Agri-data Sector* containing all other type of document, legislation, communication which does not strictly pertain to the two previous categories, such as the *Guidance on private sector data-data sharing between businesses and the public sector,* or the *Communication "Towards a common European data space" (2018)*.
- *Section 5 - Analysis of European Commission Projects in the Agri-data Sector: IACS and EHDS* which analyses the texts of two of the European Commission's projects, the IACS and EHDS, which relate to DIVINE in different ways: the first as it consists in creating a tool to manage farmers' payments, and the second as it deals with data security and safety.

The regulation mapping, as well as the timeline of application of the regulation will be provided in CHAPTER III and IV respectively.

CHAPTER II Section 1 - FRAMEWORK

The legislation in the following section deals with overall agriculture regulation, without a specific focus on agri-data. The section will be structured as it follows:

- Regulation Title
  - Regulation Summary;
  - Regulation Description & Agriculture;
  - Regulation & Data.

II.1 Farm to Fork Strategy & Data Sharing

Summary: *The Farm to Fork Strategy is at the heart of the European Green Deal aiming to make food systems fair, healthy and environmentally-friendly. Europe needs to redesign its food systems which today account for nearly one-third of global GHG emissions, uses natural resources, impact biodiversity health (due to both under- and over-nutrition) and do not allow fair economic returns and livelihoods for all actors, in particular for primary producers.*
Putting the EU food systems on a sustainable path also brings new opportunities for operators in the food value chain. New technologies and scientific discoveries, combined with increasing public awareness and demand for sustainable food, will benefit all stakeholders.

Description & Agriculture: The Green Deal, which aims at making Europe the first climate-neutral continent by 2050, is translated into the Farm to Fork strategy when it comes to agriculture, food & environment, and health. The issues of sustainable food systems are comprehensively addressed in strategy, which also acknowledges the close connections between a healthy population, society, and environment. Moreover, it has the ambition to achieve the Sustainable Development Goals of the United Nations. The Farm to Fork Strategy can then be described as a brand-new, all-encompassing strategy, for how Europeans value sustainability. It should be designed as a chance to enhance environment, health, and lives. It should be an opportunity to improve lifestyles, health, and the environment. The importance of transitioning to sustainable food systems cannot be overstated: such a transition will not only benefit the environment but also bring new opportunities for operators in the food value chain. These opportunities will arise from the combination of new technologies and scientific discoveries, coupled with an increasing public awareness and demand for sustainable food.
The Farm to Fork strategy seeks to accelerate the transition towards a sustainable food system that achieves various goals:

- Having a neutral or positive environmental impact, by reducing the use of pesticides and fertilizers, promoting agroecology, and reducing food waste. Moreover, the strategy also seeks to promote the use of renewable energy in food production and transportation.
- Mitigating climate change, reversing biodiversity loss, by reducing greenhouse gas emissions from food production and transportation, promoting sustainable land use practices, such as agroforestry and conservation agriculture.
- Ensuring food security,
- Promoting public health and nutrition,
- Ensuring that everyone has access to sufficient, safe, nutritious, and sustainable food, by promoting short food supply chains and reducing food waste.

Achieving these goals requires a multi-stakeholder approach, involving all players in the food value chain, including farmers, processors, retailers, and consumers. The strategy seeks to create a conducive environment for sustainable food systems to thrive by providing incentives and support to all players in the food value chain. The strategy recognizes that this will require addressing the imbalance in bargaining power between farmers and other players in the food value chain. It proposes measures such as improving the transparency of the food supply chain and promoting the use of sustainable and fair trade practices.

What role does the regulation play for data sharing and/or agricultural data?

Overall, the F2F Regulation does focus on ruling over data sharing. However, its relevance in relation to the DIVINE's scope comes from the focus of the report on agricultural data (the importance of which is explained in Chapter III of the 2020 F2F Strategy Report). In fact, the acceleration of the transition towards sustainable, healthy, and inclusive food systems requires significant investments in **research and innovation (R&I), technology**, and advisory services. The European Union is making efforts to achieve this through several measures:

- R&I: Under Horizon 2020, an additional call for proposals for Green Deal priorities will be made for about EUR 1 billion.
- Technology: Under Horizon Europe, the EU plans to spend EUR 10 billion on R&I for food, bioeconomy, natural resources, agriculture, fisheries, aquaculture, and the environment. This includes the **use of digital technologies** and nature-based solutions for agri-food, and focuses on areas such as microbiome, urban food systems, and alternative proteins. Under these measures, the strategy notes that *all farmers and all rural areas need to be connected to fast and reliable internet*. This *will enable mainstreaming precision farming and use of artificial intelligence*. Exploiting satellite technology will *result in a cost reduction for farmers, improve soil management and water quality, reduce the use of fertilisers, pesticides and GHG emissions, improve biodiversity and create healthier environment for farmers and citizens*.

In addition to R&I and investments, the Commission emphasizes the importance of:

- Advisory services, data and knowledge sharing, and skills. With regard to aspect, the European Commission will promote effective Agricultural Knowledge and Innovation Systems (AKIS) involving all food chain actors to provide tailored advisory services on sustainable management choices. Furthermore, the Commission will propose legislation to convert its Farm Accountancy Data Network into the **Farm Sustainability Data Network to collect data on the Farm to Fork and Biodiversity Strategies' targets and other sustainability indicators**. Through tailored advisory services and the common European agriculture data space, the Commission aims to enhance the competitive sustainability of EU agriculture and support the carbon farming initiative.

All these measures will be implemented thanks to the InvestEU Fund, which will foster monetary contributions in the agro-food sector by de-risking investments by European corporations and facilitating access to finance for SMEs and mid-cap companies.

How/why is it relevant to data sharing and/or agricultural data?

According to the Strategy, *knowledge and advice are key to enabling all actors in the food system to become sustainable*. Primary producers,in particular, require objective and

customized advisory services to make sustainable management choices. The European Commission plans to promote effective Agricultural Knowledge and Innovation Systems (AKIS) that involve all actors in the food chain to support producers in their choices. The new legislative Network will benchmark farm performance against regional, national, or sectoral averages and provide feedback and guidance to farmers through tailored advisory services. This will help participating farmers improve their sustainability and incomes. While data sharing is not specifically mentioned in the Strategy, the importance of agricultural data is certainly recognized: the report explains how the *common European agriculture data space will enhance the competitive sustainability of EU agriculture through the processing and analysis of production, land use, environmental and other data, allowing precise and tailored application of production approaches at farm level and the monitoring of performance of the sector, as well as supporting the carbon farming initiative.*

Data ownership, control and access, who owns the data?
Data ownership, control and access are not specifically mentioned in the Strategy.
Data privacy, safety and security, Distinguishing personal and non-personal data
Data privacy, safety, security, personal and non-personal data are not specifically mentioned in the Strategy.
Data Trust, transparency
Data Trust and transparency are not specifically mentioned in the Strategy.

II.2 CAP

The common agricultural policy (CAP) is a policy implemented by the European Union (EU) to support farmers and ensure food security in Europe. It was launched in 1962 and serves as a partnership between agriculture, society, and the EU's farmers. Its main objectives are[5]:

- Support farmers and improve agricultural productivity: The CAP aims at ensuring a stable supply of affordable food by enhancing agricultural productivity through various measures and promote sustainable farming practices.
- Safeguard European Union farmers' livelihoods: farmers in the EU need to be able to make a reasonable living from their agricultural activities. The CAP provides income stability and supports farmers in adapting to changing market conditions.
- Address climate change and sustainable resource management: Tackling climate change and promoting the sustainable management of natural resources in agriculture are supported by the CAP, which encourages farmers to adopt environmentally friendly practices and supports initiatives that contribute to climate action.
- Maintain rural areas and landscapes: The CAP recognizes the significance of rural areas and aims to maintain their vitality and preserve landscapes across the EU. It acknowledges the importance of agricultural activities in shaping and maintaining rural communities and promotes measures to support their sustainability.
- Promote job creation in farming and related sectors: The CAP plays a role in keeping the rural economy alive by promoting job creation in farming, agri-food

[5] https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/cap-glance_en

industries, and associated sectors. It recognizes the contribution of these sectors to employment opportunities in rural areas.

In the scope of DIVINE, the CAP defines the framework under which the technical aspects related to the data need to be kept into account. The report will describe in the following pages the different regulations which compose and define the structure of the Common Agricultural Policy.

II.2.1 CAP - Regulation (EU) 2021/2115

Summary: Entered into force on December 2nd, 2021, the regulation (EC) 2021/2115 defines the CAP goals, the types of intervention MS need to follow in order to receive EU Agricultural supports, and the establishment of CAP strategic plans.

Description & Agriculture: The text explains how the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD), should support the development of the agricultural sector in the different member states. In order to receive this support, the member states need to produce and set up the so-called "CAP Strategic Plans".

CAP Strategic Plans

Under the TITLE V, the regulation determines and defines how the MS should act in order to develop their own CAP Strategic Plans, in order to receive the adequate EAFRD and EAGF payments. While Art. 104 and Art. 107 lay down the main objectives and content of the new strategic plans (supporting farmers through higher sector resilience and competitiveness, promoting sustainable development, gender equality and food security), Art. 105 specifies the importance of including sustainable and climate-related actions. To evaluate and monitor the CAP strategic Plans implementation, MS should, according to Art. 128 and 129, establish a performance framework including KPIs and targets as a way to supervise the efficiency and achievements of the CAP goals. Moreover, not only ex-post assessment, but also ex-ante evaluations, to compare with outputs and results, should be conducted by MS [Art. 139, 140]. All these evaluation tools should then be given to the commission, in order *to enable it to perform the monitoring and evaluation of the CAP* [Art. 143]. To do so, *the Commission, in collaboration with Member States, shall establish an information system to enable the secure exchange of data of common interest* (such as *report on monitoring and evaluation* which should be *recorded, maintained and managed*) *between the Commission and each Member State* [Art. 150].

Under the rules set out by this regulation, according to Art 15, Member States must incorporate "Farm Advisory Services" into their CAP Strategic Plans (defined further, in Art. 104). This service should offer impartial advising services for farmers and other CAP beneficiaries on land management, farm management, technological and scientific information developed through research, and shall cover economic, environmental, and social dimensions while taking into account current farming practices Moreover, *farm advisory services shall be integrated within the interrelated services of farm advisors, researchers, farmer organisations and other relevant stakeholders that form the AKIS* (Agricultural Knowledge Information Systems). At the same time, the regulation points out that any personal information gathered for the purposes of enforcing any requirement

included in this Regulation must be treated in a manner consistent with those purposes, and in accordance with EC Regulation 2016/679 (GDPR).
At the Union level, categorization of regions and areas for EAFRD funding should be based on objective criteria. To guarantee sufficient support, the most recent classifications and data should be used, especially for resolving interregional inequalities within a Member State.
The regulation lays down, in Chapter II, the rules and requirements for farmers to access EAGF and EAFRD payments. Section I outlines the type of interventions needed, while Section II focuses on decoupled payments, and III on coupled direct payments. A specific attention has to be given to Chapter III, which highlights how the payments should be done in relation to other sectors. Specifically, different rules are established for interventions [Art. 42] on:

a. *Fruit and Vegetable Sector*
b. *Apiculture products*
c. *Wine Sector*
d. *Hops Sector*
e. *Olive and Olive Oil Sector*
f. *Other Sectors, listed in Annex VI.*

According to Art. 44, the forms of support allowed to these sectors are:

- *reimbursement of eligible costs actually incurred by a beneficiary;*
- *unit costs;*
- *lump sums;*
- *flat-rate financing.*

The amounts and budget related should be fair and equitable, based on statistical and objective data. The chapter continues explaining the objectives, requirements and specification for every single category listed in Art 42, while Chapter IV covers the types of intervention that are covered by EAFRD and EAGF, listed in Art. 69:

- *environmental, climate-related and other management commitments;*
- *natural or other area-specific constraints;*
- *area-specific disadvantages resulting from certain mandatory requirements;*
- *investments, including investments in irrigation;*
- *setting-up of young farmers and new farmers and rural business start-up;*
- *risk management tools;*
- *cooperation;*
- *knowledge exchange and dissemination of information*.

Regulation EC 2021/2015 & Data

While the regulations on Strategic Plans deals with data in a very 'superficial' way and do not make the focus of it in any specific article, in fact, to respect with the Strategic Plan regulation, data is mentioned:

- in reference to keep track of the gender balance of farming activities (preamble);
- to assess the categorisation of regions and areas for support from the EAFRD (preamble);
- to monitor and assess the progress of the CAP implementation in Member States (preamble);
- to protect personal data -in accordance with the GDPR- (Art. 151) ;
- to allow the functioning of Farm Advisory services (Art. 15*),

- to set the amount of financial support for beneficiaries (Art. 44),
- to evaluate the performance (Art. 128) and monitoring (Art. 143) for which Member States need to share data with the Commission**. It is also mentioned that effort shall be made to assure the secure exchange of data between MS and the EC (Art. 150)***.

*Even if it is not explicitly stated, when farmers need advises on their farm, they will need to share their data with the advisory service
** data can come from: European Statistical Programme established under Regulation (EC) No 223/2009; Farm Accountancy Data Network established by Regulation (EC) No 1217/2009; formal agreements with other data providers such as the Joint Research Centre and the European Environment Agency.
***An implementing act is awaited to establish clearer rules on the 'appropriate electronic system'

II.2.2 CAP – Regulation (EU) 2022/1475, Implementing Regulation (EU) 2021/2115

Summary: The Commission Implementing Regulation (EU) 2022/1475, of 6 September 2022 laying down detailed rules for implementation of Regulation (EU) 2021/2115 establishes the forms for reporting and publishing information on the use of funds received from the European Agricultural Fund for Rural Development (EAFRD). The regulation specifies the content and structure of the forms to be used for reporting and publishing information on EAFRD-funded projects, including their objectives, costs, and results. The regulation applies to all Member States of the European Union and comes into effect on 1 January 2023.

Description & Agriculture: The Regulation 2022/1475 aims at implementing the rules published one year in advance discussing and defining the CAP strategic plans. The new rules focus on technical aspects that MS will need to keep into account when publishing EAFRD related reports; the scope of the regulation is mentioned in Art. 1. The relevance this document assumes with regard to DIVINE's development and objectives relates to a certain number of specific articles, namely Art. 7 – 19, which are tackling the issue of data and technology.
First, Art. 7 outlines the data-related practices MS will need to follow in order to ensure a proper Strategic Plan evaluation. Where necessary, Member States must make arrangements with relevant data providers, identify the needs of stakeholders and institutions involved in the implementation and evaluation of the plans, set up support activities, and collaborate with the European CAP network to implement an annual work program based on the needs of competent authorities, evaluators, and other stakeholders. This will ensure effective monitoring and evaluation of the CAP Strategic Plans at the national, regional, and local levels.
Starting from TITLE II, the regulation requires Member States to report disaggregated data on interventions (in the form of direct payments and rural development, excluding LEADER interventions, Art. 9) and beneficiaries (information on farmers and beneficiaries receiving support under the integrated administration and control system should be reported, according to Art. 10) , the ratio of permanent grassland established each year, data on interventions in certain sectors, data on EIP operational groups, and data on Local Action Groups (LAGs) and their activities for LEADER. In terms of timing, *from the reporting year 2025 on, Member States shall report the disaggregated data on interventions and beneficiaries*

annually by 30 April of the year N in relation to interventions for which payments have been made in the agricultural financial year N-1 [Art. 15]. The data must be transferred to the Commission through specific electronic systems, and the responsible party for transferring the data varies depending on the type of data being transferred [Art. 16]. All personal data used are following under the GDPR Regulation.

Regulation (EU) 2022/1475 & Data

Compared to the Regulation EU 2021/2115, the regulation EU 2022/1475 defines how the different types of data need to be shared to the EC in order to ensure the proper CAP monitoring and evaluation. In the preamble, it is mentioned that:

- According to Art 131 Regulation EU 2021/2115, MS need to ensure a certain amount of data to be available to the commission for monitoring and evaluation purposes. Moreover, the data collected in the deployment of EIP (Eu Innovation Partnership projects) will be collected and shared among a certain group of people to enhance networking between projects promoters. These data will need to be collected by following the reporting rules defined in Commission Implementing Regulation (EU) 2021/2290.

The Articles, as well as the annexes, define the rules these data will need to respect more in detail:

- According to the regulation, EIP, LAGs for LEADER, *disaggregated data on interventions* (specified in Art. 9 – regards all the interventions in form of direct payments of Regulation 2021/2115), *and beneficiaries* (specified in Art. 10 – regards all the interventions in form of direct payments of Regulation 2021/2115), and Regulation EU 2022/126 and 2021/2115 are all data subject to the Regulation EU 2022/1475 [Art. 8] that need to be shared with from all the EU Member States to EC evaluators [Art. 7];
- The frequency MS need to respect to send their data to the EC depends on the type of data in their possession: overall, *MS need to send them annually by 30 April of year N in relation to interventions for which payments have been made in the agricultural financial year N-1 [Art 15];* The means of transition to share these data are, again, different based on the data type and described in Art 16; Before being sent, the data need to be completed, checked and corrected [Art. 17, 18];.
- Nonetheless, the EC can only use the personal data in its possession to monitor and evaluate the status of the CAP, and cannot use them for other purposes or share them [Art.19, reference to the GGDPS]]

II.2.3 CAP - Regulation (EU) 2021/2116

Summary: The regulation EU 2021/2116, applicable in all MS from January 1 2023, lays down rules for financing, management and monitoring under the two main CAP funds (EAFRD, EAGF).

Description & Agriculture: The regulation 2021/2116, applicable from January 1st 2023, lays down rules covering:

- the financing of expenditure under the CAP;
- the management and control systems to be put in place by the EU MS;

- the clearance and conformity procedures.

The bolstering of environmental protection and climate action as well as the contribution to the achievement of the Union environmental and climate objectives and targets laid out in the The Future of Food and Farming," "The European Green Deal," "Farm to Fork Strategy," "EU Biodiversity Strategy for 2030," and "Bringing nature back into our lives." are the proposed strategic orientation of the future CAP. Sharing data from integrated administration and control systems, such as the land-parcel identification system, has therefore become essential for national and Union-level environmental and climatic goals. The data gathered through the integrated system, which is pertinent for environmental and climatic objectives, should thus be shared between the public authorities of Member States and with the Union organisations and agencies. It should also be stipulated that data from the integrated system is to be made available for statistical purposes to bodies which are a part of the European Statistical System in order to increase efficiency in using data available to various public authorities for the production of European statistics.

Specifically, while Regulation 2021/2115 explains how MS Strategic Plans should be developed, in order to fall under the scope of EAGF and EAFRD, Regulation 2021/2116 illustrates the European Agricultural Guarantee Fund as well as the European Agricultural Fund for Rural Development structure, *financing, management, and monitoring* [Art. 1].

The EAGF, whose current value is set at €291.1 billion, primarily finances:

- *Direct payments to farmers and sectoral interventions* (Regulation (EU) 2021/2115);
- *Agricultural market support measures*

The EAFRD, whose current value is set at €95.5 billion, co-finances national rural development programs established. Moreover, the funds are used to support various initiatives, including: agricultural product marketing and information campaigns, administrative, technical, and monitoring operations, as well as the acquisition by the EC of Satellite Data and remote applications [Art. 5, 6, 7].

All the expenditures concerning the above-mentioned “various initiatives” are listed and detailed in Art. 23, 24, 25. As an example, regarding the acquisition of satellite data [Art. 24], MS should agree with the EC on the list, and the use of these data by the MS should be done free of charge (see High Value Dataset Regulation). In case of DIVINE, these articles and information – with regard to the high Value Dataset Regulation – may assume relevance as a certain amount of data to integrate in the platform should be obtained free of charge.

Moreover, the Commission will finance actions to monitor agricultural land use and change, soil and crop conditions, and the resilience of agricultural systems. This includes sharing estimates internationally, contributing to world market transparency, and ensuring technological follow-up of the agri-meteorological system. Data collection and purchase, creation of a spatial data infrastructure and website, specific studies on climatic conditions, remote sensing, and updating of models will be financed. Collaboration with various organisations is required where necessary, and the EC may implement a *framework governing the acquisition, enhancing and use of satellite data and meteorological data, and the applicable deadlines* [Art. 26].

Member States must establish effective management and control systems to ensure that support is distributed to the correct beneficiaries. National authorities are responsible for conducting systematic checks in high-risk areas to control the system. Moreover, to assist the Member States*, the Commission shall make available to the Member States a data-mining*

tool to assess risks presented by projects, beneficiaries, contractors and contracts while ensuring minimal administrative burden and effective protection of the Union financial interests. That data-mining tool may also be used in order to avoid circumvention of rules. By 2025, the Commission shall present a report which assesses the use of the single data-mining tool and its interoperability with a view to its generalised use by Member States.
For some payments, Member States must use the integrated administration and control system to manage and control payments to farmers. Specific rules apply to verify the commercial documents of paying agencies or beneficiaries related to the EAGF financing system to ensure accurate and correct execution of transactions. However, these rules do not apply to measures covered by the integrated administration and control system [Art. 59].

The Integrated System
The integrated system shall apply to the area and animal-based interventions listed in Title III, Chapters II and IV, of Regulation (EU) 2021/2115 [Art. 65], and should include the following elements:

- an identification system for agricultural parcels;
- a geo-spatial application system and, where applicable, an animal-based application system;
- an area monitoring system;
- a system for the identification of beneficiaries of the interventions and measures referred to in Article 65(2);
- a control and penalty system;
- where applicable, a system for the identification and registration of payment entitlements;
- where applicable, a system for the identification and registration of animals.

The integrated system shall provide information relevant for the reporting on the indicators referred to in Article 7 of Regulation (EU) 2021/2115, and should allow for the exchange and easy integration among databases with geographic information [Art. 66]. In order to ensure that comprehensive and comparable data is available throughout the Union for the purposes of monitoring agri-environment-climate policy, including the CAP's impact, environmental performance, and progress towards Union targets, Member States should continue to use data or information products provided by the Copernicus program in addition to information technologies like Galileo and EGNOS. This will also help to increase the use of full, free, and open data. To that purpose, an area monitoring system should be a part of the integrated system.
Moreover, Member States must keep data and documentation on annual outputs and progress towards the CAP targets for at least 10 years, which will have to be accessible through digital databases. Requirements for data recording can be applied at the regional level, but must allow for national-level aggregation. Relevant data collected through the integrated system must be shared free of charge among public authorities and made publicly available, even with the Commission (Eurostat) and national statistical institutes for the production of European statistics.
However, both Member States and the Commission shall protect the confidentiality of the information received in some specific contexts since the application of the national control systems and the conformity clearance may have an impact on sensitive business information. In accordance to this principle, access to the data may be limited if it would harm personal

data confidentiality in accordance with the GDPR. Farmers sharing their data must have access to all relevant information related to land they use or intend to use in order to submit accurate applications. The data shared must be reliable and verifiable, and cross-checked and verified by MS first, and by the Commission after [Chapter III]. If beneficiaries are not complying with rules, requirements and quality standards, some penalties, highlighted in Chapter IV and V TITLE IV may apply.
TITLE V Chapter IV, reminds how transparency remains an EU pillar, and thus Member States must publish annually a list of of the EAGF and EAFRD beneficiaries and include information on groups in which the beneficiaries participate. Member States must make the information listed in Regulation EC 2021/1060 Art. 49 (3) and (4) available on a single website for two years, except for the information under Art. 49 (3) (a,b) EC 2021/1060, and have to inform beneficiaries of the publication of data concerning them [Art 99]. Nonetheless, that information should be published in such a way as to cause the least interference with the beneficiaries' right to respect for private life and their right to protection of their personal data. Both those rights are recognised in Articles 7 and 8 of the Charter of Fundamental Rights of the European Union.

Regulation 2021/2116 & Data
The regulation mentions data multiple times as, in order to decide how to allocate the EAGF and EAFRD finds, the EC needs to be provided evidence of the necessity for funds and information to monitor the development of its projects.
The text preamble mentions that:

- Satellite data, as well as expenditure data should be provided to the EC by MS (and for the last ones, a regulation needs to be laid down), and in exchange the states should be provided proper data-mining tools by 2025 (also mentioned in Art. 52).
- Member States should continue to use data or information products provided by the Copernicus program in addition to information technologies like Galileo and EGNOS.
- Aggregated data provided by MS to the EC should be reliable and verifiable.
- The EC recognizes that data must be used for climate and sustainable purposes, and that sensitive information need to remain confidential (beneficiaries of the funds should be informed of the publication of their data before that publication takes place
- To receive the funds, information to the EC should contain *data on the identity of the beneficiary, the amount awarded, the fund from which it comes, and the purpose and the specific objective of the operation concerned.*

In terms of articles, Regulation EU 2021/2116 establishes that:

- Satellite data can be sold to the EC, who will consequently own the data [Art. 7, 24, 66]; When talking about the expenditures, the regulation in Art. 7 mentions that the CAP funds can be used to finance the 'preparatory, monitoring, administrative and technical support activities, the evaluation, audit and inspection', thus, the financing of data gathering in order to fulfill these activities. More specifically, it is Art 24 that specifies the modalities of (satellite) data acquisition: the Commission is allowed to buy those data (after agreement with member States) and supply them free of charge to the authorities competent in

monitoring that area. All along it is the Commission that remains the owner of the data. The reasons why the Commission needs the data are well-specified in Art 25, where to who sharing is allowed is also specified (international organisations). Moreover, the Commission is obliged by the law to create a 'spatial data infrastructure and a website' and to lay down implementing acts for 'the framework governing the acquisition, enhancing and use of satellite data and meteorological data, and the applicable deadlines' (Art. 26). Also, in Art 59, the regulation states that the Commission shall assist MS in providing them with a **data-mining tool** 'to assess risk presented by projects, beneficiaries, contractors and contracts'.

With the mentioned data, the EC will need to create a proper integrated system (see above), with the aim of *providing information relevant for the reporting on the indicators referred to in Article 7 of Regulation (EU) 2021/2115*. Rules for data keeping and sharing are defined in Art. 67: is of fundamental importance on how data collected with agricultural ends is regulated, in fact, it states that it is the MS responsibility to "record and keep any data and documentation on the annual outputs", so to track the progresses set in the Strategic Plans, shall be available for consultation. Data used for the area monitoring system may be stored as raw data on a server that is external to the competent authorities. Competent authorities have to make sure that the data that are collected "are shared free of charge between its public authorities and made publicly available at national level", as they are for European institutions. Moreover, it is specified that data that are relevant for statistics, have to be shared "free of charge with the Commission (Eurostat), national statistical institutes, and other national authorities responsible for the production of European statistics". This data can be shared with beneficiaries, so to allow them to submit accurate applications (regarding the land they use or intend to use).

Particular attention is given to privacy, and the public access to data can be limited in the case "such access would adversely affect the confidentiality of personal data". When published, MS shall inform the beneficiaries (Art. 99).

II.2.4 CAP – Regulation (EU) 1308/2013

Summary: *This Regulation establishes a common organisation of the markets for agricultural products, namely all the products listed in Annex I to the Treaties with the exception of the fishery and aquaculture products as defined in European Union legislative acts on the common organisation of the markets in fishery and aquaculture products. Agricultural products covered by these provisions include cereals, rice, sugar, seed, olive oils and table olives, fruits and vegetables, wine, tobacco, milk and milk products, meat, apiculture products and silkworms. Reference is made to the general Common Agricultural Policy provisions. [https://www.fao.org/faolex/results/details/en/c/LEX-FAOC134451/].*

Description & Agriculture: The EU Regulation 1308/2013 is a comprehensive piece of legislation that *establishes the common organisation of agricultural markets in the European Union* [Art. 1]. It provides rules for the production, processing, and marketing of agricultural products, with the aim of ensuring the competitiveness and sustainability of the EU agricultural sector, while also promoting fair and transparent trade practices.

One of the key features of the regulation is the promotion of agricultural products. This includes provisions for the funding of promotion campaigns for EU agricultural products, both within the EU and in third countries.

Art. 1 classifies the agricultural products as it follows:

b. *cereals;*
c. *rice;*
d. *sugar;*
e. *dried fodder;*
f. *seeds;*
g. *hops;*
h. *olive oil and table olives,;*
i. *flax and hemp,;*
j. *fruit and vegetables,;*
k. *processed fruit and vegetable products;*
l. *bananas;*
m. *wine;*
n. *live trees and other plants, bulbs, roots and the like, cut flowers and ornamental foliage;*
o. *tobacco;*
p. *beef and veal;*
q. *milk and milk products;*
r. *pigmeat;*
s. *sheepmeat and goatmeat;*
t. *eggs;*
u. *poultrymeat;*
v. *ethyl alcohol of agricultural origin;*
w. *apiculture products;*
x. *silkworms;*
y. *other products.*

The regulation also sets out rules for the use of quality schemes, such as geographical indications and traditional specialties guaranteed, to promote and protect traditional and high-quality EU agricultural products.

Another important aspect of the regulation is the management of supply and demand. The regulation establishes a number of market management tools, such as intervention and private storage aid, which are designed to help stabilise markets and ensure that farmers receive a fair price for their products. The regulation also includes provisions for the management of production, including the establishment of quotas and the use of voluntary production reduction schemes.

The regulation covers all agricultural products, including fruit and vegetables, dairy products, meat, and cereals. It sets out detailed rules for the production and marketing of each product, including specific quality standards and labelling requirements. The regulation also establishes a number of measures to support small farmers and ensure that they have access to markets.

Overall, EU Regulation 1308/2013 is an important piece of legislation that plays a key role in ensuring the competitiveness and sustainability of the EU agricultural sector. Its provisions for the promotion of agricultural products, management of supply and demand, and

establishment of quality standards help to ensure that EU farmers can compete on a level playing field and provide high-quality, sustainable products for consumers. However, in terms of interests for DIVINE's development, the regulation is not the most relevant piece of legislation. On the other hand, the Regulation 2021/2117, which implements the 1308/2013, amends and changes some articles in light of more recent electronic technologies.

Regulation EU 1308/2013 & Data

Some mentions to agriculture-related data are done in the regulation's preamble, where it is explained that the EC should, in order to take advantage of potential data synergies, adopt clear and necessary measures regarding their communication. These measures include determining the nature and characteristics of the information that needs to be reported, specifying the types of data to be processed and establishing maximum retention periods for such data. The communication requirements are developed in Art. 223. Additionally, the Commission should have the authority to define the purpose of processing, especially concerning the publication and transfer of data to third countries. The Commission should also regulate the access rights to the information or information systems provided and establish the conditions for publishing the information. Personal data are on the other hand regulated under the GDPR [Art. 224].

When it comes to single articles, Art. 137 mentions that the different MS should provide undertakings requesting them with *data on provisional and actual sugar beet, sugar cane and raw sugar deliveries, and on sugar production and statements of sugar stock.* On the other hand, Art. 157 allows MS to *establish and recognize interbranch organisations is specific sectors, among which the organisms pursue a specific aim taking account of the interests of their members and of consumers, such as improving knowledge and the transparency of production and the market, including by publication of aggregated statistical data on production costs, prices, including, where appropriate, price indices, volumes and duration of contracts which have been previously concluded, and by providing analyses of potential future market developments at regional, national or international level.*

II.2.5 CAP – Regulation (EU) 2021/2117, Amending Regulation 1308/2013

Summary: Regulation 2021/2117 aims at implementing and amend Regulation EC 1308/2013, which *establishes a common organisation of the markets for agricultural products, which means all the products listed in Annex I to the Treaties with the exception of the fishery and aquaculture.* [Art. 1 EC 1308/2013].

Description & Agriculture: Overall, what relates mostly to DIVINE's scope are the changes in regulation 1308/2013 taking into account the developed technologies.

Specifically, the guidelines explain that, when producers are using the Geographical "indication of origins" for a certain product, the MS authority should be authorized to access and verify the information provided in the producers' application. The MS assessment is carried out to ensure the accuracy of information provided. The resulting assessment will then be summarised in a reliable and accurate document. According to Art. 222a, the Commission must then establish different Union market observatories to improve transparency in the food supply chain, inform economic operators and public authorities, and monitor market developments and threats of market disturbance, after having defined which agricultural

sectors require observatories. These observatories will be in charge of providing statistical data as well as information necessary for monitoring the market development. According to Article 223(1) *the information obtained may be transmitted or made available to international organisations, Union and national financial market authorities, the competent authorities of third countries and may be made public, subject to the protection of personal data and the legitimate interest of undertakings in the protection of their business secrets, including prices.* Moreover, to provide consumers with more information, Article 119 of Regulation (EU) No 1308/2013 requires producers to insert in their packages a nutrition declaration and a list of ingredients. Thanks to the amendments in regulation 2021/2117, and specifically Art. 116a, producers may now limit the nutrition declaration to only the energy value on the package or label and provide the full nutrition declaration and list of ingredients through electronic means, as long as user data is not collected, and no marketing information is displayed. (Exception done for substances causing allergies or intolerances, which must still be listed on the package). In fact, according to the article, *the nutrition declaration on the package or on a label attached thereto may be limited to the energy value, which may be expressed by using the symbol "E" for energy. In such cases, the full nutrition declaration shall be provided by electronic means identified on the package or on a label attached thereto. That nutrition declaration shall not be displayed with other information intended for sales or marketing purposes and no user data shall be collected or tracked.*

Regulation 2021/2117 & Data

In the CMO, reference to data is done when talking about the obligation concerning information to consumers (nutrition declaration and list of ingredients -no personal data shall be collected through this operation) (Art. 116a), monitoring of the agricultural markets (Art. 222a).

CHAPTER II Section 2 - DATA REGULATION

Compared to the previous section, all the following regulations are, in different ways, dealing with data. The section will then be structured slightly differently, as it follows:

- Regulation Title
  - Regulation Summary;
  - Regulation Description;
  - Regulation & Agriculture.

Or:

- Regulation Title
  - Regulation Summary;
  - Regulation Description & Relation to DIVINE and Agriculture

DIGITAL SERVICES ACT PACKAGE - DIGITAL SERVICES ACT – Regulation EU 2022/2065

Summary: *The new rules are proportionate, foster innovation, growth, and competitiveness, and facilitate the scaling up of smaller platforms, SMEs and start-ups. The responsibilities of users, platforms, and public authorities are rebalanced according to European values, placing citizens at the center. The Digital Services Act includes rules for online intermediary services, which millions of Europeans use every day. The obligations of different online players match their role, size and impact in the online ecosystem.*

- ***Intermediary services*** *offering network infrastructure: Internet access providers, domain name registrars, including also:*
  - ***Hosting services*** *such as cloud and webhosting services, including also:*
    - ***Online platforms*** *bringing together sellers and consumers such as online marketplaces, app stores, collaborative economy platforms and social media platforms.*
    - ***Very large online platforms*** *pose particular risks in the dissemination of illegal content and societal harms. Specific rules are foreseen for platforms reaching more than 10% of 450 million consumers in Europe.*

The DSA has been published in the Official Journal as of 27 October 2022 and came into force on 16 November 2022. The DSA will be directly applicable across the EU and will apply fifteen months or from 1 January 2024, whichever comes later, after entry into force[6]*.*

Description: The EU regulation 2022/2065, amending the Directive 2000/31/EC, must be considered the basis for establishing the rules and responsibilities of online intermediary services. Online intermediary services can be subdivided into three main categories which are defined in Art. 3 DSA 2022/2065 as:

i. *a 'mere conduit' service, consisting of the transmission in a communication network of information provided by a recipient of the service, or the provision of access to a communication network;* E.g. Internet service providers.

ii. *a 'caching' service, consisting of the transmission in a communication network of information provided by a recipient of the service, involving the automatic,*

[6] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/digital-services-act-ensuring-safe-and-accountable-online-environment_en

intermediate and temporary storage of that information, performed for the sole purpose of making more efficient the information's onward transmission to other recipients upon their request; E.g. Content distribution networks

iii. *a 'hosting' service, consisting of the storage of information provided by, and at the request of, a recipient of the service;* E.g. Cloud.

a. Online Platforms are considered hosting services that, *at the request of a recipient of the service, stores and disseminates information to the public, unless that activity is a minor and purely ancillary feature of another service or a minor functionality of the principal service and, for objective and technical reasons, cannot be used without that other service, and the integration of the feature or functionality into the other service is not a means to circumvent the applicability of this Regulation.*

As the usage and development of these services is growing in the agricultural sector, farmers are using online platforms in order to access new markets, sign contracts, keep a track of their production and expenditures, consult forecasts and other. More and more data are being inserted, collected and shared each day from farmers who, very often, do not have a clear vision and control over these shared data. The EC's choice comes from the increased necessity of regulating operators and networks containing and storing these data.

The regulation is intended to be applied to online innovative intermediary services, providing both electronic or non-electronic services to a significant number of EU farmers, independently of where the service provider is located. It aims at clarifying when the provider of an intermediary service cannot be considered responsible of illegal contents obtained from the recipient.

- According to DSA Art. 4, a "mere conduit" intermediary service is not responsible for the information vehiculating in its network if he
  - does not start the data transmission or select the receivers,
  - and does not modify the transmitted data – even when they are stored (storage should not be longer than the reasonably necessary time to transmit the information).
- Similar provisions apply to the "catching services" [Art. 5], but moreover they:
  - Need to comply with conditions to access the information, rules regarding the information updates according to is sector,
  - Do not interfere with the lawful use of technology
  - Disable access to information if their source is no longer available on the network.
- In a similar way, "hosting" services [Art. 6] have to:
  - Not be aware of illegal activities and their circumstances,
  - Act expeditiously to disable the access to these illegal contents as soon as he finds out.
  - Need to establish a reporting mechanism [Art.16]: in this case, for both providers and recipients. If the data subject – a farmer – or the recipient - a stakeholder with access to the data- notices irregularities in the data management, he should be able to report it to the provider of the platform service.
  - Establish a statement of reason, explaining to a stakeholder why some data access was restricted [Art 17.1].

- Notify law enforcement services of suspicious criminal acts [Art. 18]

In case of the creation of a data-sharing platform – which should be implemented at the European level – the main directives to follow should fall under the 3hosting services", specifically in the section related to "large" and "very large online platforms".

- Large online platforms (the ones not defined in the Recommendation 2003/361/EC) will need to:
  - Define an internal complaint-handling system [Art. 20],
  - Provide information on out-of-court certified dispute settlement to its recipients,
  - Establish "Trusted flaggers", entities who will have the job to detect and report illegal practices on the platform and suspend the service provision to recipients often providing illegal contents
  - Set out a transparent report on terms and conditions of the use of the service, and measures against data misuse [Art. 23]: if the stakeholders or farmers are frequently providing illegal content, the platform holder should suspend – after having sent a notification - their provision of the service.
  - Provide clear and easily readable online interfaces, not distorting or impairing stakeholders to make free and informed decision [Art. 25, 27], and allowing them to recognize advertisements [Art. 26].
- If the online platform is allowing consumers to conclude distance contract with traders, it will also need to:
  - Make sure traders only post information about and to offer a product on a well-designed interface, and that both consumers and traders interests and data are safe [Art 30, 31, 32]: this article assumes a major relevance in the relation farmers – products or services providers. If the developed platform will allow the sale, purchase, and exchange of products and services, the platform provider will need to organise the network to require and verify the information provided by the trading party. In case of inaccuracy and non-compliance of the trader to the rules or corrections required, the platform provider should suspend their services.
  - Notify client/trader If the counterpart is doing something illegal.
- In case of "very large online platforms" (active user base of more than 45 million) – defined in Section 5-
  - Need to conduct risk assessment arising from use of design, functioning and use of their services, as well as implement mitigation measures;
  - Establishing independent audits at least once a year [Art. 37];

- Report – as explained in art.15, at least twice a year;
- Allow the Commission's Digital Services Coordinator to access and control the data, upon request [Art. 40];
- In addition, they can monetize advertisements on their platform.

Overall, the Commission strongly encourages all online intermediary services to draft a code of conduct in accordance with both the EC regulations and the unions' member state laws. Codes of conduct can focus on different issues, such as ads [Art 46], and accessibility [Art 47].
Chapter 6 focuses on the implementation of the DSA and non-compliance penalties. Supervision must be handled at the member state level, and MS will have to select a competent authority to check on DSA implementation (Digital Service Coordinators). The Digital Service Coordinator must cooperate with MS and the EC and fulfill the requirements of Art 50. It can impose fines and penalties (outlined by MS) for failure to comply to the law and impose measures to prevent harm. Users of the service and clients – stakeholders and farmers - should be allowed to depose a complaint [Art. 53] and obtain a *compensation from providers of intermediary services, in respect of any damage or loss suffered due to an infringement by those providers of their obligations* [Art. 54].
Art. 55-80: defines how the commission can act relatively to controls, fines.

Regulation EU 2022/2065 & Agriculture

As the Regulation applies to different types of intermediary services, including online platforms, its significance extends to the scope and goals of the DIVINE project. DIVINE aims to create an online platform for agri-data sharing, which can be considered as an online platform under the Regulation 2022/2065. Additionally, the data collected and processed to implement the DIVINE platform may originate from various sources, including other websites or applications. This further emphasizes the importance of the Regulation, as it provides guidance on data sharing and interoperability between platforms. Understanding the regulatory requirements enables DIVINE to effectively manage and utilize data from other platforms while respecting data protection principles and ensuring compliance with relevant regulations.
As online platforms in agriculture can serve various purposes, the application of the rules laid down in the DSA must be kept into account. In fact, different platforms such as applications offering different services exist (such as services to facilitate the direct sale of agricultural products between farmers and consumers, provide marketplaces for agricultural inputs and machinery, offer services related to farm management and advisory, or enable data sharing and analysis for precision agriculture).
In the agricultural sector, online platforms and intermediary services need to comply with relevant regulations governing agricultural practices, food safety, and traceability. This includes adherence to standards for product quality, labeling, and certification. Platforms may also have specific responsibilities related to the verification of suppliers' credentials and compliance with organic farming or sustainability standards. By studying and complying with the Regulation EU 2022/2065, DIVINE can ensure that it operates within the legal framework and safeguards the interests of its users and stakeholders.

DIGITAL SERVICES ACT PACKAGE - DIGITAL MARKETS ACT - Regulation (EU) 2022/1925

Summary: *Establishes rules that gatekeepers (eg apps owners) have to follow. The DMA defines when a large online platform qualifies as a "gatekeeper". These are digital platforms that provide an important gateway between business users and consumers – whose position can grant them the power to act as a private rule maker, and thus creating a bottleneck in the digital economy. As of 12 October 2022, the DMA was published in the Official Journal and entered into force on 1 November 2022. Before 3 July 2023, companies have to provide the Commission with information about their number of users so that the Commission can designate "gatekeepers" before 6 September. Gatekeepers will then have until March 2024 to ensure that they follow the obligations of the DMA.*

Description: Core platform services have unique characteristics, such as extreme scale economies and strong network effects, which can result in the provider of those services becoming a gatekeeper. This allows them to have significant power and control over the market, thus leading to imbalances in bargaining power and unfair practices for business users, as gatekeepers can often obtain and collect other data from different third-party sources. This causes a threat to competition as it increases the markets entry barriers and facilitate gatekeepers into prioritizing their own product services over third-parties' solutions.

The DMA aims to ensure fair competition and eliminate existing or emerging fragmentation in the internal market caused by divergent national laws, by laying down rules to ensure contestability and fairness for the markets in the digital sector, particularly for business users and end users of core platform services provided by gatekeepers (defined in Art. 3 as: a *company that has a significant impact on the internal market, provides a core platform service that is an important gateway for business users to reach end-users, and enjoys an entrenched and durable position or is expected to in the near future*) and is subject to the DMA if it has activities in at least three member states, and for at least three consecutive years – DMA also regulates core platform services that do not fall under these categories).

Core Platform Services are defined by Art 2 as:

a. *Online intermediation services;*
b. *Online search engines;*
c. *Online social networking services;*
d. *Video-sharing platform services;*
e. *Number-independent interpersonal communications services;*
f. *Operating systems;*
g. *Web browsers;*
h. *Virtual assistants;*
i. *Cloud computing services;*
j. *Online advertising services, including any advertising networks, advertising exchanges and any other advertising intermediation services, provided by an undertaking that provides any of the core platform services listed in points (a) to (i);*

The relevance this regulation assumes is related with the fact that, as the EU project aims at implementing a shared data space for the agricultural environment, and thus not only collecting farmer's data, but also allowing stakeholders to access those data, upload their own, and exchange goods and services through the created network, the platform could easily

become a gatekeeper. It is thus important that the platform complies with the rules laid down in the DSA, in order to avoid fines or penalties.
According to the regulation, online platforms that can be qualified as gatekeepers will have to:

- Not use, process, combine or access end-users data when they are using the core platform through a third party service [Art. 5.2(a,b)].
- Not cross-use data coming from users of one service to a different service, [Art. 5.2(c)]
- *Sign in end users to other services of the gatekeeper in order to combine personal data* [Art. 5.2(d)]

Art. 5 refers to the data of persons, both natural and legal, accessing the platform indirectly. If these persons have given consent to use, process or combine their data on the third-party platform, the same rules do not apply on the gatekeeper platform. At the same time, the gatekeeper platform cannot match and merge the data coming from the users of two different services.
Moreover, business users, as well as end-users, must be allowed, free of charges, to exchange with end-users through their own/ a third-party platform, and should thus not be constraint to use only the gatekeeper platform. At the same time, when publishing on the platform, the costs fee paid from the advertiser must be made available upon result. In case the advertiser would not want to share this information, the platform service should be able to provide, free of charge, the information concerning the average daily remuneration prices.
According to Art. 6, gatekeepers have to:

- Not use non-public data generated by competitors or their customers;
- Allow an easy download/erase/modification of their operating system, as well as proper integration with third-party services, as well as with different hardware and software;
- Allowing data portability and interoperability.

In accordance to this article, the platform used by farmers and stakeholders should be:

- Compatible with already-existing platforms,
- Easy to access, quit and modify,
- Available on different instruments (PC, phones, tablets and other),
- But, at the same time, not using data indirectly connected to the platforms – [eg. I create an app that connects to third-party apps – I cannot reuse these data inserting them directly on my platform].

Interoperability in communication is also necessary, so the gatekeeper must provide the necessary technical interfaces or solutions that facilitate interoperability, free of charge and upon request (within three months of receiving the request). They are required to make the following basic functionalities interoperable with their own end users: end-to-end text messaging between two individual end users, sharing of images, voice messages, videos, and other attached files in end-to-end communication, preserving the level of security (something that can be done through end-to-end encryption). Moreover, the gatekeeper may collect and exchange with the requesting provider only the personal data of end users that is strictly necessary to provide effective interoperability [Art. 7].
In order to comply with the rules, a gatekeeper may not circumvent the directives establishing how to designate a gatekeeper [Art. 13] and will have to notify the commission in case it considers merging with a similar entity [Art. 14], in order to avoid excessive market

concentration. Moreover, an external organism should be charged with auditing the gatekeeper, *submit to the Commission an independently audited description of any techniques for profiling of consumers that the gatekeeper applies to or across its core platform services* [Art. 15].
16,17,19, 20, 21, 22, 23,24,25,26,27 à commission to check on gatekeepers and why.
Regarding the gatekeeper compliance to the rules, a *gatekeeper shall be deemed to have engaged in systematic non-compliance with the obligations laid down in Articles 5, 6 and 7, where the Commission has issued at least three non-compliance decisions* [Art. 18.3]. Other non-compliance penalties may be represented from fines and fees [Art. 29-33]; In order to limit the risk of non-compliance, the gatekeepers have to introduce an independent compliance function [Art. 28].

Table 3: Designated gatekeepers when considering market capitalisation, turnover and number of CPS in the DMA

bruegel

	Google	Amazon	Microsoft	Apple	Facebook	SAP	ORACLE	NETFLIX	AIRBNB	TWITTER	ZOOM
European Commission proposal	y	y	y	y	y	y	y	n	y	n	y
Council of the EU position	y	y	y	y	y	y	y	n	y	n	y
Schwab proposal	y	y	y	y	y	n	n	n	n	n	n
IMCO position	y	y	y	y	y	y	y	n	n	n	n

	SPOTIFY	SALESFORCE	UBER	BOOKING HOLDINGS	EXPEDIA	PayPal	Ebay	Zalando	Yahoo (Verizon)	Slack	Vivendi
European Commission proposal	n	y	n	y	n	y	n	y	y	n	y
Council of the EU position	n	y	n	n	n	y	n	n	y	n	y
Schwab proposal	n	n	n	y	n	n	n	n	y	n	n
IMCO position	n	y	n	y	n	y	n	n	y	n	y

Source: Bruegel. Note: The thresholds considered for each of the proposals were as follows, for EEA turnover and market capitalisation, respectively. For the EC proposal, €6.5 billion and €65 billion; For the Council proposal, €6.5 billion in each of the last 3 years and €65 billion; For Schwab's first proposal, €10 billion and €100 billion; For IMCO's final agreement, €8 billion and €80 billion. Note that the turnover figure specifically for the EEA is still challenging to obtain with the available data, but we tried to approximate it as much as possible. The criterion 'the presence in at least 3 Member States of the EU' has been assumed as being always fulfilled since this is the case to the best of our knowledge. The number of CPS we considered for each firm can be seen in Table 4.

Figure 1: Potential Gatekeepers according to the definition given in the DMA, Source: Bruegel

On September 6th 2023, the EC reached an agreement and designated six companies falling under the category of gatekeepers. The firms are: Alphabet, Amazon, Apple, ByteDance, Meta, Microsoft.

Regulation (EU) 2022/1925 & Agriculture

The Regulation EU 2022/1925 focuses on the definition of "very large online platforms that can be categorized as gatekeepers". In the context of the DIVINE project, the provisions outlined in this regulation may not directly apply to the online platform itself since it does not meet the criteria of being a gatekeeper or a very large online platform. Currently, there is no exclusively agricultural online platform that falls within the definition of a gatekeeper. primarily targets major technology giants collectively known as GAFAM (Google, Amazon, Facebook, Apple, and Microsoft) as gatekeepers. However, as the technology sector continues to evolve and new companies emerge, it is possible that more platforms could become subject to the obligations outlined in the regulation[7].

7

While it is unlikely that DIVINE will be considered a gatekeeper in the market anytime soon, it is essential to consider the potential exchange of data between DIVINE and these large technology companies. In such cases, Regulation EU 2022/1925 should be taken into account to ensure compliance with the provisions related to data sharing, interoperability, and other relevant aspects.

Amazon & Agri-food Sector
While primarily known as an e-commerce platform, Amazon has expanded its presence in the agricultural sector through its Amazon Fresh and Amazon Pantry services. These platforms enable farmers and food producers to sell their products directly to consumers, making Amazon a potential gatekeeper in the online agricultural marketplace.

ARTIFICIAL INTELLIGENCE ACT - Proposal

Summary: at the moment the text is still in the form of a proposal, and it is now being discussed – the trilogues took place in June and July 2023, and the idea is to reach an agreement on the text by the end of 2023.

Description: The proposal aims at creating a legal framework for the development and use of AI in the EU that is grounded in European values and respects fundamental rights. It outlines a risk-based approach, dividing AI systems into four categories based on the potential harm they could cause: unacceptable risk, high risk, limited risk, and minimal risk. The regulation would require that high-risk AI systems undergo rigorous testing and certification before they can be put on the market. These systems would also be subject to ongoing monitoring and evaluation. Limited-risk systems would also need to meet certain requirements before they can be put on the market. The proposal also addresses issues such as transparency, accountability, and human oversight, requiring that users be provided with clear information about the AI system and its capabilities, as well as a way to appeal decisions made by the system. It also prohibits certain uses of AI, such as those that manipulate people's behavior or create "deepfakes" for malicious purposes. Overall, the proposed regulation aims to balance the potential benefits of AI with the need to ensure that its development and use align with European values and respect fundamental rights.
Art 1, scope: regulate AI systems in Europe – so Regulation applies to all AI service providers offering service in Europe or located in Europe. AI is defined in Art. 3 as *software that is developed with one or more of the techniques and approaches listed in Annex I and can, for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments they interact with*, and it applies to providers placing on the market AI, users of AI in the Union.

AI are assuming a greater importance and are more and more used to collect, clean, and process data. They are already being used in the implementation of certain online platforms and application services, and, if they are not already very common in the agri-data sector, they will soon become popular. It is thus important, when implementing the multi-actor approach of the shared agricultural data space, to take into account the AI Act – even if it is still in the form of a proposal.

Prohibited AI practices [Art. 5]:

- Using subliminal techniques to distort users' behavior, classify natural persons, exploit vulnerabilities of a specific group of persons due to their age, physical or mental disability causing physical or psychological harm;
- The use of 'real-time' remote biometric identification systems in publicly accessible spaces for law enforcement purposes, except for specific objectives such as search for victims of crime, prevention of imminent threat to life or physical safety, and detection or prosecution of a criminal offense punishable for at least three years.

An AI is considered High Risk AI if [Art. 6]: it is used as safety component of a product, or is itself a product, and is *required to undergo a third-party conformity assessment with a view to the placing on the market or putting into service of that product.* AI users or producers should comply with regulations defined in chapter 2:

- Conformity assessment: before being placed on the market or put them into service, the providers have to make sure the AI complies with the AI regulation [Art. 9]. Moreover, the provider should take appropriate measures for risk management, documentation, and testing [Art. 10]. This article refers, among others, to food retail companies using AI to improve advertising and search potential buyers.
- Technical documentation: Providers must prepare technical documentation that includes information on the design, functioning, and intended purpose of the AI system, as well as information on the identified risks and the measures taken to address them, and keep records of any change, malfunction, incident or update [Art. 11, 12]. It applies to companies developing AI programs that are used to improve processes in the Agrifood data space, such as identification of food maturation, prediction of livestock diseases, improvement of food processing. Art. 12.1(d) can also apply to those people who use software and who are experts in the field and can verify what the AI has predicted, such as livestock farmers and farmers.
- Transparency obligations: Providers must ensure transparency by providing clear and comprehensive information to users, including information on the system's capabilities and limitations, as well as any potential bias or limitations in the system's performance. Users need to be aware that they are dealing with an AI. When a video or photo is created through a deep fake, it must be clearly stated.
- Human oversight: Providers must ensure that their high-risk AI systems are subject to human oversight to monitor, control, and intervene in the AI system's decision-making process. Staff need to be trained and have enough skills. Post-market surveillance is required, in order to monitor the state of the AI [Art. 14]. regards companies developing AI programs that are used to improve processes in the Agri-food data space as well as to those farmers, ranchers or other subjects of the data space who have not developed the system but who use it and must maintain some control over it.
- Robustness and accuracy: Providers must ensure that their high-risk AI systems are robust and accurate. They must take measures to prevent errors and inaccuracies, and to ensure that the system remains reliable even in changing

conditions. The systems must be based on high-quality data, and the data used must be subject to appropriate governance and management practices. (Chapter 3: importance of transparence and clarity for users) [Art. 15].

- AI systems will have to undergo some conformity assessments, from a body selected by the member states. If the AI is complying with rules, the provider will obtain a certificate with a validity of 5 years. Before placing the product on the market, the provider or an authorized representative must register the system in the EU database referred to in Article 60. Moreover, MS will have to create and maintaining a database containing all AI related information. It will have to be publicly accessible.
- Member States should establish regulatory sandboxes where the testing, implementing and validation of Ai systems will have to be controlled, before placing the product on the market. Priority to access sandboxes is given to small firms and start-ups.

Article 83 of the EU's proposed AI regulation outlines that the regulation will not apply to AI systems that are already on the market or in use as components of large-scale IT systems established by legal acts listed in Annex IX, unless significant changes are made to their design or intended purpose. However, where applicable, the requirements laid down in the regulation should be taken into account in evaluating these large-scale IT systems. The regulation will apply to high-risk AI systems that were placed on the market or put into service before the date of application of the regulation, but only if significant changes are made to their design or intended purpose from that date.

AI Act & Agriculture

Even if the connection among AI and Agriculture does not seem evident, more and more firms and companies are relying on artificial intelligence be supported in the completion of different tasks. In fact, the AI has multiple and variate applications in the sector such as:

- It allows for precision farming;
- Machine Learning Algorithms can be used to study and monitor crops and soils;
- Generating prediction on yields and pests' infestations;
- Help optimizing the farming supply chain.

However, the proposed articles primarily focus on ruling and regulating the creation and development of new AI tools, while it does not cover the utilization of existing solutions. Therefore, in the context of DIVINE and the prospective establishment of Agri-data-sharing platforms, project managers would not be obligated to adhere to the aforementioned rules if the solution they intend to employ has already met the AI Act requirements. Nevertheless, the implementation of a new AI tool within the project would necessitate compliance with the Artificial Intelligence act.

DATA GOVERNANCE ACT - Regulation (EU) 2022/868

Summary: *Officially presented by Margrethe Vestager in 25 November 2020. Entered into force in June 23rd 2022. Applies from September 24th 2023.*
It seeks to increase trust in data sharing, strengthen mechanisms to increase data availability and overcome technical obstacles to the reuse of data. The Data Governance Act will also

support the set-up and development of common European data spaces in strategic domains, involving both private and public players, in sectors such as health, environment, energy, agriculture, mobility, finance, manufacturing, public administration and skills.

Description**:** The document aims at illustrating the techniques and best practices for public-sector institutions to share and re-use databases containing non-personal data. The act will represent a key pillar in the EU data legislation as it aims at regulating data harmonisation across Europe, fair data access, use, and clarifies who can create value from data and under which conditions. According to the European Union, it will set rules on data from the internet and ensure consistency between data accessing rights. Even if it will probably not be applicable to previous situations, all the new platforms and applications will have to be consistent with it. The text reviews certain aspects of the Database Directive. *Notably, it clarifies the role of the sui generis database right (i.e. the right to protect the content of certain databases) and its application to databases resulting from data generated or obtained by IoT devices*

Non-personal data are defined at Art.2 as *data other than personal data* (personal data are defined on the next chapter in Regulation EU 2016/679). The relevance of this regulation is given by the fact that non-personal data are still in need of protection, as they could cause harm if not used correctly (e.g., it could be possible to access personal data through cross-referencing non-personal datasets – Guideline 12 aims at avoiding it)

The regulation aims at:

- Making sure that undertakings data and interests, and specifically SMEs, are properly protected, in order to avoid markets lock-in effects*;*
- Providing guidelines for data re-use. *Common European data spaces should make data findable, accessible, interoperable and re-usable (the 'FAIR data principles')* [guideline *2*];
- Promoting data altruism for objectives of public interest [guideline 45]

The Regulation 2022/868 must be applied to all public-sector institutions using, transferring and exchanging data, as well as to intermediary services companies (already defined in the Digital Services Act above), excluding intermediators of copyrighted information. It does also apply to:

- Data covered by trade secret.
- Data covered by statistical or commercial confidentiality.
- Data covered by intellectual property rights (except for data *held by cultural establishments, such as libraries, archives and museums as well as orchestras, operas, ballets and theatres, and by educational establishments* [guideline 12]);
- Personal data, if not covered by Directive EU 2019/1024. [Art. 3]. The regulation can be applicable in the agricultural sector, as often data shared on online platforms are covered by confidentiality.

According to the regulation, the public sector bodies holding the protected data described above, should:

- Be prohibited to sign exclusive arrangement agreements [Art. 4];
- Make available to the public the data access and re-use conditions, ensure data anonymity and safety [Art. 5];
- May charge a fee for re-use. In this case it would be important to incentive re-users to use the data. The amount of the fee charged can be defined by the cost

of production provision and data dissemination, and/or the clearance of rights, and/or anonymization, and/or maintenance, and/or acquisition of rights, and/or assistance. The selected computation method has to be publicly available [Art. 6].

- Make sure that all the above-mentioned points are clearly defined and available at a single information point, and the delay of acceptance/refuse of data re-use is no longer than two months.
- Designate competent bodies to carry out different tasks [Art.7].

Art. 4, 5, and 6 assume relevance in relation to the multi actor approach, as they define the behavior and rules to account for when sharing data with stakeholders and third parties. In our situation, a platform that is managed by the public sector and is collecting, sharing and processing the farmers' data should be built in a way to ensure safety and anonymity, and at the same time allowing proper and pertinent data access. The public sector could establish rules to access and reuse those data. Stakeholders may need to provide some information about themselves and/or required to pay a certain fee. Moreover, intermediary services must act as neutral third parties, collecting and harmonizing data to connect companies to data users, and cannot monetise data. *Both stand-alone organisations providing data intermediation services only and companies that offer data intermediation services in addition to other services could function as trusted intermediaries. In the latter case, the data intermediation activity must be strictly separated, both legally and economically, from other data services*. In case company would like to do this, the competent authority will need to be notified. After obtaining the proper approval, the company can be labelled as "*data intermediation services provider recognised in the Union*"[8].

On the other hand, the data intermediation services have to:

- Have their main establishment in the Union, if they are offering their services in the EU;
- Use the data solely for the purpose of making it available to users, providing them in the original format, ensuring fair, non-discriminatory, and transparent access.
- Providers of services to data subjects: these are services helping people to exercise their rights over their data. *It is important that the business model of such providers ensures that there are no misaligned incentives that encourage individuals to use such services to make more data relating to them available for processing than would be in their interest* [Guideline 30].

Both the public bodies, as well as data intermediation services, altruistic institutions or data re-user, have to take *reasonable technical, legal and organisational measures, including contractual arrangements, in order to prevent international transfer or governmental access to non-personal data held in the Union where such transfer or access would create a conflict with Union law or the national law of the relevant Member State* [Art. 31]. *The framework offers an alternative model to the data-handling practices of the Big Tech platforms, which have a high degree of market power because they control large amounts of data*.

The Regulation continues then (Chapter 4) describing the requirements and obligations for managing the non-personal data in case of organisational and technical data altruism arrangements.

[8] https://digital-strategy.ec.europa.eu/en/policies/data-governance-act-explained

According to Art 16 and 17, the public platform can share data with third companies for “data altruism”. These need to be officially registered as data altruistic organisation.
and defines at Chapter 5 and 6 the competent authorities, as well as their duties.

REGULATION (EU) 2022/868 & Agriculture

The regulation EU 2022/868 is to be taken in account in DIVINE’s case, as the project falls under the European Union Horizon Project, and may thus be considered as a platform managed by the public sector. In fact, the above-described text of law focuses on regulating the non-personal data use and processing by the public institutions. In case DIVINE’s platform will be privately owned, the legislation will not be applicable. In terms of relationship of the regulation with the agricultural sector and its data, any data that is non-personal and transferred from end users (eg. Farmers) to the DIVINE platform will need to be considered as falling under the Data Governance Act. Some examples of these types of data are information on soil status, their yields, the amount of water or pesticides used, production information.

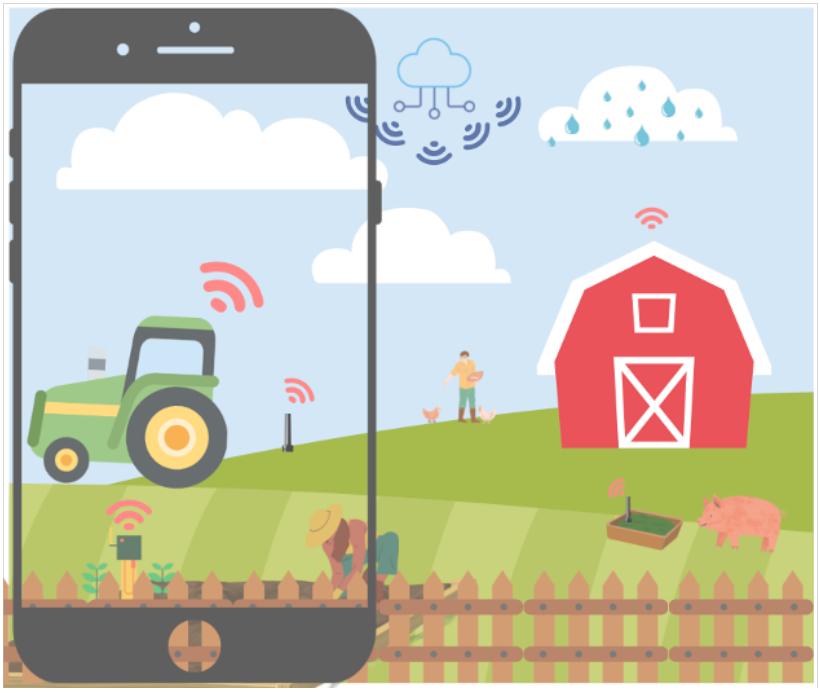

Figure 2: Source: Own

GENERAL DATA PROTECTION REGULATION – GDPR - Regulation (EU) 2016/679

Summary: *The regulation is an essential step to strengthen individuals' fundamental rights in the digital age and facilitate business by clarifying rules for companies and public bodies in the digital single market. A single law will also do away with the current fragmentation in different national systems and unnecessary administrative burdens.*
The regulation entered into force on 24 May 2016 and applies since 25 May 2018.

Description: The goal of the regulation EU 2026/679 is, as the Directive 95/46/EC that is repealing, to *harmonise the protection of fundamental rights and freedoms of natural*

persons, laying down rules aiming at protecting the processing and the flow of personal data [Art. 1], handled both through automated and manual means [Art. 2]. Personal data are referring to natural persons data – and not to legal persons, to which this regulation does not apply, and are defined by Art. 4 as *any information relating to an identified or identifiable natural person ('data subject'); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person.*, The activities or establishments processing these kind of data are always subject to the rules defined in this regulation, as long as their data subject is located in the EU. The processing of personal data for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes should be subject to appropriate safeguards for the rights and freedoms of the data subject pursuant to this Regulation. Where personal data are processed for scientific research or statistical purposes, this Regulation should also apply to that processing.

The principles relating to the processing of personal data include [Art. 5,6,7]:

- Processing data lawfully:
  - Prohibition to process data revealing data concerning health, sex life or orientation, revealing ethnicity or religious beliefs [Art. 9], unless explicit consent is given;
  - Required data subject's consent – which should be explicit and withdrawn easily;
  - To perform a contract of which the subject is party;
  - To comply with a legal obligation;
  - To protect vital interests, public interest, or legitimate interests pursued by the controller or a third party;
  - Data have to be collected for specific, legitimate purposes;
- Processing data transparently:
  - In collecting data:
    - [Art. 13]. When directly collecting farmer's data, the controller – so in our case the organism or organisation that will take care of processing farmer's data – will have to provide the following information: its identity and contact information, the purpose of the personal data processing, the recipients of the data, a statement mentioning where and how to ratify or erase the information, and if and through which channels the data will be shared with third countries. In addition to that, information on how long the data will be stored, as well as how to lodge a complaint, and, in case of the existence of automated decision making, a notification on the logic involved. In case the data have been obtained indirectly [Art. 14], the organisation will also have to notify the farmer on the category of personal data collected.
  - In processing the data:
    - right for data subject to access its data

- rectify and erase them [Art. 17.2]: If the farmer wants its personal data to be erased, the controller has the charge to contact eventual data re-user and ask them to eliminate their data.
- Choice to restrict data processing;

- In data visualization;
- Using clear language;

- Processing data fairly:
  - Actions taken by subjects in managing their data should be free of charges;
  - Data subject should have the right to transmit them to a different controller [Art. 20];
  - Storing data for no longer than necessary;
  - Ensuring data accuracy, security and confidentiality [Art. 25.1]: depending on the context, whenever the controller wants to share personal data, it should implement appropriate technical measures to ensure data protection. One of the most common techniques is pseudonymization;
  - Minimizing the data collected only to what is necessary [Art. 25.2];
  - Data cannot be shared from one processor to the other without explicit written consent, and in case the second processor does a specific work for the first, the same data protection obligations should be valid for the two processors [Art. 28, 29]. In agri-data case, if the government does most of the job in processing data, but asks a third party to work for him, the same data protection rules apply to both the organisation and the third party, and the third party will have to act under the authority of the organisation.
- Keeping data up to date;
- Establish proper risk-avoidance measures, especially focused on accidental or unlawful destruction, alteration or access to the data [Art. 32.2]. Articles 33 and 34 define what to do to avoid, or in the worst case notify, the data subject of a personal data breach.

Chapter 5 of the regulation lays down the rules for data transfer towards third countries or international organisations. This exchange of data is possible if and only if the processor or the controller are complying with the conditions defined in this chapter [Art. 44]. According to Art. 45,46 the data sharing towards third countries is possible where the EC has assessed the country meets the adequate level of data protection, or where the *processor has provided appropriate safeguards, and on condition that enforceable data subject rights and effective legal remedies for data subjects are available*. In case of legal processes, the transfer of personal data can be effectuated only if an international agreement exists between a MS and the third country [Art. 48]. Derogations to chapter 5 are listed in Art. 49.

Art. 82: states that in case of non-compliance with the regulation, controllers could be liable for the damage caused to any person that suffered material or non-material damage. So, in the agri-data sector, if farmers are damaged by data misuse, the organisation managing their personal data will be considered responsible of the harm and be required to pay a compensation to the person.

Regulation (EU) 2016/679 & Agriculture

The GDPR regulation applies to all personal data that can be referred or cross-referenced to a single natural person and does not make distinctions by sector of application. While there is no strict relationship General Data Protection Regulation and agriculture, the text of law makes it clear that the articles and rules mentioned in the regulation must be followed by all firms and activities, as long as their data are held on the European Union. DIVINE must then account for this law in its data architecture definition and management.

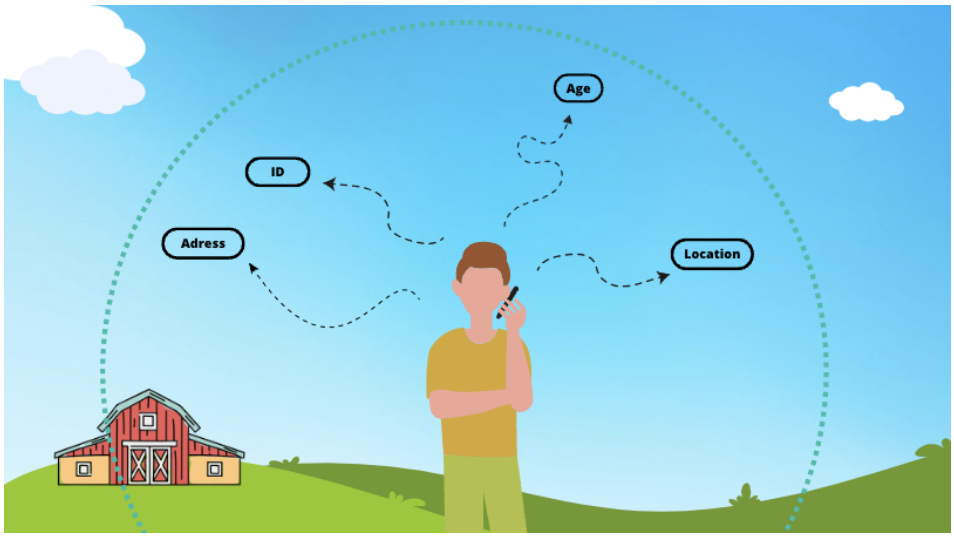

Figure 3: Source: Own

OPEN DATA DIRECTIVE (EU) 2019/1024 & IMPLEMENTING ACT OF HIGH VALUE DATASET

Summary: *The Open Data Directive mandates the release of public sector data in free and open formats. Full title "Open Data and re-use of Public Sector information Directive* ***(EU) 2019/1024****". The overall objective of the Directive is to continue the strengthening of the EU's data economy by increasing the amount of public sector data available for re-use, ensuring fair competition and easy access public sector information, and enhancing cross-border innovation based on data.*

The main principle of the Directive is that government data should be open by default and design. The provisions of the Directive include:

- *Release of non-personal data in open formats and to open standards.*
- *Data to be available in real time and via APIs (where possible).*
- *New rules on charging - free reuse becomes a principle.*
- *Re-use of publically funded research data.*
- *List of High Value Datasets (HVDs) to be laid down in an Implementing Act.*
- *Prevention of data lock-in, exclusive arrangements discouraged.*
- *Re-use of data held by public undertakings such as public utilities and transport provider.*

The Implementing Act of High Value Datasets is a document enlarging the list – laid down in the Open Data Act – of the so called "High Value Datasets". *The text has been adopted by the European Commission inter service college and is now just awaiting final formal publication.*

Description & Relation to DIVINE and Agriculture: the directive 2019/1024, whose objective is to guarantee the availability and facilitate the re-use of public data, has to be applied to all existing documents held by the public sector covering public tasks, research data and public services operators, but not to documents held by public undertakings that are not related to the provision of services in the general interest or are directly exposed to competition [Art. 1]. Art. 4 assumes its relevance specifically in the multi actor approach, as it defines the rules and timing needed for a public data re-user to request and obtain the approval to access and re-use them. Annex 1 (enlarged by Art. 1-6 of the Implementing Act, which maintains the following structure and six macro-categories) lists the thematic groups of high-value datasets - *documents the re-use of which is associated with important benefits for society, the environment and the economy, in particular because of their suitability for the creation of value-added services, applications and new, high-quality and decent jobs, and of the number of potential beneficiaries of the value-added services and applications based on those datasets* [Art. 2]:

1. Geospatial
2. Earth observation and environment
3. Meteorological
4. Statistics
5. Companies and company ownership
6. Mobility

The article and the annex are applicable to DIVINE as the Agrifood Data Space will have high chances of dealing with high value geo-referenced data. As they have high value data stored, these will be identified and will have a report or file where they are identified [Art. 5]
All these data will need to be *available free of charge, machine readable, provided via APIs, and provided as a bulk download, where relevant* [Art 14].
Categories 1-3 are extremely relevant for farmers, as they often deal with high value geo-referenced data, as they can be used for environmental benefits (e.g., measuring the NVDI of vegetation for ecological and environmental purposes). On the other hand, the data in section 4 – 6 are more interesting for stakeholders, as research stakeholders could study and analyse different kinds of data as well as their interactions. A special mention has to be done when discussing geo-localisation: GPS location data are considered personal data, and thus their processing and sharing cannot be given to everyone. In this case, to correctly handle GPS location data it will be necessary to follow the GDPR regulations.
Examples of datasets created with open data: https://landsat.gsfc.nasa.gov (Landsat), https://modis.gsfc.nasa.gov (Modis), https://www.copernicus.eu/en (Copernicus). They all offer very intuitive user interfaces, and obtaining a dataset over a region of the Earth's surface is therefore not a complicated task.
The definition of an open and high-value dataset list implies that, in the construction of a data sharing space among farmers and stakeholders, the usage of already existing and government-owned data relatively to the six above-mentioned categories should be permitted and accessible. The possibility of integrating them in the platform would represent an advantage for both farmers and stakeholders, as the first would be able to integrate geospatial and meteorological information to their private ones to know where and when is the optimal moment to plant their seeds, and the seconds to conduct better analysis.
Nonetheless, before having a complete access to those data, it is necessary to wait that the approval is accepted by the public body: according to the Directive, the approval cannot

take more than 20 working days – or 40 in case of an exceptionally large request – and has to be executed as soon as possible. When access is refused, the body needs to explain the reasons for the rejection.
Chapter III defines the conditions public bodies will have to follow when managing those data:

- Public bodies and public undertakings need to make sure their documents available in their pre-existing format, in open formats, machine readable, clear and containing their metadata [Art. 6];
- Re-use has to be free of charge – excluding libraries and museums, who are allowed to charge a fee [Art. 7];
- Facilitate cross-linguistic searches [Art. 9]
- Keep into account property rights, as well as personal data protection and confidentiality.

E-PRIVACY DIRECTIVE 2009/136

Summary*: Directive 2009/136/EC which came into force in May 2011, concerns the processing of personal data and the protection of privacy in the electronic communications sector (pdf). It is usually referred to as the "E-privacy Directive" and is an amendment of Directive 2002/58/EC.*
The E-privacy Directive covers processing of personal data and the protection of privacy including provisions on:

- *the security of networks and services;*
- *the confidentiality of communications;*
- *access to stored data;*
- *processing of traffic and location data;*
- *calling line identification;*
- *public subscriber directories; and*
- *unsolicited commercial communications ("spam").*

The main changes to the 2002 Directive include a rule requiring the notification of data breaches (for instance someone whose personal data are lost, modified or accessed unlawfully while being treated by its electronic communications provider should be notified if this breach is likely to affect him/her negatively) and an extension of the Directive to also cover various electronic tags, strengthened enforcement rules, etc.

Description & Relation to DIVINE and Agriculture [ePrivacy Directive + Directive 2002/58/EC]:
Art 1: defines to who the directive applies. Its objective is to harmonises the provisions of the Member States, in order to ensure an equivalent level of protection for fundamental rights and freedoms, particularly the right to privacy as well as confidentiality, with regard to the processing of personal data in the electronic communication sector and to ensure the free movement of such data as well as of electronic communication equipment and services in the Community. It applies to processing of personal data in the public electronic communication services (phone companies, satellites; internet providers). In DIVINE's case the regulation is relevant as it applies to data storing systems (electronic communication networks are defined by section 32 of Communications Act), and in the case of the project the platform created will store those data. Art 4 states that the service provider must make sure that the data is

safeguarded and protected by accidents, and personal data accessible only to legally authorized personnel. With this regard, in the event of a personal data breach, providers of electronic communications services must promptly inform the relevant national authority. If the breach is likely to affect the data or privacy of an individual, the provider must also notify the individual without undue delay (unless proven to authority that issues have been solved).
Relatively to the usage and storage of traffic data, the provider of a public communications network or publicly available electronic communications service must erase or anonymize traffic data (Art. 2: *means any data processed for the purpose of the conveyance of a communication on an electronic communications network or for the billing thereof)* once it is no longer needed for transmission purposes, unless certain exceptions apply. Traffic data may be processed for subscriber billing and interconnection payments, but only for a limited period. The provider may also process traffic data for marketing or value-added services with the user's prior consent, and users may withdraw consent at any time. The provider must inform the user of the types and duration of traffic data processing for these purposes. Processing of traffic data is limited to those authorized and necessary for such activities [Art. 6]. According to Art 8 and 9, service providers must allow calling users to prevent the presentation of their calling line identification on a per-call basis, and calling subscribers to do so on a per-line basis. Meaning that the organisation managing DIVINE cannot allow the connection between a phone number and the identification of a person. *Where location data other than traffic data, relating to users or subscribers of public communications networks or publicly available electronic communications services, can be processed, such data may only be processed when they are made anonymous, or with the consent of the users or subscribers to the extent and for the duration necessary for the provision of a value-added service.* Location information can only be accessed by third part if is anonymized and obtained with explicit consent.
Unsolicited communications by a machine can be done only if person gave consent.
However, if a customer purchases something and gives his email address, that address can be used for direct marketing (even if the customer should always have the possibility to freely remove his email address). [Art 13].

DATA ACT - Proposal

Summary: The Data Act aims at promoting a competitive data market, while protecting justice in the digital sphere and creating possibilities for data-driven innovation and increasing data accessibility for all. According to Margrethe **Vestager**, Executive Vice-President for a Europe fit for the Digital Age, said: *"We want to give consumers and companies even more control over what can be done with their data, clarifying who can access data and on what terms. This is a key Digital Principle that will contribute to creating a solid and fair data-driven economy and guide the Digital transformation by 2030."*[9]

[9] https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1113

Figure 3: Source: European Commission

The proposal (2022) for the Data Act includes:

a. *Measures to allow users of connected devices to gain access to data generated by them, which is often exclusively harvested by manufacturers; and to share such data with third parties to provide aftermarket or other data-driven innovative services. It maintains incentives for manufacturers to continue investing in high-quality data generation, by covering their transfer-related costs and excluding use of shared data in direct competition with their product.*

b. *Measures to* ***rebalance negotiation power for SMEs by preventing abuse of contractual*** *imbalances in data sharing contracts. The Data Act will shield them from unfair contractual terms imposed by a party with a significantly stronger bargaining position. The Commission will also develop model contractual terms in order to help such companies to draft and negotiate fair data-sharing contracts.*

c. *Means for* ***public sector bodies to access and use data*** *held by the private sector that is necessary for exceptional circumstances, particularly in case of a public emergency, such as floods and wildfires, or to implement a legal mandate if data are not otherwise available. Data insights are needed to respond quickly and securely, while minimising the burden on businesses.*

d. *New rules* ***allowing customers to effectively switch*** *between different cloud data-processing services providers and* ***putting in place safeguards against unlawful data transfer****.*

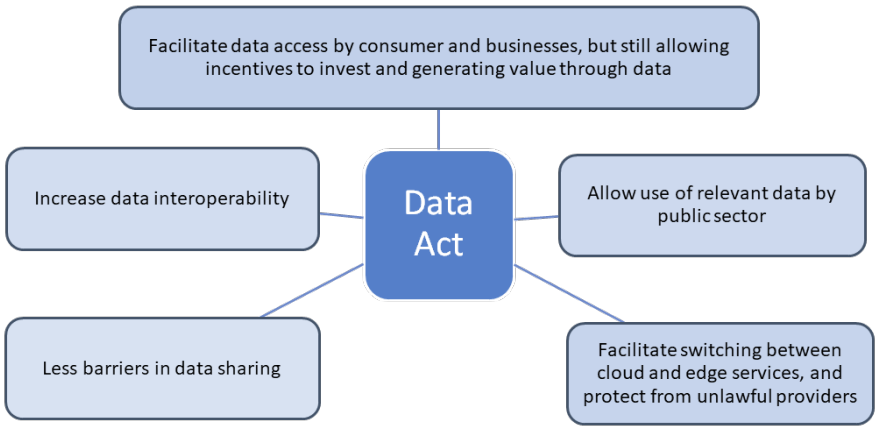

Figure 4: Source: Own

Description: one of the main goals of the EU data strategy consists in promoting the development of *trustworthy technology to foster an open and democratic society and a vibrant and sustainable economy*[10]. Nonetheless, the prerequisite to achieve that goal is to establish a clear and transparent data access and processing framework. According to the Factsheet published by the EC on February 23rd, 2022, the new regulation will help the EU exploit the potential of its data.

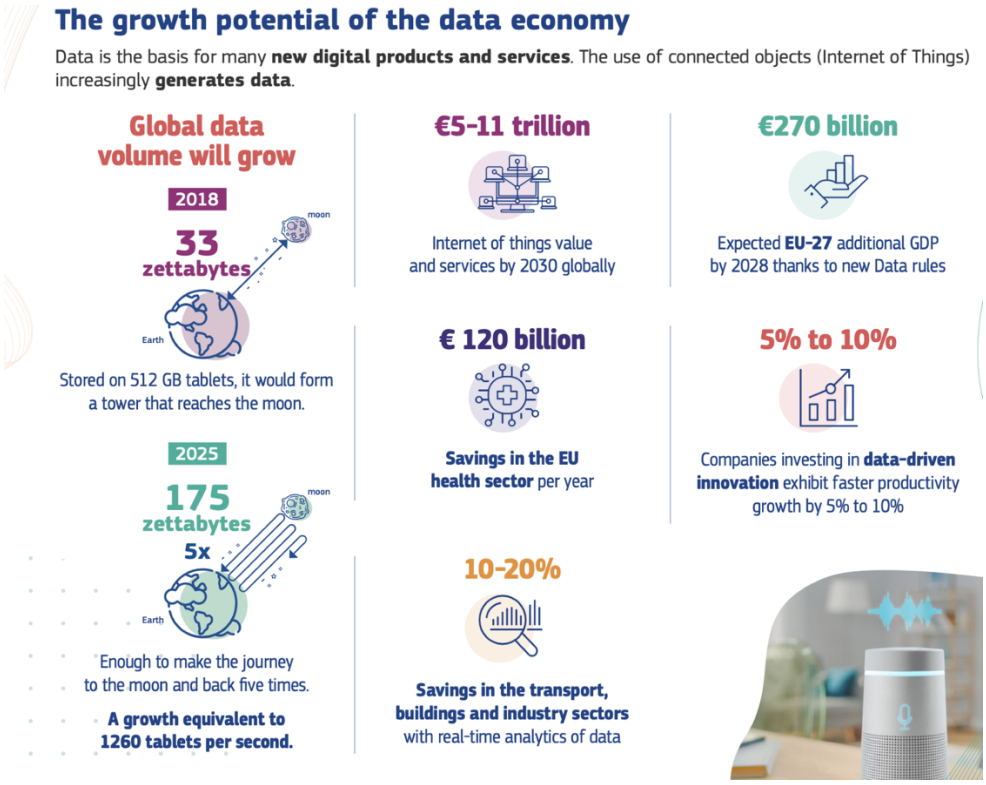

Figure 5: Source: Data Act Factsheet 2022

The last proposal, updated in February 2022, applies to [Art. 1]:

[10] https://ec.europa.eu/commission/presscorner/detail/en/ip_20_273

(a)manufacturers of products and suppliers of related services placed on the market in the Union and the users of such products or services;
(b)data holders that make data available to data recipients in the Union;
(c)data recipients in the Union to whom data are made available;
(d)public sector bodies and Union institutions, agencies or bodies that request data holders to make data available where there is an exceptional need to that data for the performance of a task carried out in the public interest and the data holders that provide those data in response to such request;
(e)providers of data processing services offering such services to customers in the Union.[11]
On the other hand, the regulation does not apply to gatekeepers, as well as to SMEs [Art. 7].
According to the proposal, the IoT (Internet of Things) technologies collecting data should make the last available to the tool user. A user is defined in Art. 2 as *a natural or legal person who owns, rents, or leases a product or receives a service*. The application of this regulation would impact farmers and breeders using smart technology tools such as sensors, connected machines or drones. In order to comply with the law, IoT services providers should share with farmer all the data collected that relate them, and the latest should be aware of which data is collected and on which amount, as well as how to access the data, who is the data holder, and how to request to share it with third party – which can be done by receiving a reasonable compensation [Art. 9]. Nonetheless, the data holder is allowed to apply technical protection measures to prevent unauthorized access [Art. 11].
All these processes should be carried out in a non-discriminatory way, and, where the data collected is not directly available from the IoT tool, the data holder should make sure the user can somehow access them [Art. 4, 8]. A third party receiving the data, as well as the data holder, must not use any non-personal data generated using the product or related service to derive insights about the economic situation, assets, and production methods of the third party unless the third party has consented to such use and has the technical possibility to withdraw that consent at any time [Art. 6].
The law also specifies that data-sharing practices should not be unfair to small or micro companies [Art. 13], but that they should allow authorities – after having notified the data subject – to access data in case of exceptional needs [Chapter V].
Chapter VI discusses data interoperability. In fact, Art. 23 states that providers of data processing services must remove commercial, technical, contractual and organisational obstacles which may inhibit customers from terminating the contract or conclude a new one: the service should allow for data portability. All these rules regarding a contract-switching eventuality have to be clearly stated in a contract [Art. 24], which must also specify which data and applications can be exported during the process. *If the mandatory transition period is not technically feasible, the provider must notify the customer and provide an alternative transition period that does not exceed 6 months. Service continuity must be ensured throughout the alternative transition period against reduced charges.* Article 26 specifies that providers of certain data processing services must ensure functional equivalence for customers after switching, while others must make open interfaces available and ensure compatibility with interoperability specifications or export data at the customer's request. The essential requirements for interoperability of data sharing mechanisms and services are outlined in Art. 28.

[11] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A68%3AFIN

All Chapter VI will have a strong impact on the structure of DIVINE's data sharing platform. In fact, according to the proposal, all platform users should be allowed to easily switch between one service provider and another. This implies that the architecture of the platform needs to consider the market status and common practices, in order to comply with the law and allow for an easy data exchange between platforms.
Regarding eventual switching fees, Article 25 states that from [date X+3yrs], data processing service providers cannot charge customers for switching processes, while between [date X] and [date X+3yrs], reduced charges may be imposed, but they cannot exceed the provider's direct costs for the process. Operators of data spaces are required to comply with these requirements, which include the description of dataset content, data structures, and technical means to access data, as well as the provision of means to enable the interoperability of smart contracts, whose essential requirements such as robustness, safe termination and interruption, data archiving and continuity, and access control are outlined in Article 30.

The European Parliament and the Council of the EU reached an agreement on the Regulation on June 28th 2023. *The political agreement reached by the European Parliament and the Council is now subject to formal approval by the two co-legislators. Once adopted, the Data Act will enter into force on the 20th day following its publication in the Official Journal and will become applicable 20 months after the entry into force*[12].

Cybersecurity Package

The European Union's Cybersecurity Policies aim to protect EU citizens, businesses, and infrastructure from cyber threats. The policies include measures to enhance cybersecurity capabilities, promote the use of secure technologies, and establish cooperation between member states and private entities.
The EU has established a cybersecurity certification framework to encourage the adoption of secure products and services and ensure that they meet minimum cybersecurity standards. The framework also aims to increase trust in digital products and services across the EU.
The EU's policies also include initiatives to strengthen the resilience of critical infrastructure, such as energy grids and transportation networks, against cyber attacks. Additionally, the EU is working to improve the ability of law enforcement agencies to investigate and prosecute cybercrime.
Overall, the EU's cybersecurity policies aim to create a safer and more secure digital environment for all EU citizens and businesses.
Practically, for a company to be in line with the regulations, the Ict will need to use some specific certified "products". For the next decade, Europe plans to develop a strong cybersecurity framework (2021-2027).

Cyber Security Act - Regulation (EU) 2019/881

Description: The regulation defines the behavior of different bodies – MS and organisms working for them - in supporting public sector bodies to improve the *prevention, detection and analysis of cyber threats and incidents and to improve their capabilities to respond to such cyber threats and incidents, through appropriate suppor*t [Art. 6]. The regulation establishes a new organism, called ENISA, aiming at supporting MS in developing safe and valuable

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cybersecurity tools. The organisation will support data and processes standardization and issue certifications [Art. 8]. From TITLE III on, the text explains that EU should define a cybersecurity framework to improve the functioning of the internal market, and that the ENISA should provide support in the completion of this task. Art 14: necessary to establish a cooperation group among MS to exchange info from one country to other.

DIRECTIVE (EU) 2022/2555

Description: The Directive Applies to all sectors listed in Annex I and II [Art. 2], such as digital providers (only if considered, according to the law, as medium size digital providers), and public administration bodies (independently form their dimension). Art 4: this directive is applicable but if there is a more stringent rule on security laid down in some act for the specific sector, the more stringent rules apply. According to Art. 6-10, all the EU Member States should set up cybersecurity rules to comply with this directive, and that they should establish a computer security incident response teams (CSIRTs). In terms of EU level coordination, except the ENISA, Art. 16 defines the establishment of an organism called *EU-CyCLONe to support the coordinated management of large-scale cybersecurity incidents and crises at operational level and to ensure the regular exchange of relevant information among Member States and Union institutions, bodies, offices and agencies*. Art 25 encourages *the use of European and international standards and technical specifications relevant to the security of network and information systems.*

Framework for Free Flow of non-Personal Data - Regulation (EU) 2018/180

Description: Adopted in 2018, the main goal of the regulation is, how defined by Art. 1, *to ensure the free flow of data other than personal data within the Union.* It applies to whoever processes electronic data. The Regulation being extremely short (9 articles only), the most interesting information can be found at Art 4, which explains that one cannot Impose localisation restriction on these kind of data and Art. 6, which encourages the development of codes of conduct (explaining the best practices for switching service providers, provision of transparent information, certifications schemes to compare different products and services).

Cybersecurity Package & Relation to DIVINE and Agriculture

Overall, the Cybersecurity Act does not strictly relate to agriculture nor define rules or best practices on how to handle data, as it strictly focuses on regulating the establishment, scope, and functions of the ENISA organisation. However, in terms of relevance with relation to the Horizon-DIVINE project, ENISA produced in 2022 a report on National capabilities assessment framework, that aims at providing Member States with a self-assessment of their level of maturity by assessing their NCSS objectives, that will help them enhance and build cybersecurity capabilities both at strategic and at operational level.[13] Even if the guidelines are referred to the EU MS rather than to organisation, it will be relevant to monitor them and eventual future developments. Something similar can be said in relation to Directive 2555.

[13] https://www.enisa.europa.eu/topics/national-cyber-security-strategies/national-cyber-security-strategies-guidelines-tools/national-cybersecurity-assessment-framework-ncaf-tool#/

Unless DIVINE is established as a publicly owned online platform, the rules laid down in the law text do not directly and strictly apply to the project.
On the other hand, DIVINE and the project of the creation of an agri-data-sharing platform will be impacted by the Framework for Free Flow of non-personal Data. As it applies to electronic data and whoever processes them. The regulation then will impact DIVINE, as, among all the farmer's data that aiming at collecting, some will be non-personal data, which will have to be processed according to the rules laid out in this framework. In brief, while data portability and cooperation on data exchange should be promoted by the EC at the EU level [Art. 4,5,6,7], all *data localisation requirements shall be prohibited, unless they are justified on grounds of public security in compliance with the principle of proportionality.* Thus, DIVINE cannot freely use, and transfer data related to geo-localisation of farmers.

Guidance on private sector data-data sharing between businesses and the public sector

Summary: The Business-to-Government (B2G) Data Sharing for the Public Interest report explores the potential benefits and risks associated with the sharing of data between businesses and government entities. *Indeed, business- to-government (B2G) data sharing for the public interest can be a game-changer for improving general welfare. This report Summarises the expert work and contains key recommendations that will contribute to making B2G data sharing a responsible, sustainable and scalable practice in the EU.* Roberto Viola, Director General For Dg Communications Networks.
In DIVINE's case, the following information are relevant as the agri-data platform which will be developed aims at promoting data sharing among different players, such as farmers and types of stakeholders. By reading the following report, the problems, challenges, and eventual solutions related to the (agricultural) data sharing will be clarified.

Description: European countries have a large amount of privately held data that could be used for the public good, but they are not utilizing it to its full potential. Due to organisational, technical and legal obstacles (as well as an overall lack of a data-sharing culture) business-to-government (B2G) data-sharing partnerships are still largely isolated or exploited only for short-term collaboration. With respect to all these issues, and as an introduction to the B2G Report, commissioner for Internal Market, Thierry Breton, mentioned that he sees an opportunity to lead the data revolution on the world stage by encouraging more secure and regular data sharing across the EU, as business-to-government data sharing could become a game-changer for the public interest. Similarly, the rapporteur of the High-Level Expert Group on B2G Data Sharing, Alberto Alemanno, suggests that *the EU might become a global leader in fostering not only a framework for B2G data access, but also a sensible, inclusive and participatory data culture through a set of viable, practicable and scalable welfare-enhancing solutions*[14]. The idea behind the B2G Report is to increase private to public sector data sharing thanks to an appropriate and tailored policy, clear and structured laws, and fair investments. The areas to focus into, in order to incentive and promote the Business to Governance collaboration are:

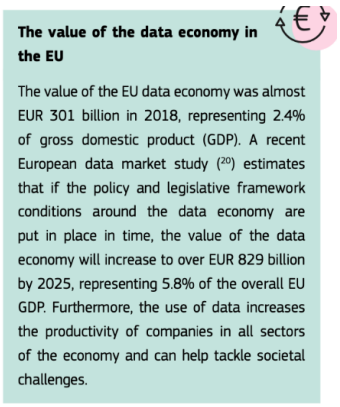
- Development of an appropriate system for B2G data sharing governance across the EU, such as putting in place national governance structures, setting up

[14] b2g_data_sharing_report__hleg_0891ACFC-BF33-AA88-24DA996D50D4D220_64954.pdf P 16

a recognised function ('data stewards') in public and private organisations, and exploring the creation of a cross-EU regulatory framework.

- Promoting transparency, citizen engagement and ethics, such as making B2G data sharing more citizen-centric, developing ethical guidelines, and investing in training and education.
- Implement operational models, structures and technical tools, such as creating incentives for companies to share data, carrying out studies on the benefits of B2G data sharing, and providing support to develop the technical infrastructure through the Horizon Europe and Digital Europe programs.

However, different challenges, technical and non-technical, are rising.



The value of the data economy in the EU

The value of the EU data economy was almost EUR 301 billion in 2018, representing 2.4% of gross domestic product (GDP). A recent European data market study ([20]) estimates that if the policy and legislative framework conditions around the data economy are put in place in time, the value of the data economy will increase to over EUR 829 billion by 2025, representing 5.8% of the overall EU GDP. Furthermore, the use of data increases the productivity of companies in all sectors of the economy and can help tackle societal challenges.

Figure 6: Source: B2G Guidelines Report

First, it is necessary to keep in mind that, in order to bolster this B2G collaboration, the proper identification and qualification of 'public interest' is crucial. *While 'public interest' broadly refers to the welfare of individuals in society, its exact boundaries remain largely undefined, being heavily dependent on socioeconomic, cultural and historical factor. Therefore, instead of trying to define public interest in a 'one-size fits all' manner, the expert group acknowledged the context-specific nature of this concept and identified instead a set of criteria to help qualify whether a given purpose is in the public interest*[14]. Following this definition criteria, such data sharing can enable government entities to improve their service delivery and decision-making processes, as well as support businesses in better understanding and complying with regulatory requirements.

The application of the B2G guidelines can serve the public interest in at least five different ways:

- To improve situational awareness;
- To better understand the causes and variables behind the current situation;
- To more accurately predict and forecast;
- To run more rigorous impact assessments and evaluations (of any intervention) in order to better define the policy problem and identify the most effective policy options;
- To guide public management decisions taken either by humans or automated processes.

On the other hand, businesses could be better supported in understanding and complying with regulatory requirements, as government entities can provide guidance based on the data

they receive from businesses. This would be a great advantage, especially for SMEs, as they will be able to reduce their costs and increase their efficiency.

What are the Challenges?

Absence of a data-sharing culture: It is necessary to balance the benefits of data sharing with the need to protect individual privacy. The report notes that data sharing must be conducted in a secure and transparent manner, with appropriate safeguards in place to protect personal information and prevent misuse of data. Moreover, the authority should ensure that data sharing is conducted in a way that is fair and equitable. This includes ensuring that all businesses have equal access to government services and that data sharing does not unfairly advantage certain businesses over others. Under this point, the experts highlighted the absence of a coherent ethical approach to B2G data sharing, and, as a consequence, a lack of quantifiable economic and societal gains of B2G data sharing.

On the contrary, there are instances where individuals are not necessarily averse to the idea of sharing their data; rather, they frequently lack awareness regarding the potential opportunities and benefits associated with data sharing.

Several best practices that should be followed when sharing data between businesses and government entities. These include:

- Prioritizing privacy and security: Data sharing must be conducted in a way that protects individual privacy and prevents misuse of data. This includes implementing strong data protection and security measures, as well as providing clear guidance on how data will be used and shared.
- Ensuring fairness and equity: B2G data sharing must be conducted in a way that is fair and equitable, ensuring that all businesses have equal access to government services and that data sharing does not unfairly advantage certain businesses over others.
- Establishing clear governance structures: Clear governance structures must be established to oversee B2G data sharing initiatives. This includes establishing clear roles and responsibilities for government entities and businesses, as well as implementing mechanisms for transparency and accountability.
- Maximizing transparency and openness: B2G data sharing must be conducted in a transparent and open manner, with clear communication channels established between government entities and businesses. This includes providing businesses with access to information on how their data is being processed and stored.
- Implement Data Intermediation services to shed light on the advantages data sharing and data altruism may offer.

Organisational challenges: A data provider must weigh the benefits against the costs and risks of a given data-sharing initiative. This includes:

- The absence of dedicated structures and legal framework: The main tool used today for B2G data sharing is contractual agreements. Yet, contracts are often phrased in a highly restrictive way vis-à- vis the actions to be performed on the data and may therefore limit its use or render big data analytics unworkable.
- Shortage of dedicated functions in the field: The potential of data collaborations for public-interest purposes is also hindered by the absence of dedicated professional figures in this emerging sector.
- Economic barriers: The major economic barriers that distinguish feasible from unfeasible B2G data-sharing operations consist of a lack of incentives for private firms to contribute to the production of public benefits, high *ex ante* transaction costs and perceived *ex post* risks, and monopolistic data suppliers and data pricing.

Operational and technical challenges: Security and privacy of the data are prerequisites for B2G data sharing to happen. From an operational and technical perspective, the availability of trusted technical systems that enable 'safe' B2G data sharing is currently limited; Moreover, the legal landscape for data sharing is highly fragmented: Some Member States have adopted horizontal, or even sector-specific, legislation concerning data sharing with the public sector. Thus, due to the lack of a common, consistent approach to B2G data sharing, a risk of fragmentation exists both between Member States (which can harm the functioning of the single market, as companies and organisations may have to respect as many different legal frameworks) and between sectors (due to fragmented practices and rules within sectors, the full value that could be derived from combining datasets from different sectors is not reaped).

A similar issue has to be discussed relatively to data quality: in fact, it needs to be fit for purpose depending on the intended use case, but there is currently no common system to measure data quality. Additionally, using private-sector data for policymaking can lead to biased results since the data only represents the customer base of the company or organisation that collected it. To avoid this, public-sector bodies need to access data from multiple sources to achieve a representative mass of data. Other challenges include lack of real-time access, technical difficulties in combining data from different sources, interpretability of machine-learning models, and lack of accurate training datasets. As a solution, *the expert group recommends the development of incentives as well as public investment to encourage participation in B2G data-sharing pilots or sandboxes. Horizon Europe funding should also target the development of technologies that ensure the secure and trusted transfer and processing of data operations in real-world conditions. Finally, further empirical evidence should be obtained on the quantitative impact of B2G data sharing for the public interest.*

At the moment, the most used data-sharing practices between private and public sector consist in:

1. A private data provider conducts all the data analysis in-house and then shares with public authorities, or the general public, the insights that emerge from that analysis.
2. A data provider can host external researchers within its network to analyse data and report findings publicly.
3. A data provider works with other data providers to share data or insights derived from the data amongst themselves, and also with public authorities.
4. A data provider shares data with trusted third parties.
5. A data provider allows direct access to some of its datasets.

Nonetheless, the procurement of data is frequently an ineffective and inefficient mechanism to enable B2G data sharing for public-interest purposes. B2G data sharing for the public interest emerges as a novel form of collaboration between data providers and data users. As a solution, the EC experts suggest that *to create such an environment, action* is needed *in five areas: to ensure transparency on B2G data-sharing partnerships; to improve public awareness and participation in prioritising societal challenges; to advance data-donation mechanisms; to develop a data ethics framework, and to foster specialised and bespoke digital skills.* National structures to support B2G data sharing, champions of data sharing, incentives for the private sector, as well as legal certainty will then need to be tackled to bolster cooperation.

Finally, business-to-government data collaborations should follow several principles. First, the request and use of private-sector data should have clear public interest and be balanced with private sector interests. Second, collaboration agreements should specify the intended public-interest purpose, data-use rights, and respect existing legislation. Third, risks should be mitigated and safeguards implemented to protect stakeholders' rights. Fourth, compensation should reflect the public-interest goal, and non-discrimination should be ensured. Fifth, limitations of private-sector data should be addressed, and support provided to assess data quality. Finally, transparency and societal participation should be promoted, and good practices made publicly available.

CHAPTER II Section 3 – AGRI-DATA REGULATION

The following section will introduce regulation, frameworks and guidelines relating to the agricultural and data sector together.
The structure of the Section will be as it follows:

- Title of the Regulation
  - Regulation Summary;
  - Regulation Description;

Introduction on Regulation on Regional Economic Account, SAIO, IFS

Summary: *The European agricultural statistics system (EASS) is undergoing a major modernization plan following the publication of the 'Strategy for Agricultural Statistics for 2020 and beyond'. This enhancement program aims to provide the most accurate statistics for the design and evaluation of the agricultural and other related EU policies (e.g. climate and environment policies), while reducing the costs and burden of data collection.*
In 2016 impact assessment of the strategy suggested a two-step integration of existing agricultural statistics with the introduction of two new framework regulations:

1. *Statistics on agricultural input and output (SAIO), and a framework regulation on statistics on agricultural input and output with a target of being in place by 2022.*

The objective was to bring under one legal framework the following data:
-agricultural production statistics, including on organic farming,
-agricultural price statistics, and
-statistics on plant protection products (PPPs) and on nutrients.

2. *Integrated farm statistics (IFS)*

An integrated farm statistics (IFS) regulation covering data on farm structure, orchards and vineyards to be in place for the agricultural census in 2020 (focus on Regulation (EU) 2018/1091)

Indeed, these changes require a simplification of the European system of agricultural statistics which should be governed by three regulations. Two of these are new framework regulations which will replace several previous EU regulations on the subject, eliminating fragmentation, while the third will amend an already existing regulation: - The first, Regulation (EU) 2018/1091 on integrated farm statistics (IFS), covering data on farm structure, orchards and vineyards, was adopted in 2018 – The second of these regulations, relating to statistics on agricultural inputs and outputs, is being of this proposal and concerns the inputs and outputs of the agricultural sector (SAIO). The third regulation will concern an amendment of the regulation (CE) n. 138/2004 relating to the economic accounts of agriculture (CEA).
The European Statistical System Committee (ESS Committee) and Eurostat collaborated to create the agricultural statistics plan, which includes the following particular goals: To produce high-quality statistics that efficiently and effectively meet users' needs; to make the agricultural statistics system more adaptable and quick to act; to better integrate agriculture, forestry, land use, and environmental statistics; to develop an accountable and responsive governance framework for agricultural statistics; to increase the consistency and harmonisation of European agricultural statistics; and to produce more statistics.

Regulation on Regional Economic Account 138/2004

Summary: *Eurostat has compiled European agricultural statistics on EU agriculture for decades. Today they cover the following aspects: structure of farms, economic accounts for agriculture, animal and crop production, organic farming, agricultural prices, pesticides, nutrients and other agri-environmental aspects. The main aim is to monitor and evaluate the common agricultural policy (CAP) and other important EU policies, and to support policy-making.*

Description: As the EU's policies evolve and adapt to changing circumstances, European statistics need to develop and meet users' information needs efficiently. New technologies can help to combine and integrate different data sources without too great a burden on data producers. Farm statistics are the backbone of the EU's agricultural statistical system. To increase their response speed to new data needs, the Commission put forward a new approach based on an integrated, flexible and modular framework. The agricultural statistics of the European Union (EU) have as primary objective that of providing the basic data for constructing valid indicators for EU policies - from the Common Agricultural Policy (CAP) to all aspects related to sustainable agriculture, whether they are environmental, social or economic. For several decades, Eurostat has compiled European statistics on EU agriculture covering: farm structure, farm economic performance, agricultural economic accounts, plant and animal production, organic farming, fisheries and aquaculture, agricultural prices, pesticides, nutrients and other agri-environmental aspects. These statistics are strictly regulated by European legislation - which is frequently updated - or implemented through gentlemen's agreements and agreements within the framework of the European Statistical System (ESS). In the context of the modernization of European statistics and the evaluation of the current agricultural statistics system of the European Union, a strong recommendation emerged to adopt a systematic approach for all agricultural statistics, the basic principles of which are precisely described in the proposal regulation under discussion today.
The purpose of the older regulation, the EC 138/2004, was to create *common standards, definitions, classifications, and accounting rules for compiling agricultural accounts on comparable bases* for the purposes of the EU [EC 138/2004, Art. 1]. The EEA Methodology, as well as the different data to be sent to the commission were highlighted in Annex I and II respectively. However, it is important to note that this regulation did not obligate any Member State to use the EAA (Economic Account for Agriculture) methodology in compiling agricultural accounts for its own purposes.
In such a context, the proposal to amend EC Regulation 138/2004 aims at implement Annex I and II, with the objective to update the rules on agri-data, to monitor and evaluate the common agricultural policy (CAP) and other important EU policies, and to support policy-making and found to be in need of an update to take account of changes in agriculture, the CAP and other related EU policies. The 2020 agricultural statistics strategy includes the following key objectives: produce high quality statistics that meet users' needs efficiently and effectively and improve the harmonisation and coherence of European agricultural statistics.
Overall, the two regulations together illustrate the correct way to collect, store, and standardize the agricultural data, in order to allow their share with the commission and the other MS. In DIVINE's case, the basic data architecture and management rules will have to be developed according to these two Regulations.

SAIO

Summary: *The regulation establishes an integrated framework for aggregated European statistics on factors of production and the production of agricultural activities, as well as the intermediate uses of such production in agriculture and its collection and processing. It is part of the process of modernizing the European system of agricultural statistics which, by reinforcing the surveys on agricultural inputs and products, will contribute to improving knowledge of agricultural production and practices in relation to the Common Agricultural Policy (CAP), the Green deal for Europe and the Farm to fork strategy (from the producer to the consumer). It includes inputs and products of agriculture (e.g. crops and livestock, pesticides, nutrients, agricultural prices).*

The objective is to bring under one legal framework the following data:

-agricultural production statistics, including on organic farming,

-agricultural price statistics, and

-statistics on plant protection products (PPPs) and on nutrients.

Description: *Regulation (EU) 2022/2379 on statistics on agricultural input and output, amending Commission Regulation (EC) No 617/2008 and repealing Regulations (EC) No 1165/2008, (EC) No 543/2009 and (EC) No 1185/2009 and Council Directive 96/16/EC*

Following an impact assessment of the EASS (European Agriculture Statistic System), the Commission proposed to modernise farming statistics in Europe by introducing new regulations on agricultural input and output statistics (SAIO), which were formally adopted in 2022 and will apply from January 2025. The new Regulation establishes an *integrated framework for aggregated European statistics relating to the input and output of agricultural activities, as well as the intermediate use of such output within agriculture and its collection and processing* [Art. 1]. It introduces amendments to Commission Regulation (EC) No 617/2008. It also repeals Regulation (EC) 1165/2008, (EC) 543/2009 and (EC) 1185/2009 of the EP and Council Directive 96/16/EC . The initiative updates the statistical rules for EU agriculture, including the organic sector.

The framework aims at facilitating the data sharing and comparison among MS and the EC, accounting for new data requirements, and it does that by rationalizing the current production of agricultural statistics (surface and production of crops, livestock, slaughtering, production of milk and derivatives, plant protection products, fertilisers, fishing and other sector statistics [Art. 5]). Thanks to the new regulation, these statistics are governed by a single framework at the EU level, replacing the various existing rules and agreements, allowing for a systematic and high-quality data collection approach. The use of standard definitions is introduced, as well as clear and harmonised data transmission timelines [Art. 7, 9 and Annex]. Having a highly harmonised legislative environment will improve the quality, comparability and coherence of European agricultural statistics, so that policy makers, businesses and the general public will be able to make the right decisions based on consistent data.

The Framework SAIO foresees consist of:

1. aggregated **crop** and **animal production** statistics;
2. agri-environmental statistics on **fertilisers**, **nutrient** balances and **pesticides**;
3. **agricultural price** statistics.

Mainly, the data can be divided into agricultural **outputs** (crop and animal production and prices) and **inputs** (prices seeds, fertilizers, pesticides, feed, etc.). According to the regulation

laid down in SAIO, these data can be collected from farms, administrative sources, intermediates (dairies, slaughterhouses, etc.), wholesale entities and market organisations and often include a certain number of expert estimations. It is important to underline the fact that all these data are **aggregated statistics with no micro data transmission to Eurostat**, unlike the IFS (explained below).

However, the introduction of the SAIO regulation has generated different issues: in fact, the new data requirements foreseen in the proposal imply an adaptation of statistical processes in order to develop and produce all the required figures. As a result, a structural increase in the burden on National Statistical Institutes (NSIs) and other national authorities responsible for producing and disseminating statistics on agricultural inputs and outputs is expected. In particular, it may be necessary to:

i. Adjust the data related to *organic agriculture*, in order to comply with the new and stringent requests in terms of thematic coverage and timeliness;
ii. Adapt the methodologies for requesting *balance of cereals* data to guarantee quality and comparability. The current MS tools for qualitative assessment are not sufficient at the moment, and they must thus be strengthened.
iii. Implement the NSIs and the respondents work on the *production and management of grassland (haymaking);*
iv. Implement the rules on *nutrient balance* statistics, as at the moment they are produced on a voluntary basis. An adjustment will be necessary to shift form the old, voluntary regime to the new, mandatory one defined by SAIO. Moreover, as it is the case for the cereal balance, the current MS tools for qualitative assessment (which at the moment seem insufficient) must be strengthened.

The collection of additional information is to be provided on an *ad hoc* basis, in the event that it is deemed necessary.

IFS

Summary: *Regulation (EU) 2018/1091 on integrated farm statistics and repealing Regulations (EC) No 1166/2008 and (EU) No 1337/2011*

Description: Differently from the SAIO, the Integrated Farm Statistics (IFS) aims at establishing *a framework for European statistics at the **level of agricultural holdings** and provides for the integration of information on the structure with that on production methods, rural development measures, agro-environmental aspects and other related information* [Art. 1]. In Art. 2, an agricultural holding is defined as *a single unit, both technically and economically, that has a single management and that undertakes economic activities in agriculture*. This means that, while the SAIO framework regulates the input and output of farming data, the IFS aims at providing guidelines on data related to farms, orchards, and vineyards structure. In a few words, the data on how much fertilizer was used in tones/year will fall under the SAIO regulation, while the information on arable land or the NUTS3 classification will fall under the IFS framework.
The IFS framework came into force in 2018, and its initial scope was to replace the Farm Structure Survey regulation.

The main idea behind the IFS is to define so-called "core structural data", fir which measurements have to be taken in 2020 (in the form of census), 2023 and 2026 (which can be *carried out on samples*) [Art. 5]. The list of these core data can be found in Annex III, and is divided in macro-categories as it follows:

4. General Variables (E.g. Geographical Location, farmer's ID, Legal Person, etc.…)
5. Variables of Land (Arable Land in ha, Permanent Crops, Unutilized Land …)
6. Variables of Livestock (Bovine animals in head, Sheep and Goats, Pigs…)

The regulation introduces in the list some data not previously collected, such as irrigation, manure, nutrient use and livestock management. Moreover, in addition to the core data, other variables, defined in Art. 7 as 'module data', have to be collected in different ways and times, as well as following different requirements. This new approach would allow the Member States to significantly reduce the sample sizes, and to set up their surveys in a more flexible manner than before. Those MS with many subsistence rural households would be able to cut down the size of the surveys quite significantly, thus creating additional savings.
Similarly to the above-mentioned SAIO, the IFS defines not only which type of data should be collected, but introduces also data quality requirements [Art. 11], as well as harmonised rules on timelines [Art. 10, 12].
This framework regulation replaced two prior statistical regulations: the Farm Structure Surveys (1166/2008), as well as the Permanent crop statistics (Orchards and Vineyards surveys) (1337/2011).

(COPA COGECA) EU Code of Conduct on agricultural data sharing by contractual agreement

Summary**:** *The EU code of conduct on agricultural data sharing will look at general principles for sharing agricultural data from farm to farm products within the agro-food chain. It constitutes a joint effort from signatory organisations to shed greater light on contractual relations and provide guidance on the use of agricultural data.*

Description**:** The code, jointly created by Copa Cogeca, CEMA, CEETTAR, ESA, Fertilizers Europe, FEFAC, ECPA, EFFAB and CEJA, represents an initiative to ensure that agri-data sharing leads to a prosperous agri-food chain, by increasing mutual trust among working partners. To do so, the document provides support on contractual relations and guidance on re-using and sharing agricultural data through setting up transparent principles and clarifying responsibilities. Among others, the Code of Conduct recalls the GDPR definition of data "*processing*" [GDPR, Art 4.2: '*processing' means any operation or set of operations which is performed on personal data or on sets of personal data, whether or not by automated means, such as collection, recording, organisation, structuring, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, restriction, erasure or destruction*] and defines the roles of '*data originator*', *'data provider'*, *'data user'*, *'controller*'.
Based on those definitions, some default principles divided into five categories are introduced:

1. Attribution of the underlying rights to derive data (also referenced as **data ownership**);

2. **Data access**, control and portability;
3. **Data protection** and transparency;
4. **Privacy** and security;
5. **Liability** and intellectual property rights.

Since April 23rd, 2018 when the associations agreed on the Code, the document has been one of the most useful tools to encourage all parties involved in the agri-food chain to conform according to its principles. Nonetheless, it is important to **point out that Compliance with the Code of conduct is voluntary**, and it predominantly **focuses on non-personal data**. Thus, the processing of all those data that can be linked to an identifiable person falls under the General Data Protection Regulation.

On the other hand, the high compliance to the principles from farmers and associations raised awareness on a wide range of issues in agricultural data sharing. First, the necessity of opening the conversation between farmers and agribusinesses producing agri-related IOT technologies – specifically regarding their data sharing relationship. In fact, the Code signatories acknowledge that '*farmer and agribusinesses are more than willing to share data with each other and engage in a more open data mind-set. However, they will only do so if the potential benefits and risks are made clear and when they can trust that these are settled in a proper and fair way through contractual agreements'*. The Code focuses on the notion of **transparency when dealing with data access and usage**, with the aim of building farmers' trust in the way that their data is being managed. The five key principles introduced serve, in this case, as a guiding framework on transparency.

The *Data originator* (also referred as "*owner*") is defined as '*the person or entity that can claim the exclusive right to license access to the data and control its downstream use or re-use, i.e. the party that the data is attributed to. The data originator of all of the data generated during the operation is the one who has created/collected this data either by technical means (e.g. agricultural machinery, electronic data processing programs), by themselves, or who has commissioned data providers for this purpose'.*

All the parties in the data sharing network need to acknowledge the fact that **the data originator should have control over his data**, meaning that he **should be aware of how the data are used and who has access to them**.

Moreover, parties (originator, provider, user, third parties) are encouraged to establish contracts which clearly setting data collection and sharing conditions according to the needs of the contracting actors. The collection, access, storage, and usage of the collected agricultural data can only occur once the data originator (owner) has granted their explicit express and informed consent via contractual arrangement. The data must be collected and used for the specific purposes agreed in the contract. Similarly, the contract must not be amended without the prior consent of the data originator. If any data is to be sold or shared with a third party not initially mentioned in the contract, the data originator must be able to give his consent or refusal without any repercussions. Moreover, even when the consent is given by the data owner, the data user can only sell or disclose data to a third party if he/she has secured the same terms and conditions as specified in the contract between data user and originator.

According to the Code, the new contract should clearly define both the data user's and provider's security and confidentiality responsibilities. The data user should keep track of the data as much as possible throughout the value chain and share the gathered information with

the originator. Collectors and users of farm data must therefore not use this data for unlawful purposes or take advantage of it to speculate or for other such purposes.

In order to increase data trust and transparency, it is essential for data users controlling a database to establish a protocol on data protection and safeguard for individual originators, not allowing unauthorised sharing with third parties. Furthermore, **personal data in databases must be both stored under pseudonym and encrypted or protected with similar methods**. This is to render the data less identifiable and mitigate risks both during the course of normal operations and in the event of a data breach.
In the contract, the contact details of the data users should be easily available, in case the data originator may need support, clarifications or to voice complaints, as well as the terms for opting out of the contract.

CHAPTER II Section 4 – OTHER

The following section contains explanations and summaries of other regulation, codes of conduct or communications may be relevant in developing DIVINE, but do not enter in one of the three previously mentioned categories.
The first two elements are Communications form the EC made to promote the development of a digital strategy and economy in the EU, while the two last documents are aiming at specifying what IP Rights and Trade Secret are, and how the two are regulated in the EU. In fact, most of the above-mentioned regulation on non-personal data flow tends to not apply, or apply differently, to these kinds of protected data.

Communication on Building a European Data Economy 2017

Summary: *This Communication looks at proven or potential blockages to the free movement of data and presents options to remove unjustified and or disproportionate data location restrictions in the EU. It also considers the barriers around access to and transfer of non-personal machine-generated data, data liability, as well as issues related to the portability of non-personal data, interoperability and standards.*

Description: Data analysis has the potential to facilitate innovation and progress in various fields. In 2014, the EU data economy was valued at €257 billions, and it is expected to reach €643 billions by 2020 if appropriate policy and legal framework conditions are in place. By establishing the General Data Protection Regulation (GDPR), the EU created a single set of pan-European rules for data protection, ensuring consistency of interpretation and a level playing field between EU and foreign companies. Similarly, the revised ePrivacy Directive aimed to ensure a high level of data protection in coherence with the GDPR. The expansion of the EU economy is likely to be hampered by excessive limitations on the free flow of data, which will affect all economic sectors and lower competitiveness. The EU is attempting to regulate e-commerce and cross-border data flows by using trade agreements to debate unreasonable data localisation with its trading partners. Legal ambiguities are brought about by the growing significance of data in the global economy, including concerns about responsibility and safety, access to and transfer of machine-generated data, and portability and interoperability of non-personal data. In order to create a European data economy, the Commission is outlining topics for debate that include the free flow of data, access to and transfer of data, liability and safety in regards to developing technologies, as well as portability, interoperability, and standards for non-personal data. *An efficient and barrier-free Single Market in this sector would create significant opportunities for additional growth and jobs.*
Requirements for data localisation may impede the development of the European data economy and restrict access to cutting-edge data services. They may be justifiable in some circumstances, but these cases should be thoroughly justified to make sure they are necessary and reasonable to achieve a primary goal of universal interest. The principle of free movement of data within the EU should guide any Member State action affecting data storage or processing, and Member States should be encouraged not to make use of the opening clauses in the GDPR to further restrict the free flow of data. Modern ICT management best practices should be used, and cross-border collaboration between national agencies should be improved. The main action taken by the EC to favor the free movement of data consisted

in discussing with MS and stakeholders to attribute a fair proportion to the data localisation measures.

The commission agreed on the fact that limited data access is still an issue in the data economy. On the other hand, large data holding companies frequently utilize internal data analytics tools and may not provide user-friendly APIs. Moreover, raw machine-generated data is not covered by any of the current intellectual property rights, nor are there any complete legal frameworks that would allow for its commercial use or trading. Market-based remedies alone may thus not guarantee fair and innovation-friendly outcomes: European contractual solutions, general contract law, and competition law tools may be more adequate.

In order *to explore a possible future EU framework for data access*, the commission aims at achieving the following objectives:

- Improve access to anonymous machine-generated data;
- Facilitate and incentivise the sharing of such data;
- Protect investments and assets;
- Avoid disclosure of confidential data;
- Minimise lock-in effects.

The EC continued its communication exploring possible ways to enhance legal certainty with regard to liability in the context of emerging technologies and suggests to issue guidance on the application of EU rules on liability to IoT and robotics. On a different note, regarding non-personal data, there are no obligations to guarantee even a minimum level of data portability, even for widely used online services such as cloud hosting providers, and the requirements for implementing data portability can be technically demanding and costly. The EC suggests that meaningful portability for non-personal data would need to take into account broader data governance considerations involving transparency.

In conclusion, the EU requires a regulatory framework that permits data to be utilized for scientific, social, and industrial objectives along the whole value chain in order to establish the data economy. To do this, the Commission is starting a massive stakeholder debate on the topics included in this communication. A public consultation will be the first stage of this conversation. In the context of cooperative, connected, and automated mobility, the questions of data access and liability will also be put to the test in a practical setting. To properly implement the principle of the free movement of data within the EU, the Commission will continue to work on this problem in accordance with the strategy stated above, including where necessary and appropriate by prioritised enforcement action. The Commission will also keep track of developments, gather data, and, if required, consider taking additional actions to promote data flow.

The Commission will also determine whether more action is necessary on the emergent challenges and provide appropriate solution recommendations based on the outcomes of the stakeholder engagement. Real-world experiments may be important in this situation.

Communication "Towards a common European data space" (2018)

Summary*: With this Communication, the Commission proposes a package of measures as a key step towards a common data space in the EU - a seamless digital area with the scale that will enable the development of new products and services based on data.*

Description**:** The European Commission recognizes that data-driven innovation is a crucial driver of growth and job creation that can significantly enhance European competitiveness in the global market. In this context, the Commission believes that the European data economy could double by 2020 if the appropriate framework conditions are established. It suggests a range of actions aimed at promoting data sharing, enhancing data protection and cybersecurity, and developing technical standards to support the growth of the European data economy. One of the EC's primary actions is to introduce common rules for the sharing of data, ensuring that data can be shared across sectors and borders while simultaneously protecting privacy and cybersecurity.
Additionally, the Commission acknowledges the importance of establishing strong data protection and cybersecurity measures, and therefore, proposes the creation of a European Data Protection Board to enforce data protection laws across the EU and it also intends to update EU cybersecurity legislation to address emerging threats in the digital economy. Moreover, it proposes the development of technical standards that would facilitate the interoperability of different data systems and the sharing of data between different organisations. These standards would promote the development of new technologies and services that could drive innovation and growth in the European data economy. The need to support the development of skills and competencies in the data sector is recognized. To this end, a European Data Skills Framework, as well as European Data Innovation Board should be established, in order to provide guidance on the skills and competencies required for different roles in the data sector, and support businesses and organisations seeking to innovate using data.
Overall, the Commission's proposed actions aim to create a favorable environment for the growth of the European data economy. By promoting data sharing, enhancing data protection and cybersecurity, developing technical standards, and supporting the development of skills and competencies, the EU believes that the European data economy could double by 2020, driving growth, job creation, and competitiveness in the global market.

Intellectual Property Rights & Value Chains

As DIVINE's main objective is the creation of a platform to promote the share agricultural data among farmers and stakeholders, it is Important to keep in mind that non-personal data can fall under different categories, and thus be subject to different and specific regulation. It is the case for data covered by copyright or Intellectual Property (IP) Rights.
The application of the EU rules and the respect of these rights are necessary to preserve the competitiveness of firms and are even more relevant in case of SMEs and Start-ups. In fact, *intellectual property rights play an important role in promoting innovation and protecting investment, in particular in the digital and green economy. That is why the European Commission works to harmonise and enhance laws relating to intellectual property rights in the EU, and to ensure that a level playing field is available at global level. But at the same time, access to IP should be facilitated under fair conditions. The Commission has designed a legal framework and intellectual property system that offers incentives for EU companies to invest in the provision of goods and services with high standards of quality, innovation, design and creativity*[15]*.* Specifically, the EC aims at

[15] https://single-market-economy.ec.europa.eu/industry/strategy/intellectual-property_en

- Protecting IP rights, making it easier to license and share data, aiding in the creation of excellent infrastructure enhancing transparency and predictability in the licensing of standard patents. With this regard, the different actions the EU has taken are:
    - *Support a rapid roll out of the unitary patent system, to create a one-stop-shop for patent protection and enforcement across the EU (2022-23);*
    - *Optimise the supplementary protection certificates system, to make it more transparent and efficient;*
    - *Modernise the EU legislation on industrial designs, to make it more accessible and better support the transition to the digital and green economy*[16].
- Encouraging SMEs to use IPR, by implementing tighter infringement rules. This consists in:
    - *Provide, with the EUIPO, a scheme for IP **SME vouchers** to finance IPR registration and strategic IP advice;*
    - *Roll out **IP assistance services** for SMEs in the 'Horizon Europe' programme and expand it to other EU programmes (2020+);*
    - *Present a **code of practice on smart use of intellectual property in an international context** to raise awareness among universities, research organisations and businesses*[17].

7. Promoting fair practices.

Intellectual property is defined as *creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce*[18]. Under this definition, IP can be classified into different types, such as Patents, Trademarks, or Geographical Indications (GI). What is relevant in DIVINE's scope are the data and information falling under the IP – Trade Secret type. Trade secrets consist of two types of information: technical information, which includes things like manufacturing processes, pharmaceutical test results, computer program designs and drawings, and commercial information, which includes distribution methods, supplier and client lists, and advertising strategies. A trade secret may also be a combination of different elements that are individually publicly available, but when combined and kept secret, provide a competitive edge. Financial information, formulas, recipes, and source codes are additional examples of information that may be safeguarded as trade secrets.

[16] https://single-market-economy.ec.europa.eu/industry/strategy/intellectual-property/intellectual-property-action-plan-implementation_en

[17] See Reference 3

[18] https://www.wipo.int/about-ip/en/

CHAPTER II Section 5 – RELEVANT EU PROJECTS

EHDS:

European Health Data Space Regulation (EHDSR) – 6 May 2022 Proposal
The following project has been inserted in the data governance analysis not because relating to agriculture, but rather due to its structure and implementation. The system has been conceived by the EC and aims at dealing with data in the healthcare sector.

Summary*: In order to unleash the full potential of health data, the European Commission is presenting a regulation to set up the European Health Data Space. This proposal supports individuals to take control of their own health data supports the use of health data for better healthcare delivery, better research, innovation and policy making and enables the EU to make full use of the potential offered by a safe and secure exchange, use and reuse of health data*[19]*.*
The European Health Data Space Regulation *is the first common EU data space in a specific area to emerge from the EU Strategy for Data.*

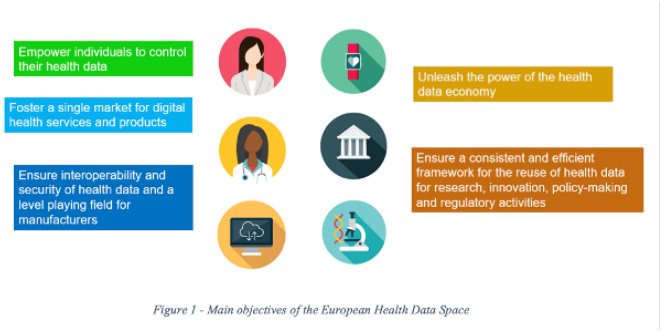


Figure 7: EDHS goals, Source: European Commission

Description: As mentioned in the summary and explained on the EC's website, the main scope of the EHDS is to strengthen the rights of natural persons in controlling their electronic health data.
While it is true that the project does not strictly relate to DIVINE (the sector of application being different), some elements and takeaways could be interesting for the construction of the agri-data sharing platform, specifically in terms of data safety and security.

	EHDS	AGRI-DATA-PLATFORM
Application [Art 1]	Regulation applies to manufacturer and suppliers of EHR systems and wellness applications that are on the market; Controllers in the EU and established in a third country (but	Should apply to providers of electronic applications for farming; As well as for all controllers established in the EU and in a third country (but that provides interoperable services).

[19] https://health.ec.europa.eu/ehealth-digital-health-and-care/european-health-data-space_en

	that provides interoperable services to the EHR).	
Definitions [Art. 2]	A distinction is made between personal electronic health data and non-personal electronic health data, as well as primary use of data and secondary use of data[20].	A distinction could be made between personal electronic agricultural data and non-personal electronic agricultural data.
Primary Data Use		
Data Access and Transmission [Art. 3,4]	Natural persons should be able to easily access and modify, share, or restrict access to their data, and MS needs to guarantee that and provide proxy services free of charges. This data should be accessible by health professionals, only when a person is under their treatment and approved the data sharing.	Natural persons should be able to easily access and modify, share, or restrict access to their data. When farmers share data with stakeholders, they should be able to define with whom they want the data to be shared, for how long, and have the power to restrict data access.
Identification [Art. 9]	When using electronic services, identification needs to have a high assurance level and respect Art. 6 Regulation (EU) No 910/2014.	Farmer's data must be kept safe, and farmers need to trust the organisation managing their data.
Secondary Data Use		
List and Scope [Art 33,34,35]	Secondary data can be provided access to a larger public, for question of public interest, produce high level statistics, promote scientific research. Nonetheless, confidentiality still needs to be guaranteed, and it is prohibited to use electronic	Could apply to farmers, breeders and other stakeholders included in the agriculture data space who use electronic data for research, innovation, policy making, regulation to have an easier access to these certain data – respecting their confidentiality, making sure

[20] Art. 2: (a)'*personal electronic health data' means data concerning health and genetic data as defined in Regulation (EU) 2016/679, as well as data referring to determinants of health, or data processed in relation to the provision of healthcare services, processed in an electronic form;*
(b)'non-personal electronic health data' means data concerning health and genetic data in electronic format that falls outside the definition of personal data provided in Article 4(1) of Regulation (EU) 2016/679;
(d)'primary use of electronic health data' means the processing of personal electronic health data for the provision of health services to assess, maintain or restore the state of health of the natural person to whom that data relates, including the prescription, dispensation and provision of medicinal products and medical devices, as well as for relevant social security, administrative or reimbursement services;
(e)'secondary use of electronic health data' means the processing of electronic health data for purposes set out in Chapter IV of this Regulation. The data used may include personal electronic health data initially collected in the context of primary use, but also electronic health data collected for the purpose of the secondary use;

	health data if the data is used knowing that the result will harm individuals.	the stakeholders 'intentions are not to harm farmers.
Fees [Art. 42]	Fees may be applied to access secondary electronic health data.	Transparent fees may add to the operating costs of the agriculture and livestock sector, for the sharing of Secondary use data.
Limitations [Art. 44]	Health data access bodies should provide secondary use data only in anonymized or pseudonymized form.	Health data access bodies should provide secondary use data only in anonymized or pseudonymized form.
Data Access [Art. 45, 46]	Article lists all the requirements and information the person requiring access to the data needs to respect, and a data permit should be issued.	When implementing the data sharing platform and eventually the secondary use data, some requirements to access those data need to be established for the stakeholders (e.g., Giving their name, email…).
Secure environment and cross-border exchange [Art. 50, 52, 61, 62]	The health data body has to make sure the data sharing environment is safe and secure and minimize risks of breaches. Third countries may access the data only if complying with instructions given by this regulation.	The body taking care of DIVINE has to make sure the data sharing environment is safe and secure and minimize risks of breaches. Third countries may access the data only if complying with instructions given by this regulation.
Quality [Art. 56]	The article defines some data quality rules that need to be accounted for when data holders upload their data on the platform.	Data quality rules may need to be established for farmers and stakeholders.[21]

IACS

Summary: *European Union countries are responsible for the administration and control of payments to farmers in their country under a principle known as 'shared management'. The main building block of the management of payments system is the integrated administration and control system (IACS).* ***IACS consists of a number of digital and interconnected databases, in particular:***

- *a system for the identification of all agricultural plots in EU countries, called the land parcel identification system;*
- *a system allowing farmers to graphically indicate the agricultural areas for which they apply for aid (the geospatial aid application);*
- *a computerised database for animals in EU countries where animal-based aid schemes apply;*

- *an integrated control system which ensures systematic checks of aid applications based on computerised cross checks and physical on-farm controls (on-the spot checks).*

Description: The Integrated Administration and Control System (IACS) is a system established by the European Union (EU) to ensure the proper administration and control of payments to farmers in EU countries. It is an essential component of the shared management principle, where EU countries are responsible for managing agricultural payments within their territories.
To implement the IACS, EU countries utilize appropriate technologies to establish their systems. The aim is to reduce administrative burdens and ensure efficient and effective control over agricultural payments. Control of taxpayers' money is of great importance within the EU. Since income support for farmers is funded through the European agricultural guarantee fund (EAGF), which constitutes a significant portion of the EU budget, it is crucial to ensure that the funds are allocated to the right farmers and any undue sums are recovered[21].

How does it work?
The Integrated Administration and Control System (IACS) operates through a series of steps to ensure the proper management and control of payments to farmers[22]. It works in different steps:

- Application Submission: Farmers start the process by submitting their aid applications online. These applications provide information about their agricultural activities and their eligibility for income support. When doing that, national administrations provide farmers with pre-established information related to their applications. This information is intended to assist farmers in verifying and correcting their applications, ensuring accuracy and compliance.
- Administrative Checks: National administrations conduct administrative checks on all aid applications received. These checks involve reviewing the submitted information and documentation to ensure compliance with eligibility criteria and regulations set by the EU. Later, a sample of farmers is selected for on-farm checks. These checks involve physical inspections of farms to verify the accuracy and compliance of the declared agricultural activities, such as verifying land use, animal records, and compliance with agricultural and environmental standards.
- The IACS is deployed, as it incorporates an integrated control system that performs systematic checks on aid applications. It utilizes both computerized cross-checks and physical on-farm controls to ensure accuracy and detect any irregularities or fraudulent activities. Following this step, findings and adjustments are done. If discrepancies or non-compliance are identified, the necessary actions are taken to rectify the situation.

[21] https://agriculture.ec.europa.eu/common-agricultural-policy/financing-cap/assurance-and-audit/managing-payments_en
[22] https://info.bml.gv.at/en/topics/agriculture/eu-agricultural-policy-and-subsidies/direct-payments/iacs-integrated-administration-and-control-system.html

- Payment Calculation: Once the checks are completed, payment calculations are carried out. The findings from the administrative and on-farm checks are taken into consideration to determine the final amounts for each farmer. Payments are then distributed to farmers' designated bank accounts or through other payment methods established by the national administration.
- Data Update: The national administration updates the pre-established aid applications for the following year. This includes incorporating information collected during the current year's process, such as changes in land use or animal numbers.

Throughout the entire process, the IACS relies on interconnected databases and digital systems. These include the Land Parcel Identification System, which identifies agricultural plots, the Geospatial Aid Application system for farmers to indicate their agricultural areas, and the Animal Database for animal-related aid schemes. These systems support the control and management of payments by providing accurate data and facilitating efficient verification processes.

By implementing the IACS, EU countries ensure standardized procedures for managing income support to farmers and enable the control of taxpayer funds. The system helps prevent irregularities, recover any unduly paid amounts, and support farmers in making accurate aid applications while minimizing administrative burdens[23]

[23] https://www.fao.org/3/a0464e/A0464E09.htm

Chapter III - MAPPING

The following pages will contain a regulation mapping and a regulation timeline relating to the current legislation - described in the previous chapter, CHAPTER II - SoTA ANALYSIS.

What is Regulation Mapping?

Regulation mapping refers to the process of identifying and analyzing regulations that apply to a specific industry or business. Normally, the process involves mapping out the complex web of laws, rules, and regulations that govern a particular field, and determining how they apply to a particular company, product, or service. In our case, we will map the laws, codes of conduct, and directives evolving around the data management and data sharing in the agricultural context.

Why is it relevant?

The study and definition of links among existing rules will benefit DIVINE's platform in different ways:

1. By creating and structuring a platform which correctly complies with the existing law. In fact, as it is known, failing to comply with regulations can result in serious consequences, including fines, legal penalties, reputational damage, and even criminal charges. Thus, regulation mapping can help DIVINE to identify the regulations that apply to its processes and ensure that they are in compliance with the current legislation;
2. By keeping up to date with eventual policy changes: regulation mapping often helps to stay up to date with legislation, as it is constantly evolving, and it could be challenging – both during the development of the project and after its completion - to keep track of all the changes;
3. By identifying potential compliance risks and develop strategies to mitigate them;
4. In addition, regulation mapping can help DIVINE to improve its processes and operations. By understanding the regulatory landscape, it is possible to identify areas where processes can be streamlined, allowing for cost reduction. This can lead to more efficient operations, improved productivity, and ultimately, increased profitability.

Thus, all the previous points highlight how mapping the current legislation is a necessary step in the analysis of the existing rules and laws, as it will allow the reader to understand the baseline structure and the connections among the different directives, regulations and codes of conducts developed around data, data sharing and agri-data sharing. In fact, very often the content of these texts is not straightforward, and it is thus difficult to understand in which cases it is necessary to apply one regulation or another. By organizing, classifying, and aligning the directives and regulation, the chapter aims at providing a clear and transparent overview of the SoTA policies relationships, which will be used to develop DIVINE's platform and guidelines manual. The process of regulation mapping can be complex and time-consuming, as it involves identifying and analyzing all the relevant regulations and directives. However, the benefits of regulation mapping cannot be overstated. It is an essential step for any business that wants to stay compliant with regulations, manage compliance risks, and improve its operations.

Regulation Mapping: Preparing the work

Regulatory mapping in the context of the DIVINE project involves identifying, organizing, and analyzing the existing regulations and directives related to agri-data sharing.
This is necessary to provide a clear and transparent overview of the state-of-the-art policies relationships, which will be used to develop DIVINE's platform and guidelines manual.
Overall, the general steps to follow when conducting a regulatory mapping can be summarised as it follows:

- Identify the relevant regulatory bodies: the first step in the development of a regulatory mapping consists in identifying the regulatory bodies that have authority over the business in question. These may include federal, state, or local agencies. In DIVINE's case, the main authorities identified are the EU and its different Member States.
- Research the regulations: Once the relevant regulatory bodies have been identified, the next step entails the research of the regulations that they have promulgated. This can be done by reviewing the relevant agency websites, publications, and other sources of regulatory information. In our case and according to the scope of DIVINE, the main source of legislation is given by the EU Regulations and Directives, as well as codes of conduct and communications focusing on agriculture and data sharing at the EU level.
- Organise the regulations: arrange the findings in a way that makes sense for the scope of the project. This involves categorizing the rules by topic, type, or level of importance.
- Analyse the regulations: this to determine how it applies to the DIVINE's platform. This normally involves reviewing the text of the regulation, as well as any guidance or interpretation provided by the regulatory body. Once the regulations have been analysed, identify the specific compliance requirements that apply to the scope of the project.
- If necessary, add a section/image explaining how all the regulations are interacting with each other, highlighting the different use-cases and eventual legislation gaps.
- Monitor changes in regulations: Finally, it is important to monitor changes in regulations over time. This can be done by subscribing to regulatory updates or other sources of regulatory information.

The first four steps, consisting in finding and arranging the pertinent regulatory bodies and legislation, have already been completed in chapter CHAPTER II - SoTA ANALYSIS. This chapter will focus on the fifth point and aims at developing a scheme linking the different regulations. The sixth point, monitoring the regulation changes, will be done throughout the development of DIVINE's platform, from the beginning of the project (September 2022) to its end (September 2025).

Chapter Structure

The following chapter represents the core analysis of the deliverable. It is structured as it follows:

1. Mapping Scheme & Explanation;
    a. Introductory Questions;
    b. Data Ownership;
        i. Concept of Data Ownership;
        ii. Concept of Data Holder;
    c. Type Of Service;
        i. Intermediation Service;
        ii. Gatekeeper;
    d. Data Type;
        i. General Introduction on Types of data used in agriculture and their application;
        ii. Personal Data vs. Non-Personal Data;
        iii. Public Vs. Private sector;
    e. Framework 1;
    f. Framework 2;
2. Mapping Regulation with Force of law and Regulatory Gaps;
    a. Gaps In technology-related regulations;
    b. Gaps in Agricultural Regulation;
    c. Eventual Issues
        i. More Regulation equals a more efficient market and higher data quality?
        ii. The Problem with Private Data and Data Silos
        iii. Data Monetization
        iv. Market for Agri Data
3. Conclusion.

Regulation Mapping: the Scheme

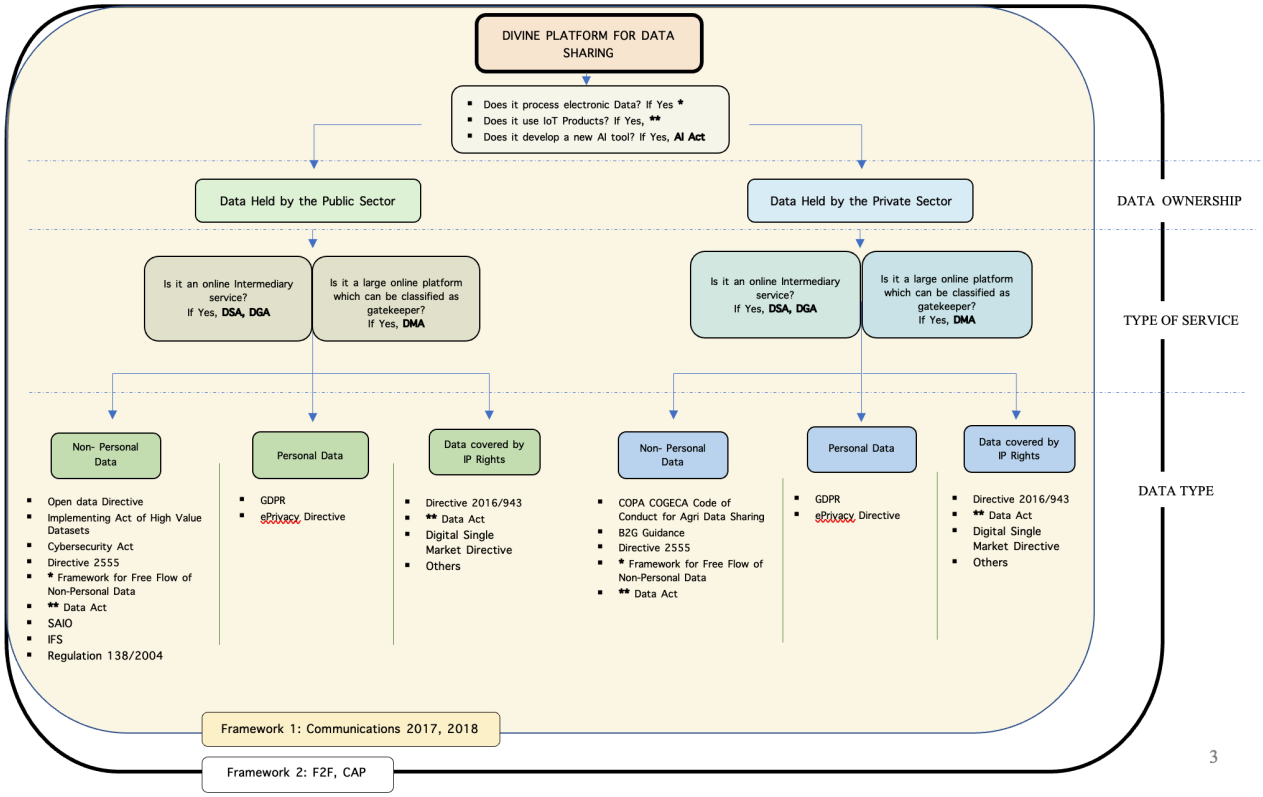
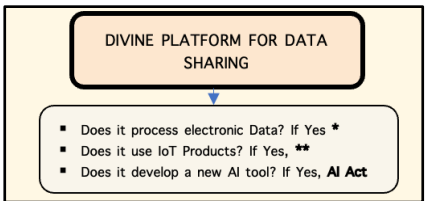


Figure 8: Mapping of the Current EU regulation applicable to Agri-Data platforms, Source: Own

Regulation Mapping: The Explanation

The Scheme mentioned in the previous page contains all the regulations, directives and acts identified in the previous chapter as related to the creation of an agri-data sharing platform. The platform that DIVINE aims at creating can develop in different manners.

Part 1 – Questions



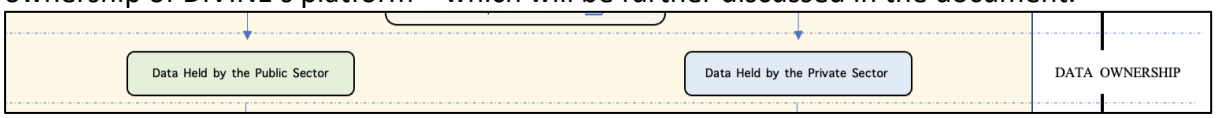
First of all, we need an answer to the three initial questions:

- *Does it process electronic Data?*
- *Does it use IoT Products?*
- *Does it develop a new AI tool?*

All the three subjects relate to some data regulation that may be necessary to apply to different cases, whose representation in the scheme may be too complex otherwise. For a detailed explanation, see Annex I.

Part 2 – Ownership

The second part of the scheme focuses on the concept of ownership. In this case, ownership refers both to the data collected according to DIVINE's scope, a different issue is the ownership of DIVINE's platform – which will be further discussed in the document.



What is Data Ownership?

It is important to note that, from a legal standpoint, the notion of data ownership does not exist. Rather, the concept that is typically used to determine who has the ability to control access to and reuse of data is that of "data rights." At the European Union (EU) level, data rights are often referred to as a means of determining who has the authority to control data. However, it is crucial to understand that data rights are not always attributed to individuals, as there are various scenarios in which data rights are assigned to organisations or entities. This is especially true when it comes to data that falls outside the scope of the General Data Protection Regulation (GDPR). In such cases, the ability to control data may rest with the organisation that collected it, or with the data processor who has been tasked with managing it. It is worth noting that, under GDPR, individuals are granted the right to control their personal data. This means that, in situations where data falls under the GDPR's purview, individuals have the ability to decide how their data is used, shared, and accessed. This can include the right to access their personal data, the right to have their data erased, the right

to restrict processing of their data, and the right to object to the use of their data for certain purposes.
In cases where data is not considered personal data under GDPR, the question of data control can become more complex. For example, data collected by organisations for commercial purposes may be subject to various data privacy laws and regulations, which can impact who has the right to access and use the data. Moreover, there are instances where data ownership can be attributed to the creator or originator of the data. For example, if a company creates a proprietary algorithm, it can claim ownership over the data that is used to train the algorithm. Similarly, if an individual creates a work of art or a piece of written content, they can claim ownership over that data. Overall, while the concept of data ownership may not be legally recognized, the issue of data control is still highly relevant and complex. The determination of who has the right to control data can be impacted by a range of factors, including data privacy laws and regulations, the type of data being collected, and the purpose for which the data is being used.
Still, it is important to remind that some specific non-personal data can be covered by more stringent legislation. This is the case for data which are covered by trade secret, intellectual property, or copyrights. In these cases, the different treatment is justified by economic reasons, as they can be highly valuable and, in some cases, critical to the functioning of a business or organisation. As such, it is important to protect this data from unauthorized access, use, or distribution.
In cases where non-personal data is subject to trade secret or intellectual property laws, the owner of the data may have more control over who has access to it. For example, a company that has developed a proprietary algorithm may be able to prevent others from using or distributing that algorithm without their permission. Similarly, an artist who has created a piece of artwork may be able to prevent others from reproducing or selling that artwork without their consent.

In cases where non-personal data is subject to trade secret, intellectual property, or copyright laws, the owner of the data may have more control over who can access and use that data. It is important for individuals and organisations to understand the various laws and regulations that govern data usage and to take appropriate steps to protect their data when necessary. In the document, we will thus refer to the person, firm or organisation who has the data stored and can control and manage the access to them as the **data holder**. The data holder is a concept widely used in the new Data Act, defined as *a legal or natural person who has the right or obligation, in accordance with this Regulation, applicable Union law or national legislation implementing Union law, or in the case of non-personal data and through control of the technical design of the product and related services, the ability, to make available certain data*[24][25]. The concept of a "data holder" is fundamental in understanding the ownership and control of data. Essentially, the data holder refers to the individual or organisation that possesses the data and has the legal rights to access, use, and share it.
The term "data holder" can refer to various entities, including individuals, companies, government agencies, and other organisations. The data holder's role is crucial in determining who has control over the data and who can access it.

[24] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A68%3AFIN
[25] https://fefac.eu/wp-content/uploads/2020/07/eu_code_of_conduct_on_agricultural_data_sharing-1.pdf

For example, in the case of personal data, the data holder would typically be the individual whose data is being collected. They have the right to access, modify, and delete their personal data, and organisations that collect this data must comply with various data protection regulations.
Similarly, in the case of non-personal data, the data holder may be the organisation that collects or generates the data, such as a research institution or a private company. In this case, the data holder has the right to control how the data is used and shared, and they may have legal obligations to protect the data from unauthorized access or misuse.
Overall, understanding the concept of the data holder is crucial in ensuring that data is collected, used, and shared responsibly and in compliance with relevant laws and regulations. By clarifying who has ownership and control over the data, stakeholders can work together to develop effective data governance strategies and promote responsible data sharing practices.
The concept assumes a critical relevance in the development of DIVINE. As an innovative project focused on improving data sharing practices in the agricultural sector, DIVINE aims to provide a platform for farmers, researchers, and other stakeholders to collaborate and share data seamlessly. However, the rules and regulations applicable to different types of data may vary depending on whether they are held by the public or private sector. As the above schema highlights, while legislation governing personal data and data covered by trade secrets is the same, non-personal data is subject to significant variation in the two different cases. This difference adds to the complexity of data governance, which is already a challenging task.
In this context, DIVINE faces a major challenge of understanding how to handle these different types of data and how to leverage them to improve agri-data sharing practices while maintaining farmers' trust and expectations. This challenge requires careful consideration of the legal and ethical implications of data sharing, as well as the technical requirements for secure and efficient data sharing.
To address this challenge, DIVINE needs to work closely with experts in data privacy, and security, to develop robust policies and guidelines for data sharing. The project must also engage with farmers and other stakeholders to ensure that their needs and concerns are adequately addressed in the design and implementation of the data sharing platform.

Data Holder: Controlling Data Access, Use and Share
The definition of the data holder is essential in determining who has ownership and control over data and is crucial for ensuring that data is collected, used, and shared in compliance with relevant laws and regulations.
Data holders can include various entities, such as individuals, companies, government agencies, and research institutions. In the case of personal data, the data holder is typically the individual whose data is being collected. They have the right to access, modify, and delete their personal data, and organisations that collect this data must comply with various data protection regulations, such as the General Data Protection Regulation (GDPR) in the European Union.
In the case of non-personal data, the data holder may be the organisation that collects or generates the data, such as a research institution or a private company. In this case, the data holder has the right to control how the data is used and shared, and they may have legal obligations to protect the data from unauthorized access or misuse.

What should data holders do?

Based on the type of data they own, data holders must respect different requirements. Nonetheless, some basic requirements must always be followed:

- Data holders must ensure that data is used responsibly and ethically: they are responsible for controlling access to the data and determining who has permission to use it.
- The data holder must also ensure that the data is being used for its intended purpose and that it is not being misused or shared inappropriately.

Moreover, one of the main challenges that data holders face is balancing the need to share data with the need to protect it. While sharing data can lead to valuable insights and innovation, it also poses significant risks, such as the risk of data breaches or misuse. To address this challenge, data holders must implement robust data governance policies and procedures to ensure that data is collected, used, and shared responsibly.

Effective data governance requires collaboration between data holders, data processors, and other stakeholders, to develop clear guidelines for data access, use, and sharing. Stakeholders need to be aware of their rights and responsibilities with respect to data.

In addition to legal obligations, data holders must also consider ethical considerations when controlling data access, use, and share. They must ensure that the data is being used for the public good and that it is not being used to harm individuals or communities, and be transparent about their data practices and provide individuals with the information they need to make informed decisions about how their data is being used.

Overall, the concept of the data holder is crucial in ensuring that data is collected, used, and shared responsibly. By promoting responsible data sharing practices, data holders can unlock the full potential of data and contribute to the sustainable development of society.

Part 3 – Type of Service

In the modern world, data sharing and exchange are an essential part of business operations. However, it is important to consider the type of platforms or services used for data exchange, as different services are subject to different regulations. The third part of this chapter delves into this aspect of data handling.

When it comes to online intermediary services, there are different types, each subject to varying regulations. The Digital Service Act, as well as the Data Governance Act regulate the first group of online intermediary services, while the second group, larger online intermediary services defined as gatekeepers, are regulated by the Digital Markets Act. The Digital Service Act aims to regulate online services that are based within the European Union and provide intermediary services, such as online marketplaces, social media platforms, and search engines.

Digital Service Act Art.3, online intermediary service definition:

- *a 'mere conduit' service, consisting of the transmission in a communication network of information provided by a recipient […];*
- *a 'caching' service, consisting of the transmission in a communication network of information provided by a recipient of the service, involving the automatic, intermediate and temporary storage of that information, performed for the sole purpose of making more efficient the information's onward transmission to other recipients upon their request;*
- *a 'hosting' service, consisting of the storage of information provided by, and at the request of, a recipient of the service;* Online Platforms are considered hosting services.

This regulation imposes a set of obligations, such as transparency requirements, measures to combat illegal content, and the obligation to appoint a legal representative within the EU for services based outside the EU. The Digital Service Act seeks to ensure that online intermediary services operate in a fair and transparent manner, promoting competition and consumer protection.

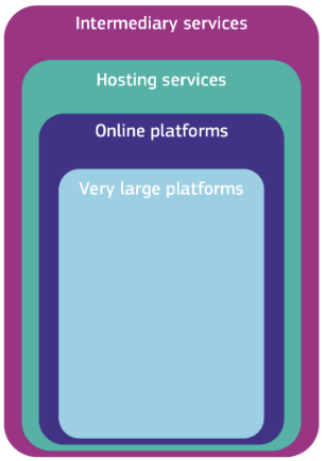


Figure 9: DSA Subjects, Source: European Commission

Similarly, the DGA, entered into force on June 23rd, 2022, aims to provide a comprehensive guide for public-sector institutions as well as intermediary services companies on the sharing and re-use of non-personal data. It is crucial to carefully protect non-personal data, as their misuse could still cause harm to individuals. For instance, if data access is granted to anyone without proper previous controls, there is the chance that the non-personal datasets could be cross-referenced, and this grant access to personal data. For this reason, the new Regulation 2022/868 aims to ensure the protection of undertakings data and interests, especially for small and medium-sized enterprises, to prevent market lock-in effects. It also provides guidance on data re-use, emphasizing the need for data to be findable, accessible, interoperable, and re-usable according to the 'FAIR data principles'. Additionally, the regulation encourages data altruism for public interest purposes. The scope of the regulation covers all public-sector institutions that use, transfer, and exchange data, as well as intermediary services companies, except for intermediators of copyrighted information. It

also applies to data covered by trade secrets, statistical or commercial confidentiality, and intellectual property rights, except for data held by cultural establishments such as libraries, archives, museums, orchestras, operas, ballets, and theaters, as well as educational establishments. The regulation may also be applicable in the agricultural sector as much data shared on online platforms are covered by confidentiality.

On the other hand, the Digital Markets Act regulates larger online platforms that act as gatekeepers to the digital economy.
These platforms are considered to have significant market power, and the regulation aims to ensure fair competition and prevent them from abusing their power to harm smaller businesses or consumers. The regulation imposes obligations such as transparency requirements, measures to ensure interoperability with other services, and non-discrimination obligations.

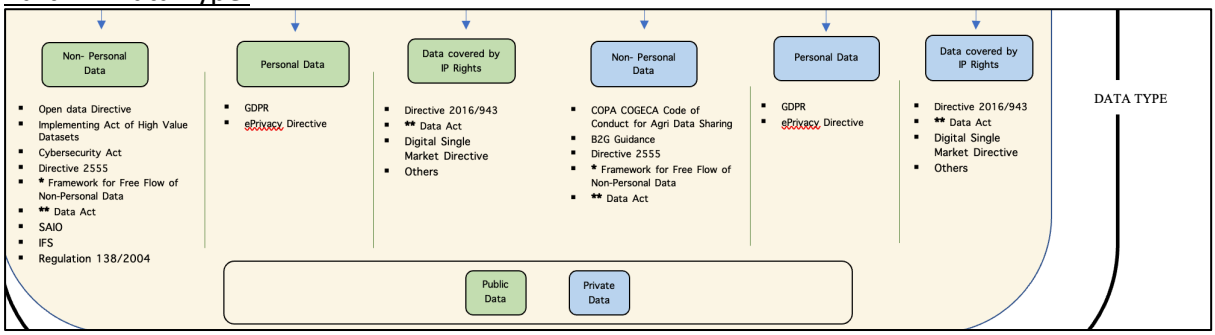
Art. 3 DMA, gatekeeper definition:

Company that has a significant impact on the internal market, provides a core platform service that is an important gateway for business users to reach end-users, and enjoys an entrenched and durable position or is expected to in the near future.

Regulations play a crucial role in promoting competition and protecting the interests of both businesses and consumers. By having clear rules and guidelines in place, businesses can operate within a level playing field, ensuring that larger online platforms do not have an unfair advantage over smaller businesses. This helps to promote healthy competition, which ultimately leads to better products and services for consumers.
Additionally, regulations help to protect consumers' interests by ensuring that data handling is done in a transparent and responsible manner. This means that consumers can have confidence in the services they use, knowing that their data is being handled in a way that protects their privacy and security.

See Annex 3 for a focus on Competition and Markets.

Part 4 – Data Type



For a general introduction on What is Data, See Annex 4.

Types of data used in agriculture and their application:

There are several types of data used in agriculture, including weather data, soil data, crop data, and market data. Weather data is critical for understanding the impact of climate change on agriculture and for making informed decisions about crop management. Soil data provides information about the physical and chemical properties of soil, which is critical for making decisions about fertilizer use and irrigation.
Crop data includes information about crop yields, planting dates, and pest and disease management. This data can be collected through field surveys, remote sensing, and sensors in the field. Market data provides information about market prices, demand, and supply, which is critical for making informed decisions about what to grow and when to sell.

There are several applications of data in agriculture, including precision agriculture, credit scoring, and market analysis. Precision agriculture involves using data to optimize crop management, such as fertilization, irrigation, and pest control. This can improve crop yields, reduce input costs, and increase profitability.
Credit scoring involves using data to assess the creditworthiness of farmers and deliver loans more efficiently. This can increase access to finance for smallholder farmers and improve their livelihoods.
Market analysis involves using data to understand market trends, such as prices, demand, and supply. This information can be used to make informed decisions about what to grow and when to sell, and to connect farmers with buyers.

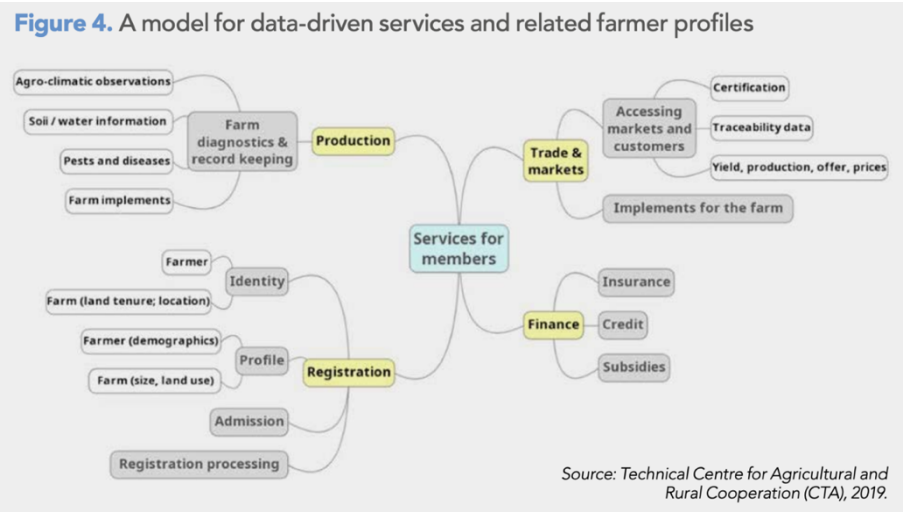


Figure 10: Source: FAO, Farm data management, sharing and services for agriculture development

Farm-level data is crucial in delivering tailored farmer-centric services and information to individual farmers. The information about the farm and the farmer can be categorized into different components that are useful for different types of services.
The first part of this section focuses on data and usage, where we present the different categories of information and their usefulness for various services. It is important to note that the exact set of information within each category may vary significantly depending on the specific service designed that may or may not require specific information.
The main categories of data at farm-level are[26]:

[26] FAO Farm data management, sharing and services for agriculture development

- Personal information: contains the profile and lists the information about the farmer's identity, such as name, ID number, birth date, gender, language spoken, income level, education level/literacy level, and number of people in the household. Some information, such as the literacy level or the languages known, is critical for the design of accessible ICT services.
- Communication information: all information to interact with the farmer, either directly or through broadcast media. This includes information such as phone number(s), phone type (smartphone, basic phone, etc.), phone literacy (ability to use different technologies on the phone such as SMS or app), email, social networks used, or radio and TV listened (and at which time). This data is particularly useful in understanding the most efficient way to deliver services and information to the farmer.
- Location: critical to locate the farmer. It usually includes information such as administrative address (split by administrative divisions such as region, district ...) and GPS coordinates.
- Financial instruments: critical for financial services (e.g., credit, insurance or subsidy payments). It includes information about bank accounts, including mobile money accounts.
- Credit information: includes information such as credit record, farm business plan (to identify cash needs and timing of repayment during a complete crop cycle), savings and credit cooperative societies (SACCOs), rotating savings and credit associations (ROSCAs) membership, active credit information.
- Insurance information: such as credit, but also to identify covered and uncovered risks. Information includes field(s) covered, risk(s) covered, cost, company, amount repaid in case the risk(s) materialize.
- Farm details: Information about the farm as an enterprise is critical to identify specific needs and interventions to support its activities. Key information includes registration number (if the farm is a formal registered business), labor force available on the farm, equipment (for planting, harvesting, post-harvesting), or the (list of) extension agent(s) associated with the farm/farmer. When the farm is a formal business, it is characterized by its financial data (turnover, benefit, etc.). In the case of smallholder farmers, the farm's financial data is usually the same as the farmer's financial data. In some cases, it may be appropriate to separate the two.
- Qualification and certification data: apply to either the farm or the farmer and, sometimes, to specific fields. Most certification requires training first. However, some training does not lead to any certification. This information is critical for many purposes. First, most certifications have regulations on various activities from planting to applying treatment to harvesting. Extension services must adapt to these constraints. Then, certification provides added value to the end-product, and this is critical for marketing activities. Finally, knowing a farmer's certification enables him to more easily access other certifications.
- Field information: location, size, elevation, soil of the land.
- Production information/ Space, amount of seeds planted, equipment used, type and quantity of fertilizer.
- Business information: stakeholders, markets used to sell and buy products.

Data Type

The definition of "data type" can be versatile and change from the context we are using it in. as an example, in data analysis it defines how the data is stored in a computer (eg. Integers, floating values, characters, etc.) In our case and in DIVINEs scope, the "data type" is defined as a macro category under which we can classify the data. According to our schema, the data have to be distinguished as by falling under three different types: Personal Data, Non-Personal Data, and data covered by intellectual property regulation, as it may be the case for data subjected to a copyright or trade secret. All the previously – mentioned agri-data categories are falling under one of the three groups. In the next pages we will study each one in detail, explaining what are the different among the different types, as well as their main regulatory requirements.

Personal Data

Personal data are numbers, images, values and information that can easily allow us to identify the individual they refer to. This includes any information that can be used to directly or indirectly identify a person, such as their name, address, phone number, email address, social security number, date of birth, IP address, biometric data, and more. Personal data can be sensitive and private, and the collection, storage, and processing of personal data is often subject to privacy laws and regulations to protect individuals' rights and ensure their personal data is not misused or mishandled. In the EU, due to the sensitivity of these data, implemented in 2018 the General Data Protection Regulation (**GDPR)**, with the aim to standardize the protection of personal data across EU member states. It applies to the processing of personal data by automated means as well as manual filing systems. In the text, the Personal data is defined as *any information relating to an identified or identifiable natural person ('data subject'); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person.* The text creates guidelines on processing personal data lawfully, transparently, and fairly, as well as ensuring accuracy, confidentiality, security, and limiting the storage of data for only as long as necessary. It also requires that data subjects have the right to access their data, transmit it to another controller, and have it erased when it is no longer necessary. The GDPR applies to all organisations that process personal data within the EU or that process personal data of EU citizens. The regulation is aimed at protecting the fundamental rights of individuals in the digital age and facilitating business while reducing administrative burdens.

In the schema, the GDPR appears two times: one under the section "data held by the public sector" and the second time under "data held by the private sector. The fact that this regulation is applicable in both cases is due to the relevance of preserving individuals' privacy and data confidentiality.

In DIVINE's case, when collecting and receiving data from a third party or directly from a farmer, one for the first question we need to ask ourselves is "are these personal data?" "do they allow me to directly or indirectly identify the individual they refer to?" if the answer is yes, then the chances we might be dealing with personal data are very high. Due to their specificity and importance, they have to be treated with extreme care and attention, and follow the guidelines given by the GDPR.

Another text regulating the transfer and use of personal data is the ePrivacy Directive. Again, the text refers to both publicly and privately held data. This directive, which entered into force in 2011, can be considered a past step towards the construction of the GDPR. It aimed at *regulating the processing of personal data in the electronic communications*, and at harmonizing the rules over personal data in the EU. However, compared to the GDPR, the rules:

- Only applies to data processed in the electronic communication sector;
- Overall, its rules are less stringent;
- Is a directive and not a regulation, something that leaves the EU MS some discretion in how they implement the directive, and they can adapt it to their national laws and circumstances. The difference and hierarchy between regulations and directives will be further explained in the next section.

Non-Personal Data

Non-Personal Data are defined Art.2 DSA as *data other than personal data.* These data are the ones that DIVINE will aim at using and exploiting through its platform. Non-personal data can be divided in different categories, based on the context and the scope of their use. In our case, we can imagine the majority of the data collected by DIVINE to be related to the agricultural world, and thus similar to the ones mentioned by the FAO Report[27]:

- ***Field information***: *In many cases, a farmer manages more than one field in different places, or even if he has one piece of land, the space is split into sections with different crops. Core field information includes location , size (the size may be available on the land title, evaluated by the farmer or automatically computed if a field map is provided), elevation (important for some crops), soil, land title and crop history. Field information also includes crop information (crop, variety, type of seeds). The crop information is highly dependent on the type of commodity grown: trees (coffee, cocoa, coconut) or tea are very different compared to seasonal crops. The crop information must therefore be adapted.*
- ***Production information***:*The production information is usually linked to a field. This information is usually useful for extension services and to prepare trade or post-harvest activities. It usually includes planting information (date, spacing, intercropping information, equipment, amount of seeds used), activities information (treatment applied, fertiliser, extension service interventions, pest and disease attacks and treatments, activities such as weeding, water usage, yield, loss, rainfall...). Here again the production information is directly related to the crop specificities.*
- ***Business information*** *: Business information is a critical element for marketing and selling of the yields or transformed products. This information describes the linkages between the farmer and other key stakeholders in the value chain for conducting his/her businesses. It includes information such as cooperatives/production cluster membership, markets the farmers are linked to, agribusinesses linkages, total amount of products sold (per trade channel such as cooperative, at market, at farm gate) and prices sold.*

[27] See Reference 25

However, it is important to notice that, comparing to the case of personal data, these types of data are regulated differently whether they are held from the public sector or from the private one. In fact, as you can see in the image below, while the public sector data are strictly regulated, the rules regarding the private sector are fewer and less stringent.
To all these rules, we need to consider adding the **SAIO**, **IFS**, and **Regulation 138/2004** which regulate the use, provision, transmission and sharing of data in the agricultural sector and thus strictly apply to DIVINE's scope.

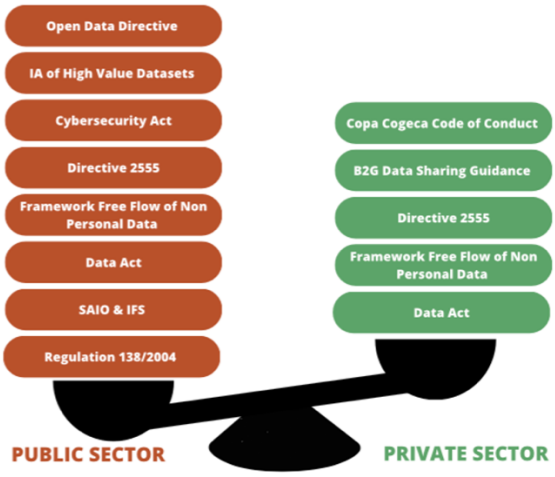


Figure 11:Balance between Public and Private Sector Legislation

Public Sector

Regulation over data (general definition)

In terms of data sharing and easiness to access and gather the data, a special mention has to be done related to the Implementing Act of High Value Datasets and Open Data Directive. In fact, these two legislations define a certain type/amount of data which they mandate the *release of public sector data in free and open formats.* When creating a platform aiming at developing data-sharing in the agricultural sector, these regulations and the related datasets may represent one first source of information and some first, easy-to-access data. This legislation only regards only publicly held data. The First one, the Open Data Directive, has the objective to increase the amount of public sector data available for re-use, ensure fair competition and easy access to public sector information, and enhance cross-border innovation based on data.
Its main principle is that government data should be open by default and design, and the directive allows for the re-use of data held by public undertakings such as public utilities and transport providers. In order to allow the creation of this data flow, the EC has listed in the Directive's annex a list of "High value datasets" that are subjects to the law.
Similarly, the Implementing Act of High Value Datasets is a document that enlarges the list of "High Value Datasets" laid down in the Open Data Act. This list includes geospatial, earth observation and environment, meteorological, statistics, companies and company ownership, and mobility datasets. These datasets will need to be available free of charge, machine readable, provided via APIs, and provided as a bulk download, where relevant.

The directive applies to all existing documents held by the public sector covering public tasks, research data, and public services operators, but not to documents held by public undertakings that are not related to the provision of services in the general interest or are directly exposed to competition.
In the scope of DIVINE, Categories 1-3 of data listed in the Act (geospatial, earth observation and environment, and meteorological datasets) are extremely relevant, as farmers often deal with high value geo-referenced data, as they can be used for environmental benefits (e.g., measuring the NVDI of vegetation for ecological and environmental purposes). Categories 4-6 (statistics, companies and company ownership, and mobility datasets) are more interesting for stakeholders, as research stakeholders could study and analyse different kinds of data as well as their interactions.
A specific mention has to be done for the Data Act. The document, which is still under study as its text has not been approved yet, applies to manufacturers, users, and providers of data processing services in the European Union, as well as public sector bodies and Union institutions.
It aims to facilitate data access while still allowing for incentives to invest and generate value through data, allow the use of relevant data by the public sector, facilitate switching between cloud and edge services, increase data interoperability, and reduce barriers in data sharing, and it should be applicable to both Public and Private non Personal Data.
The Relation of the Data Act with the existing regulation can be found in Annex 5.

Regulation over Agri-Data

The EU has adopted new regulations called the Statistics on Agricultural Input and Output (SAIO) in 2022, to modernise the European system of agricultural statistics. The objective of the regulation is to bring under one legal framework the data related to agricultural production statistics, including organic farming, agricultural price statistics, and statistics on plant protection products (PPPs) and nutrients, to facilitate data sharing and comparison among Member States and the European Commission. The framework aims to improve the quality, comparability, and coherence of European agricultural statistics. The SAIO consists of aggregated crop and animal production statistics, agri-environmental statistics on fertilizers, nutrient balances, and pesticides, and agricultural price statistics. When building DIVINE's data sharing platform, the data included in the SAIO framework may be used and exploited, as it is the case for the data defined in the High Value Dataset Act.
Similarly, the Integrated Farm Statistics (IFS) framework introduced some new data variables that were not previously collected, such as irrigation, manure, nutrient use, and livestock management.
Together with SAIO and IFS, EC Regulation 138/2004 (and the proposals to amend it) updates the rules on agri-data, monitors and evaluates the CAP and other EU policies, and improves the quality and coherence of European agricultural statistics. Moreover, it provides guidelines on how to collect, store, and standardize agricultural data to allow their sharing with the commission and other member states.

Regulation over Data Security

In terms of privacy respect and security, the EU aims to improve its ability to prevent, detect, and respond to cyber threats and incidents: to do so, it published the CyberSecurity Act, a text whose goal is to establish a cybersecurity framework that includes standardization and

certifications. It involves various bodies, including Member States (MS) and organisations that work with them, and establishes The European Union Agency for Network and Information Security (ENISA) as a key player in supporting this framework and providing appropriate assistance.
Other rules are given by Directive 2555 and the framework for Free Flow of Non-Personal Data, which also applies to certain specific private sector data.

Private Sector

Regulation over data (general definition)
Regarding the processing and sharing of Private data, the regulation for the private sector is not as vast and stringent as it is for the public one. The most relevant document in our case is the Guidance of public sector data sharing between Business to Government report. The document provides guidelines and suggestions on how to better develop the collaboration and exchange between the two sectors, increasing data security and stakeholders' trust. Nonetheless, the text only provides guidelines, not rules, and has no force of law.
The Data Act, which is currently under discussion, will represent one of the main regulations over Private, non-Personal Data.

Regulation over Agri-Data
The Copa-Cogeca Code of Conduct is an initiative to ensure that agri-data sharing leads to a prosperous agri-food chain by increasing mutual trust among working partners. The document provides support on contractual relations and guidance on re-using and sharing agricultural data through setting up transparent principles and clarifying responsibilities. However, due to its non-legislative nature, compliance with the Code of Conduct is voluntary, and it predominantly focuses on non-personal data. The text calls for transparency when dealing with data access and usage, with the aim of building farmers' trusts on the way that their data is being managed.

Regulation over data Security
If the Privately held data are subject to some same regulation of the public ones in terms of cybersecurity (Directive 2555 and framework for Free Flow of Non-Personal Data), the legislation over the data processing, sharing, and access granting is limited to the Copa Cogeca Code of Conduct and the B2G data sharing.

Now, after having outlined the relationship among the mentioned rules on data processing and data sharing, we can reorganise the Public/Private sector balance as it follows:

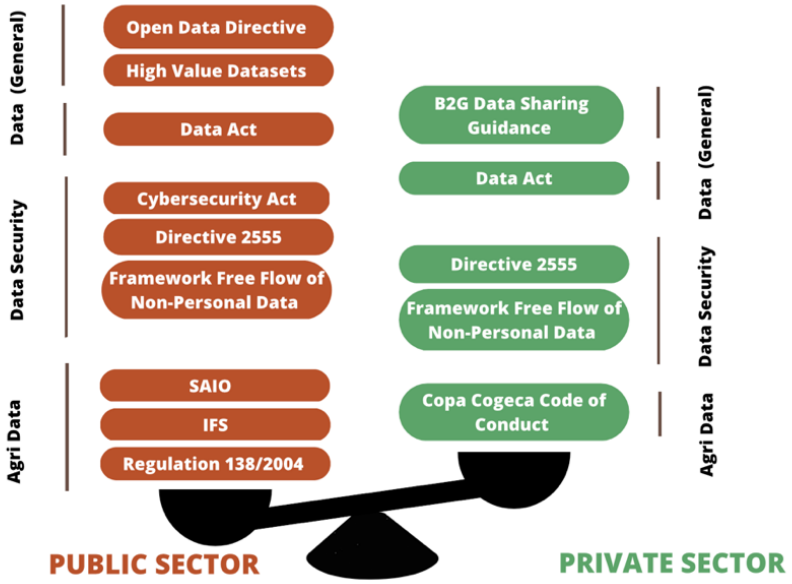


Figure 12: Public Sector Vs. Private Sector Regulation, Source: Own

The section above effectively highlights the stark contrast between the degree of regulation that the public and private sectors are subject to. While the public sector operates under a comprehensive regulatory framework, the private sector's data practices are not subjected to enough official legislative acts, regulations, and directives.

Upon a closer examination of the regulatory landscape, it becomes apparent that the private sector's data practices are governed mainly by non-binding instruments such as the Copa-Cogeca Code of Conduct and the B2G Data sharing guidance. These documents lack the force of law and are not recognized at the EU level as official regulatory instruments. The absence of clear and enforceable regulations exposes individuals to potential abuses and breaches of their data, including unauthorized access, use, or disclosure.

Therefore, in the close future, it is imperative for policymakers and regulators to take a proactive approach towards strengthening the regulatory framework that governs private sector data practices.

Data Covered by IP rights

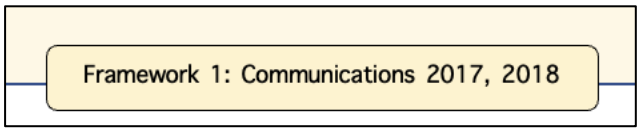
Data covered by IP rights refers to information that is protected by intellectual property laws, such as patents, copyrights, trademarks, and trade secrets. These laws exist to provide creators and inventors with exclusive rights over their creations or inventions, allowing them to control how their works are used and ensuring they receive fair compensation for their efforts.

In the context of data, IP rights can apply to a wide range of information, including databases, computer programs, digital media, and other forms of intellectual property. For example, a database that compiles information on consumer preferences and habits may be protected by copyright, while a computer program that analyses that data may be protected by patent law.

One of the challenges with IP protection of data is determining what types of information are eligible for protection, as well as the extent to which that protection applies. In some cases, it may be possible to protect data as a trade secret, which involves taking reasonable

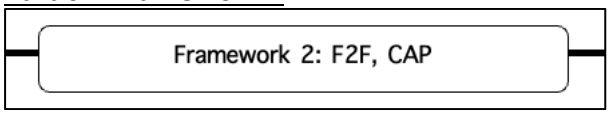
measures to keep the information confidential. In other cases, it may be possible to apply for patents or copyrights to protect certain aspects of the data.
Overall, the protection of data through IP rights is an important consideration for businesses and individuals who create or use valuable information. By understanding the various forms of IP protection that may be available, it is possible to ensure that data is properly protected and that creators receive the recognition and compensation they deserve.
In DIVINE's case, the section is relevant both when gathering data for the platform – as it will be necessary to be aware of the fact that not all data may always be available – and when managing the data that have already been collected.

Part 5 – Framework 1



The European Commission's proposed actions are highly relevant to DIVINE's project of creating an agri-data-sharing platform. The Commission's recognition of the importance of data-driven innovation and the potential for growth in the European data economy emphasizes the need for appropriate framework conditions to support the growth of the data economy. This includes promoting data sharing, enhancing data protection and cybersecurity, and developing technical standards to support interoperability between different data systems and organisations.
To comply with the proposed common rules for sharing data, protecting privacy, and cybersecurity, DIVINE's platform must prioritise the development of strong data protection and cybersecurity measures. This is especially important given the Commission's proposal for a European Data Protection Board to enforce data protection laws across the EU and the intention to update EU cybersecurity legislation to address emerging threats in the digital economy.
Furthermore, DIVINE's project must consider the need to develop skills and competencies in the data sector. The platform can provide guidance on the skills and competencies required for different roles in the data sector, and support businesses and organisations seeking to innovate using data. By following the proposed framework conditions, DIVINE's project can contribute to driving growth, job creation, and competitiveness in the global market while promoting innovation in the agriculture sector.

Part 6 – Framework 2



Both the Common Agricultural Policy (2023-2027) and the Farm to Fork Strategy need to be kept into account when designing and mapping the data governance of DIVINE. In fact, even if they do not properly outline the development of an agri-data-sharing platform and they do not discuss details of data management, they strictly relate to the agricultural world, and lay out the EU goals and objectives for the next future.

Figure 13: Source: EC

Specifically, the Farm to Fork (F2F) Strategy, which is a part of the European Green Deal, represents a comprehensive plan for the creation of a sustainable food system in Europe. The F2F Strategy seeks to achieve various goals such as having a neutral or positive environmental impact, mitigating climate change, reversing biodiversity loss, promoting public health and nutrition, and ensuring food security. The strategy requires a multi-stakeholder approach involving farmers, processors, retailers, and consumers. Data sharing and agricultural data regulation play a crucial role in achieving these goals. The European Commission is making significant investments in research and innovation (R&I), technology, advisory services, data, and knowledge sharing to accelerate the transition towards a sustainable, healthy, and inclusive food system. The Commission aims to promote effective Agricultural Knowledge and Innovation Systems (AKIS) involving all food chain actors to provide tailored advisory services on sustainable management choices. Furthermore, the Commission will propose legislation to convert its Farm Accountancy Data Network into the Farm Sustainability Data Network to collect data on the Farm to Fork and Biodiversity Strategies' targets and other sustainability indicators. Through tailored advisory services and the common European agriculture data space, the Commission aims to enhance the competitive sustainability of EU agriculture and support the carbon farming initiative.

Figure 14: Source: EC

Overall, the strategy related to DIVINE as one of its four main goals is the creation of a “sustainable food production”. The platform DIVINE aims to create will collect different types of data from farmers – which should and could be used to promote the F2F goals.
Similarly, the CAP (Common Agricultural Policy) framework is crucial to consider when creating an agri-data-sharing platform for DIVINE's project. This is because the CAP Strategic Plans, which all Member States must develop in order to receive EAFRD and EAGF payments, play a key role in defining how agricultural activities are conducted in the European Union. The CAP Strategic Plans require Member States to incorporate "Farm Advisory Services" into their plans, which offer impartial advising services for farmers and other beneficiaries of the CAP. These advisory services cover various dimensions such as economic, environmental, and social dimensions, and take into account current farming practices and should be integrated within the interrelated services of farm advisors, researchers, farmer organisations, and other relevant stakeholders that form the AKIS (Agricultural Knowledge Information Systems).
It is essential that the agri-data-sharing platform considers the various types of support allowed under the CAP framework, such as reimbursing eligible costs, unit costs, lump sums, and flat-rate financing. The agri-data-sharing platform may provide a way to record and maintain the data required to ensure fair and equitable budget allocation based on statistical and objective data. Moreover, the platform could acknowledge the performance framework established by Member States to evaluate and monitor the implementation of their CAP Strategic Plans. This framework should include KPIs and targets, and both ex-post and ex-ante evaluations should be conducted to compare outputs and results. The agri-data-sharing platform should provide a way to record and maintain this data, enabling secure exchange between the Commission and each Member State.

Supported by facts:
CAP Strategic Plans will be based on data, analysis and a needs assessment in relation to agriculture and rural areas in each Member State. The Commission Recommendations of December 2020[8] provide guidance to Member States.

In summary, the CAP framework should be kept into account in DIVINE's project when creating an agri-data-sharing platform as it defines the rules and requirements for accessing EAFRD and EAGF payments, establishes the performance framework for monitoring and evaluating CAP Strategic Plans, and sets out the types of support allowed under the regulation. The platform should be designed with data protection principles in mind, ensuring the privacy concerns of farmers and other beneficiaries of the CAP are taken into account.

Regulation Mapping: the texts with force of law (in red)

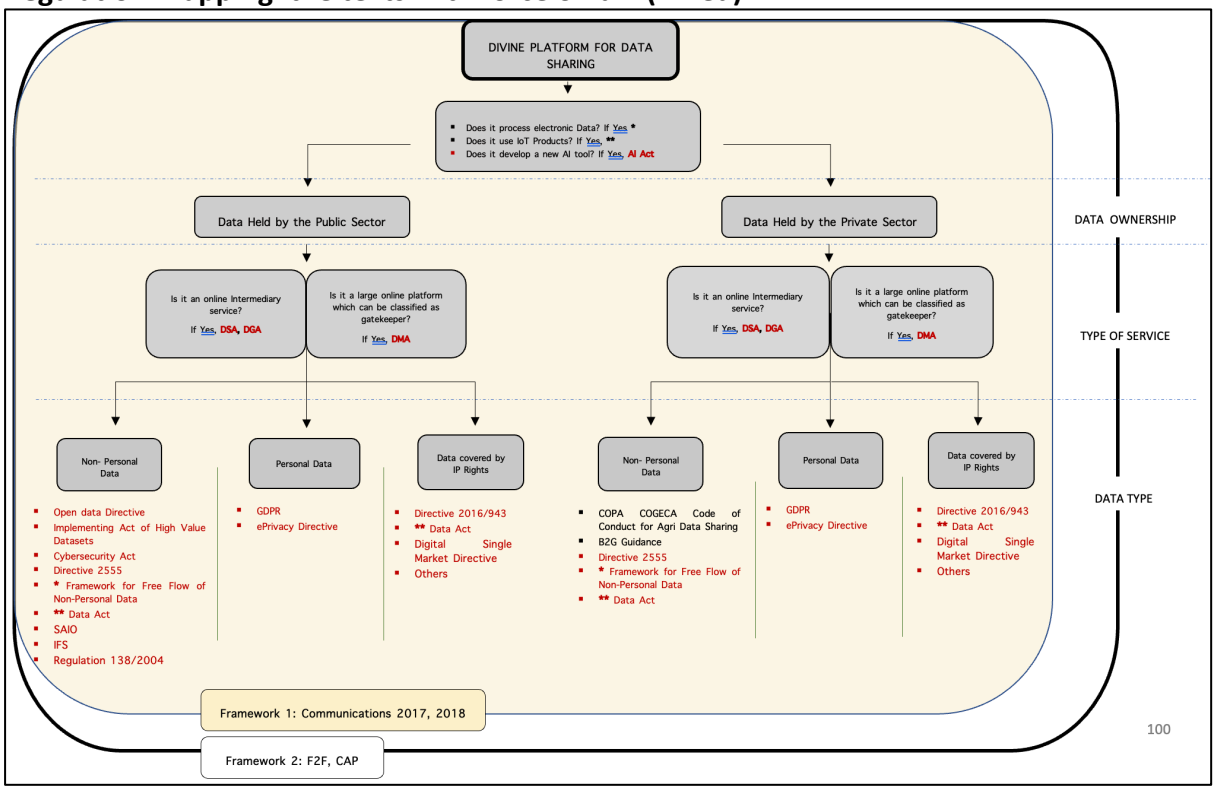


Figure 15: Mapping of Current Agri - Data legislation, focus on force of law texts. Source: Own

Regulatory Gaps

After a first broad analysis of the DIVINE SoTA legislation, we can say that the biggest regulatory gap to cover regards the Private Data Sector (See the image above).

Implications

Different concerns can arise when dealing with such a discrepancy among public and private sectors. The biggest issues relate to:

- Data security and privacy concerns: Without adequate regulations, there is a higher risk of data breaches, unauthorized access, and misuse of private sector data, which can lead to financial losses and reputational damage for businesses and individuals.
- Lack of accountability and transparency: The absence of clear regulations may result in a lack of accountability for data handling practices by private sector entities. This can undermine public trust in the use of personal data and hinder the ability to hold organisations responsible for any wrongdoing.
- Inconsistent data protection standards: Without uniform regulations, there may be disparities in data protection practices across different private sector entities. This can create confusion for individuals and hinder their ability to exercise control over their personal information.
- Inhibited innovation and competition: Unclear or inadequate regulations may discourage businesses from investing in innovative data-driven technologies and

services due to concerns about legal compliance and potential liabilities. This can limit market competition and impede the development of new solutions.

- Potential for discriminatory practices: Without proper guidelines, private sector entities may engage in discriminatory practices based on personal data, such as targeting specific demographics or excluding certain groups. This can have negative social and ethical implications.
- International data transfers and harmonisation challenges: In the absence of robust regulations, cross-border data transfers between countries may face legal uncertainties and barriers, impacting global business operations and collaborations. Harmonizing data protection standards becomes challenging in the absence of clear guidelines.
- Regulatory arbitrage and jurisdictional challenges: The lack of comprehensive regulations can create opportunities for regulatory arbitrage, where businesses exploit loopholes or move operations to jurisdictions with more lenient data protection laws. This can make it difficult to enforce consistent and effective regulations globally.
- Consumer rights and empowerment: Insufficient regulations may hinder individuals' ability to exercise their rights over their personal data, such as accessing, correcting, or deleting information. It can limit the choices and control individuals have over the use of their data.
- Ethical considerations: Without proper guidelines, private sector entities may face ethical dilemmas regarding the collection, use, and sharing of personal data. The absence of clear regulations can impede the establishment of ethical frameworks for responsible data practices.
- Public perception and social acceptance: The lack of comprehensive regulations can lead to public skepticism and resistance towards the private sector's handling of personal data, impacting the acceptance and adoption of data-driven technologies and services.

However, the highlighted regulatory gap does not mean that the private sector data are worse off (see the discussion below “More Regulation equals a more efficient market and higher data quality?”) nor that there is no other relevant regulatory gaps. In fact, we may find lack of regulation in different aspects, related strictly to technology, to agriculture, or smart agriculture.

Moreover, in different ways and through different means, all the previous points seem to derive from one main issue: the lack of trust. Trust can be referred to the people with whom we intend to share our data, but also lack of trust towards authorities or the environment. In order to promote data sharing and exchange – especially between the public and private sector – and to strengthen farmer’s trust, the EU may establish a structured and transparent certification scheme for data space participants. However, a standardized EU-wide certification framework for accrediting data providers, consumers, and intermediaries is currently absent.

Gaps in Technological Regulation

Technological advancements have been occurring at an unprecedented rate, surpassing the ability of legislative and bureaucratic processes to keep pace. This creates significant regulatory gaps that need to be addressed urgently. The data act has shed light on some of these gaps, exposing the challenges posed by the rapid development of technology.
While technology evolves rapidly, laws and regulations often require lengthy processes, including drafting, consultation, and approval, which can lag behind technological innovations.
The regulatory gaps resulting from this time disparity can have various consequences. New technologies may lack clear legal frameworks, leading to uncertainty in their use and potential misuse. This uncertainty can hinder innovation and investment in emerging technologies, as businesses are cautious about navigating legal grey areas.
Moreover, without adequate regulations, there may be gaps in consumer protection, cybersecurity, and privacy. As technology evolves, new risks and challenges emerge, necessitating the creation of comprehensive regulatory frameworks to safeguard individuals, businesses, and society at large, taking into account inconsistencies and discrepancies in standards and practices across different industries and jurisdictions. The lack of harmonisation can impede collaboration, hinder technological integration, and create barriers to the development of seamless solutions that transcend boundaries.
For all the above-mentioned reasons to bridge these regulatory gaps, there is a need for proactive measures. Policymakers and regulatory bodies must adopt agile approaches to lawmaking, leveraging consultation processes, expert input, and continuous evaluation to keep up with the evolving technological landscape.

Gaps in Agricultural Regulation

The agricultural sector may be also experiencing regulatory gaps, particularly as advancements in technology transform traditional farming practices. While the fundamental purpose of agriculture remains unchanged, the methods and materials employed have evolved significantly.
A global trend in agriculture is the increasing utilization of Internet of Things (IoT) products. These technologies offer numerous benefits, such as precision farming, real-time monitoring, and data-driven decision-making. However, the agricultural sector is lagging in adopting these technologies due to the lack of comprehensive regulations and the scarcity of studies and applications that explore their potential.
The absence of adequate agricultural regulations hampers the widespread adoption of IoT, platforms, and data-driven solutions in farming practices. Without clear guidelines and standards, farmers may be hesitant to invest in these technologies, unsure of their legal implications or potential risks.
Addressing these eventual regulatory gaps requires collaboration between policymakers, agricultural stakeholders, and technology providers. The development of comprehensive agricultural regulations should consider the unique challenges and opportunities posed by IoT, platforms, and data-driven solutions. This involves conducting research, fostering innovation, and engaging in dialogue with industry experts to shape effective and future-proof regulatory frameworks.

By closing the gaps in agricultural regulation, it is possible to unlock the full potential of technology in the sector, drive sustainable practices, enhance productivity, and ensure the safety and quality of agricultural products for consumers worldwide.

Issues

From the comprehensive State-of-the-Art (SoTA) mapping and analysis conducted earlier, several crucial questions arise concerning the development and organisation of DIVINE's platform for agri-data sharing. In particular, there may be concerns regarding the transparency and safety of privately held data, as the sharing of such information is often perceived to be less regulated than public data. Additionally, questions may arise about the practices and implications of data sharing and monetization within the agri-data domain. Recognizing the significance of these inquiries, the following pages aim to dive into various "pivotal topics" related to data, agri-data, and agri-data sharing, which play a major role in shaping the development of DIVINE's platform. Addressing these hot topics is crucial for designing a robust and trustworthy platform that meets the needs of all stakeholders involved.

Among others, one issue is represented by the role of Data Intermediary Services and Data Intermediation Services: defined in the Digital Services Act, are now subject to new, more stringent regulation and rules. Nonetheless, their definition seems rather general and there is a lack of concrete examples given about their roles in a dataspace (or a data sharing ecosystem). This aspect will be further analysed in the next 6.1 Deliverables.

In order, the following aspects will be tackled:

- More Regulation equals a more efficient market and higher data quality? The level of regulation in the agri-data sharing landscape is an important consideration for DIVINE's platform development. While regulations can provide a framework for ensuring data quality, it is essential to strike a balance. Excessive regulations may hinder innovation, restrict data sharing, and create unnecessary administrative burdens. On the other hand, inadequate regulations can lead to data misuse, privacy breaches, and compromised data quality. DIVINE should advocate for a balanced regulatory environment that promotes data quality while fostering innovation and collaboration.
- The Problem with Private Data and Data Silos: The existence of private data silos poses challenges to agri-data sharing initiatives. Some stakeholders may be reluctant to share their data due to concerns about losing competitive advantage or control over proprietary information. DIVINE's platform can address this issue by establishing clear data sharing agreements that protect the rights and interests of data owners. Implementing data anonymization techniques and allowing users to retain control over their data while still contributing to the shared pool can incentivize participation and overcome the barriers posed by private data silos.
- Data Monetization: Data monetization is a complex issue in agri-data sharing. While data has significant value, balancing fair compensation for data contributors with accessibility for the broader agricultural community is crucial. DIVINE should explore innovative models, such as data marketplaces or data cooperatives, that promote fair data monetization and incentivize data sharing. Clear guidelines and mechanisms for revenue distribution should be established, ensuring that all

stakeholders receive appropriate compensation while fostering a collaborative and sustainable data-sharing ecosystem.

- Market for Agri Data: The emerging market for agri-data presents opportunities and challenges for DIVINE's platform. By facilitating agri-data sharing, the platform can contribute to the growth of the market and create economic value for participants. However, ensuring fair and ethical data practices within this market is vital. DIVINE should promote transparency, encourage data standardization, and facilitate fair data exchange to prevent monopolistic practices and promote healthy competition. Creating a level playing field will support the growth and sustainability of the agri-data market.

More Regulation equals a higher data quality?

Before Diving into the analysis and reply to this question, the concept of **data quality** needs to be discussed and introduced. Overall, the broad concept of data quality refers to the degree to which data is accurate, reliable, complete, consistent, and relevant for its intended use[28]. It is a measure of the overall reliability and fitness for the purpose of the data[29]. Data quality is crucial because decisions and insights derived from data are only as good as the quality of the underlying data.

Several key dimensions contribute to data quality:

- Accuracy: Accuracy refers to the correctness and precision of the data. Accurate data is free from errors, inconsistencies, or mistakes that could lead to incorrect analyses or decisions.
- Reliability: Reliability pertains to the consistency and trustworthiness of the data over time. Reliable data can be consistently replicated and produces consistent results when used for analysis or decision-making.
- Completeness: Completeness relates to whether all required data fields or elements are present. Complete data includes all necessary information without any missing values or gaps, ensuring a comprehensive and holistic understanding of the subject matter.
- Consistency: Consistency ensures that data is coherent and compatible with other related data. Consistent data follows defined rules, formats, and standards, and there are no contradictions or conflicts between different data sources or data sets.
- Relevance: Relevance indicates that the data is applicable and suitable for the specific analysis or decision at hand. Relevant data aligns with the objectives, context, and requirements of the intended use and avoids unnecessary or extraneous information.

Ensuring data quality involves various processes and practices, such as data validation (performing checks and verification procedures to identify and correct errors, inconsistencies, or outliers in the data), data cleansing (process of removing or correcting inaccurate, incomplete, or duplicate data), and data standardization (establishing and adhering to

[28] https://www.techtarget.com/searchdatamanagement/definition/data-quality

[29] Farm data management, sharing and services for agriculture development

defined rules, formats, and conventions to ensure consistent and uniform data across different sources or systems).

Organisations and data professionals employ data quality management frameworks and tools to assess, monitor, and improve data quality. These frameworks encompass activities such as data profiling, data governance, data stewardship, and data quality measurement and reporting. By prioritizing data quality, organisations can enhance decision-making, improve operational efficiency, and gain a competitive edge in today's data-driven landscape. By implementing quality control measures, such as data validation processes, standardized data formats, and data cleansing techniques, DIVINE can ensure the integrity and reliability of the shared agri-data. Robust data quality protocols will enhance the platform's credibility and encourage greater participation from stakeholders.

Data Sharing: Data sharing refers to the practice of voluntarily exchanging or providing access to data between individuals, organisations, or entities[30]. It involves allowing others to access, use, or analyse data that was originally collected or generated by a particular party. Data sharing can occur within an organisation, between organisations, or even across sectors and geographic boundaries. It can take various forms, including:

Open Data: Open data refers to the practice of making data freely available to the public, without restrictions on access, usage, or redistribution. Open data initiatives aim to promote transparency, accountability, and innovation by enabling individuals and organisations to freely access, use, and repurpose the data for various purposes.

Collaborative Data Sharing: Collaborative data sharing involves sharing data among multiple parties for a specific purpose or project. It often occurs in research collaborations, public-private partnerships, or industry consortia, where organisations pool their data resources to achieve shared goals, such as scientific discoveries, innovation, or addressing societal challenges.

Controlled Data Sharing: Controlled data sharing involves sharing data under specific conditions, access controls, or agreements. Data owners or custodians may grant access to selected individuals, organisations, or entities based on predefined criteria, such as legal agreements, data sharing agreements, or specific permissions. Controlled data sharing is common in sensitive domains, such as healthcare, where data privacy and confidentiality are paramount.

Commercial Data Sharing: Commercial data sharing occurs when organisations or individuals exchange data for financial or economic purposes. This includes business-to-business data exchanges, data marketplaces, or data licensing arrangements, where data providers offer access to their data in exchange for compensation.

[30] See Reference 12

The data that are not shared outside the company is defined as Closed Data. These data cannot normally be shared due to their characteristics as either personal data or data covered by copyright or trade secret.

After this short explanation, we can move back to the original question: Does more regulation equals a more efficient market and higher data quality?
In principle, regulation may serve as a tool to organise, standardize and control data. In the EU's case, and how it was highlighted during the SoTA analysis, one of the main objectives of regulating data is to create European Data standards for all the member states, in a way that allows for the comparison of information across the different countries. The benefits of developing and regulating common platforms and sharing data are numerous:
First, an increased exchange of data among countries leads to enhanced collaboration and fosters innovation: businesses, researchers, policymakers, and citizens sharing the same goals and interests can cooperate with each other to reach their objectives and develop new technologies. By facilitating the exchange of data across sectors and borders, data sharing fosters a collaborative environment where organisations can share insights, knowledge, and resources. This promotes innovation by encouraging the development of new products, services, and solutions based on the combined power of diverse data sources.
Second, a higher regulation increases transparency: a data sharing platform that adheres to robust data governance and privacy frameworks fosters trust among data contributors and users. By establishing clear rules and protocols for data access, usage, and protection, the platform ensures that data is shared and utilized in a responsible and secure manner. This transparency and trust contribute to greater confidence among stakeholders, encouraging broader participation and engagement in data sharing initiatives. Third, it helps removing barriers to cross-border data flows within the EU. By establishing common data standards and protocols, organisations can seamlessly exchange data across national borders, without encountering compatibility issues or legal complexities. This promotes data-driven collaborations, market expansion, and economic growth, facilitating a unified digital single market within the EU.

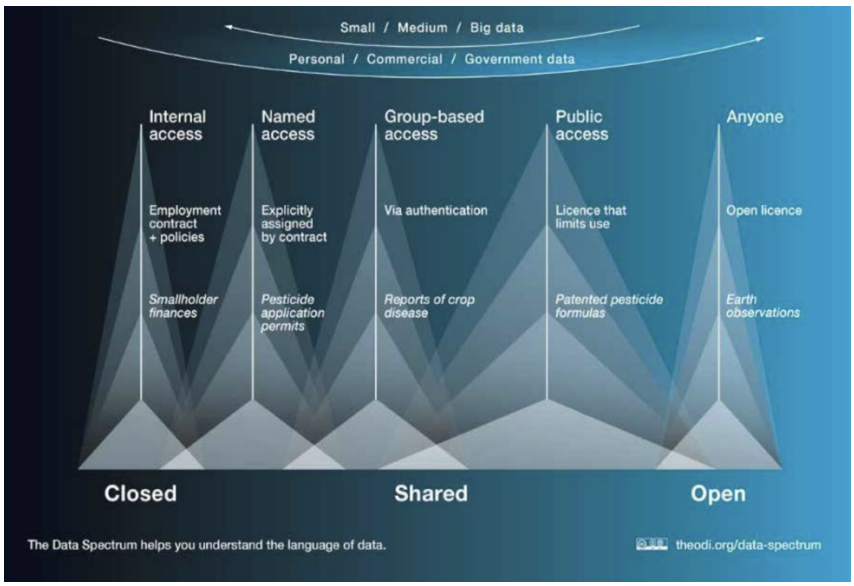
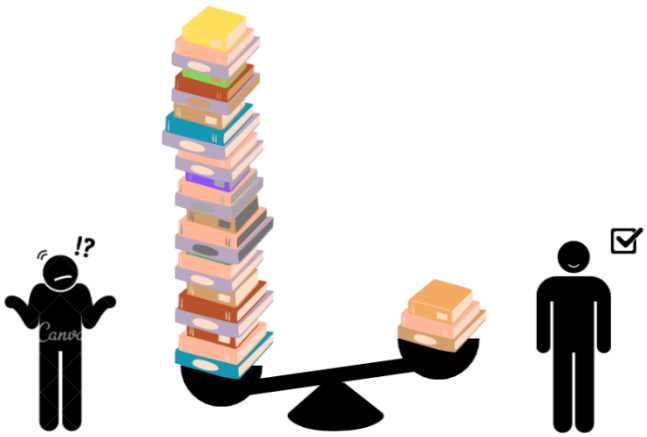


Figure 16: Agri-Data Spectrum, Source: FAO

However, excessive regulation may present some downsides: a document titled "Regulatory Complexity: Quest for Robust Regulation" published by the European Systemic Risk Board (ESRB)31 discusses the challenges posed by regulatory complexity (with a focus on the financial sector). In a nutshell, the document highlights the need for robust regulation while acknowledging the potential burden it imposes on businesses and regulatory authorities. This includes the cumulative impact of regulations on businesses, including the costs, administrative requirements, and compliance obligations. While regulation is necessary to ensure stability and protect the interests of various stakeholders, excessive or overly complex regulations can hinder economic growth and innovation. The ESRB recognizes the importance of striking the right balance between regulation and the need for efficient and dynamic markets and tries to stress the fact that overlapping and fragmented regulations, multiple regulatory bodies, and differing regulatory approaches across jurisdictions can lead to inconsistencies, compliance challenges, and increased costs for businesses.



As an answer to the main question – does more regulation imply better data quality? – we may reply that the answer depends on the context. Overall, a proper level of rules and an appropriate standardization method can help in achieving efficiency and guaranteeing good data quality. However, when the regulatory burden is increasing, the platform efficiency may be negatively impacted, detrimentally influence the quality of the data that is being collected.

In DIVINE's case and in light of the current SoTA analysis, we have seen how the publicly held data are subject to a higher regulatory burden. On the other hand, privately held data seem to be less controlled. Nonetheless, a higher level of freedom in processing data does not always mean that their quality is lower than the public ones. In fact, private companies often have high interests in properly analyzing and collecting accurate data: the better their data, the higher their profits may be. Moreover, compared to the public sector, which has limited investment resources, the private sector can, in most cases, invest considerable funds in developing, processing, and collecting the best data possible. Nonetheless, this is not always valid for all businesses. Thus, when collecting data in the scope of DIVINE, it will be necessary to compare and control the data, making sure all of them are in line and complying with the current standards and legislation.

31 https://www.esrb.europa.eu/pub/pdf/asc/esrb.asc190604_8_regulatorycomplexityquestrobustregulation~e63a7136c7.en.pdf

The Problem with Private Data and Data Silos

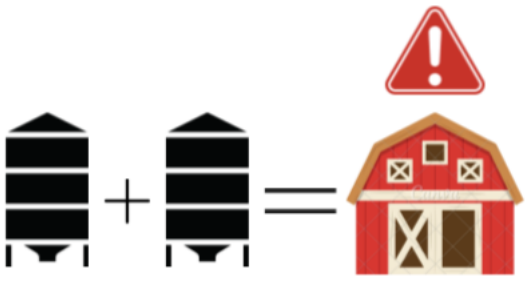
The concept of a data silo refers to a situation where data is isolated, segregated, or stored in separate systems or departments within an organisation[32]. In such a scenario, the data becomes compartmentalized and inaccessible to other parts of the organisation, inhibiting effective data sharing and collaboration.This may be harmful for businesses for several reasons:

First, they restrict access to information, making it difficult for individuals or departments outside the silo to obtain the data they need. This lack of accessibility hampers decision-making processes and inhibits the organisation's ability to derive comprehensive insights from its data assets.

Second, as the data are not shared among departments, this often leads to data duplication, inconsistencies in data definitions, formats, and quality, and incompatibility. This can result in discrepancies and inaccuracies when attempting to integrate or analyse the data from different sources. Moreover, as a consequence, they hinder collaboration and information sharing among teams or departments. This leads to redundant efforts, as individuals or teams may unknowingly duplicate work that has already been done elsewhere in the organisation. It also slows down decision-making processes, as relevant data is not readily available for analysis and insights.

In DIVINE's case, problems may arise when collecting the data for the creation of the platform and could thus lead to having duplicated data or inconsistent datasets.

Moreover, a problem found when dealing with private data from different businesses, as well as from private data from different silos, is data interoperability. According to the EDPS' website, Data *interoperability refers to the functionality of information systems to exchange data and to enable sharing of information*[33].



While big data has been celebrated as a gamechanger for operational efficiency and business intelligence, large-scale data collection, storage, and analysis can be fraught with issues. Most organizations have diverse data assets, distributed across multiple data layers, on-premises data warehouses, or within multiple cloud services.
Gaining analytical or actionable data insights can be hampered by the fragmented nature of data storage. This can have a number of negative outcomes, such as:

- *Time spent cleaning and curating data slows all other data querying processes*
- *Poor data portability prevents data from easily being exported or redeployed*
- *Requiring batch run Extract – Transform – Load (ETL) processes to consolidate data in one location*

[32] https://www.talend.com/resources/what-are-data-silos/#:~:text=A%20data%20silo%20is%20a,information%20to%20do%20their%20work

[33] https://edps.europa.eu/data-protection/our-work/subjects/interoperability_en#:~:text=Interoperability%20refers%20to%20the%20functionality,databases%20contain%20information%20about%20people.

Data monetization is the process of utilizing data to procure economic benefits. Direct or external data monetization involves selling data to third parties independently or via a broker, data sharing to obtain beneficial business terms and conditions, and offering information

- *Security and regulatory risks of moving, copying, and transporting data*
- *Risks from third-party data vendors, such as limited access control or permanently losing data access in a bankruptcy or sale situation*

Unfortunately, standardized data is lacking and the data assets of many companies are often found across a number of on-premises, private cloud, or open cloud locations. Not only is data consolidation a very time-consuming process that requires considerable expertise, it can also be a financial impossibility due to huge capital or ongoing costs[34].

Data Interoperability ensures that data can be shared, integrated, and interpreted across various platforms, technologies, and organisational boundaries.
Interoperability is essential because it allows diverse systems and stakeholders to work together effectively, enabling data to flow and be utilized efficiently. It involves the use of common standards, formats, and protocols that facilitate the exchange and integration of data.
In developing its platform, DIVINE will need to consider:

- Data Format Standardization: Interoperability requires the use of standardized data formats, such as XML, JSON, or CSV, that are widely recognized and accepted across systems. Standardization ensures that data can be interpreted and understood consistently by different systems and applications.
- Semantic Interoperability: Semantic interoperability focuses on enabling data to be interpreted and understood in a meaningful way across different systems or domains. It involves the use of common vocabularies, ontologies, and metadata that provide a shared understanding of data semantics and context. This allows systems to align their understanding of data, enabling accurate data exchange and interpretation.
- Technical Compatibility: Data interoperability requires technical compatibility between systems, including compatibility in terms of protocols, APIs (Application Programming Interfaces), data schemas, and connectivity standards. Systems need to be able to communicate and exchange data seamlessly, regardless of the underlying technologies they employ.

Data Monetization:

In the digital age, data has emerged as one of the most valuable assets, revolutionizing industries across the globe. The concept of data monetization, the process of leveraging data to create economic value, has gained significant traction.
Why discuss data monetization in DIVINE?
The tool that DIVINE aims at creating consists of an agri-data-sharing platform, to which different stakeholders can bring contributions or access different data accordingly to a specific scope. However, it would be a mistake to assume that data holders and owners, and in specific farmers and private companies, would be willing to share their data (raw or

[34] *https://www.intertrust.com/blog/what-is-data-interoperability/*

processed) without receiving anything in exchange. The necessity to provide a proper compensation and incentive to receive data has to be taken into account in the project development, at different surveys, among which the one organised by Agri Dataspace on March 31st, 2023, have shown that only 6% of the respondents would accept to share data without any constraint.

Are you willing to share your data?

- 94% "Yes, if there are incentives"
- 6% yes, no constraint
- 0% No

Agri Dataspace Meeting 31/03/2023 – 16 Respondents

In line with the survey results, several larger-scale studies, such as the one promoted by Statista and Capgemini, have investigated the data monetization practices of private companies across various sectors. These studies aimed to understand if companies are monetizing their data and if they account for the value of data in their accounting systems. The findings shed light on the prevalence of data monetization across sectors, highlighting the diverse ways in which data is sold and valued.

The survey results demonstrate that data monetization is a widespread practice, with companies from all sectors engaging in the sale of data to some extent. While the percentage of data sold and the assigned value varies across sectors, the data monetization trend is evident across the board. This indicates that organisations recognize the economic potential of data and are actively capitalizing on it as a valuable asset.

Characteristic	We monetize data assets/insights through our products and services	We quantify the value of data in our accounting systems
Overall	43%	22%
Banking	60%	28%
Automotive	47%	21%
Telecom	46%	30%
Insurance	43%	19%
Consumer products manufacturing	42%	14%
Public services	41%	26%
Life sciences and healthcare	41%	18%
Energy and utilities	40%	25%
Industrial manufacturing	40%	16%
Retail	36%	19%

Figure 17: Source: Statista

Moreover, according to a study conducted by MCKinsey in 2017, *across industries, most respondents agree that the primary objective of their data-and-analytics activities is to generate new revenue. We asked about data monetization as one such way to create revenue, and the results suggest that these efforts are fairly new. Of the 41 percent of respondents whose companies have begun to monetize data, a majority say they began doing so just in the past two years. Though nascent, monetization is already more prevalent in certain industries:*

more than half of the respondents in basic materials and energy, financial services, and high tech say their companies have begun monetizing data. What's more, these efforts are also proving to be a source of differentiation. Most notably, data monetization seems to correlate with industry-leading performance. Respondents at the high-performing companies in our survey are more likely than others to say they are already doing so in more ways, including adding new services to existing to existing offerings, developing entirely new business models, and partnering with other companies in related industries to create pools of shared data. Perhaps unsurprisingly, respondents at high performers also see a top-line benefit: they are three times more likely than others to say their monetization efforts contribute more than 20 percent to company revenues[35]*.*

By examining the potential benefits, challenges, and ethical considerations surrounding data monetization, we can understand its transformative potential in optimizing agricultural practices and driving sustainable growth. As it entails the extraction of value from vast amounts of structured and unstructured data, by applying advanced analytics and technologies, organisations can unlock insights, create innovative solutions, and generate revenue streams. Data monetization encompasses various approaches, such as selling raw data, providing data-as-a-service (DaaS), creating data-driven products, and enabling targeted advertising based on consumer insights.

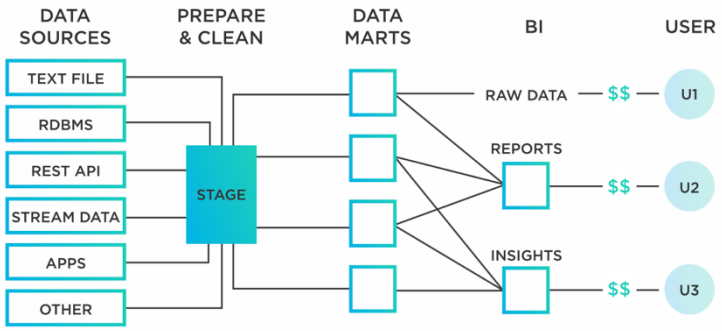


Figure 18: Source: Jaspersoft

Data Monetization in the Agricultural Sector

The agricultural sector has undergone profound changes due to technological advancements, and data monetization holds immense promise for its future. By leveraging data, stakeholders in the agricultural value chain can optimize production, enhance efficiency, and foster sustainable practices. By collecting and analyzing data related to crop yields, weather patterns, soil health, market trends, and consumer preferences, these entities can make informed decisions that optimize production, reduce waste, and better cater to market demands.

If monetary incentives are given to the farmers, data may transform the agricultural landscape in different ways:

a) Precision Agriculture: Data-driven insights enable farmers to make informed decisions, leading to optimized crop management, resource allocation, and improved yields. Through

35 https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/McKinsey%20Analytics/Our%20Insights/Fueling%20growth%20through%20data%20monetization/Fueling-growth-through-data-monetization.pdf

the integration of sensors, satellite imagery, and weather data, precision agriculture empowers farmers to minimize input wastage, reduce environmental impact, and enhance productivity.

b) Supply Chain Optimization: Efficient supply chain management is crucial for the agricultural industry. Data monetization may facilitate real-time monitoring of logistics, inventory management, and market demand, enabling stakeholders to minimize losses, improve traceability, and respond to market dynamics effectively.

c) Predictive Analytics: Data analytics helps predict crop diseases, pests, and yield variations, enabling proactive measures for disease control, crop rotation, and mitigation of risks. Accurate forecasts based on historical and real-time data facilitate informed decision-making, minimizing losses and optimizing resource allocation.

d) Market Intelligence: Data monetization empowers farmers and agribusinesses with market insights, including consumer preferences, purchasing behavior, and price trends. Such information helps stakeholders identify new market opportunities, tailor products to consumer needs, and optimize pricing strategies.

Benefits and Challenges:

Benefits:

- Enhanced Efficiency: Data-driven decision-making improves resource allocation, reduces waste, and enhances overall operational efficiency.
- Help Developing Sustainable Agriculture: Data monetization facilitates the adoption of precision farming techniques, reducing chemical usage, optimizing water consumption, and promoting sustainable practices.
- Increased Productivity: By leveraging data analytics, farmers can optimize crop management, improve soil health, and maximize yield potential, ensuring food security.
- Market Competitiveness: Access to market intelligence and consumer insights helps farmers and agribusinesses adapt to changing market dynamics, boost competitiveness, and deliver targeted products and services.

Challenges:

- Data Privacy and Security: Agricultural data often contains sensitive information about farmers, land holdings, and market behavior. Protecting privacy and ensuring data security is crucial to maintain trust and ethical practices.
- Data Quality and Standardization: Data collected from various sources must be reliable, standardized, and interoperable to enable meaningful analysis and decision-making.
- Technical Infrastructure: Access to reliable connectivity, advanced technology, and data analytics capabilities can be limited in rural areas, posing challenges to data monetization efforts.
- Digital Divide: Unequal access to digital technologies and knowledge gaps can hinder the equitable distribution of the benefits of data monetization in agriculture.
- It has been claimed that surplus generated thanks to data contributed by the farmer should be shared with the farmer, or that farmers should, in some way, benefit from it as well. However, this has not been successfully tried so far although there are a few initial examples in the United States of America and in

Canada of platforms for farmers to share and sell their data. The main difficulties are along the lines of the ODI's reasoning around personal data (Tennison and Scott, 2018): (a) while the total value of all farm data from all farmers is high, the value of data from the individual farmer would probably be very small; (b) mainly poor farmers would resort to selling data, while richer farmers would maintain the privilege of data control.

Data Value

Table 1: Characteristics affecting the value of data

ECONOMIC LENS	INFORMATION LENS
Non-rival/excludable	Subject
Externalities (positive and negative)	Generality
Increasing/Decreasing returns	Temporal coverage
Option value	Quality
High fixed, low marginal costs	Sensitivity
Complementary investments	Interoperability/linkability

Source: Coyle et al 2020

Figure 19: Source: BennetInstitute

Overall, data monetization and issues related to the data market relate to the so-called data value. In order to understand how to best take advantage of data and exploit them, it is necessary to understand what its value is, and how to best compute it. In fact, understanding it and interpreting it in the best way possible often leads to increased company's efficiency and profits. A policy Brief published by Cambridge University in July 2022 analyses the most common empirical methods used to establish the value of data[36].
The report refers back to a prior work at the Bennett Institute for Public Policy (Coyle et al 2020a), and divides the methods used to account or the value of data in three main groups:

- Cost-Based Methods
- Income based Methods
- Market-Based Methods.

Cost-Based Methods
The cost-based method involves identifying the costs associated with generating, collecting, storing, and replacing a dataset. It also considers the costs a firm would incur if the data were to be lost or involve additional expenses such as compensation for security breaches. This approach assumes that the value of an asset is at least equal to its cost, considering depreciation (although this assumption may not hold in cases where data collection is mandated by law).
Extensions of the cost-based approach include the Modified Historical Cost Method (MHCM) and the consumption-based method. The MHCM adjusts costs by considering data-specific

[36] https://www.bennettinstitute.cam.ac.uk/wp-content/uploads/2022/07/policy-brief_what-is-the-value-of-data.pdf

characteristics, such as eliminating duplicated or unused data, and incorporates factors like usage rates, accuracy, and depreciation based on the purpose of data use. The consumption-based method assumes that users value data at least as much as the cost to acquire it and adjusts this value based on the frequency of data usage by consumers.

Several national statistical offices, including Statistics Canada, the US Bureau of Economic Analysis (BEA), the UK Office of National Statistics (ONS), and Statistics Netherlands, have experimented with cost-based approaches for valuing data. They use labor force surveys and employment data to determine the proportion of economic activity related to data and calculate the associated investment in data, along with additional expenditures. Efforts have been made to improve classification and categorization of data-related tasks through machine learning techniques. However, national-level cost-based approaches face challenges in accurately classifying data at the micro-level. Allocating costs for data relative to other associated database costs and pinpointing the precise investment in different stages of the data value chain can be complex. Inadequate precision in occupation selection may lead to underestimation of data value. Various issues and uncertainties remain in incorporating data valuation within the System of National Accounts, and discussions are ongoing in preparation for the 2025 update of the SNA.

Income based Methods

Income-based methods for valuing data focus on estimating its value based on the expected revenue streams generated from its use. This approach is most applicable when there are direct revenue streams attributed to the data. One common method is the "relief from royalty" approach, which calculates the cost savings a company achieves by creating or owning the data instead of paying royalty fees to license it. Other income-based methods involve calculating reported revenues related to data compilation and sales based on business survey data. However, these methods face challenges in identifying cases where data is the "product" and may exclude the value created by data in firms that use it to enhance their products, processes, or generate revenue from data analytics.

Income-based approaches require more judgment compared to cost-based methods since data costs are well-defined but revenue streams can be influenced by factors beyond data insights. These methods often involve estimating counterfactual income streams and can be retrospective, making it difficult to predict the value of revenue streams before they are realized.

Market-Based Methods.

Market-based methods rely on observable market prices, making them preferred when available. However, there are limited observable market prices for data since most data is used internally by organisations rather than being sold or traded. Data markets such as credit scoring typically do not publicly disclose prices, although revenues from sales of credit scores are reported in company accounts, offering some insights into average prices. It's important to note that the value of aggregated data can exceed the sum of its individual parts, as demonstrated in cases where lenders provide data to credit scoring bureaus, which then sell services back to the lenders.

The academic literature exploring market-based approaches to data valuation can be categorized into three groups: those advocating for data marketplaces and examining desirable characteristics of data pricing, those using market capitalization of firms to estimate value, and those utilizing global data flows to derive a valuation.

Market for Agri Data:

The agricultural data market refers to the buying, selling, and utilization of data in the context of agricultural activities. It involves the collection, analysis, and application of various types of data to improve agricultural practices, decision-making, and overall farm management. The market encompasses a wide range of data sources, including weather data, soil data, satellite imagery, sensor data, and market information.

The agricultural data market has been expanding rapidly in recent years due to advancements in technology, such as the Internet of Things (IoT), remote sensing, and data analytics. These technologies enable the collection of large volumes of data from farm equipment, sensors, and other sources, providing valuable insights for farmers, agribusinesses, and other stakeholders in the agricultural ecosystem.

The data collected in the agricultural sector has diverse applications. It can be used to optimize crop management, monitor and manage irrigation systems, assess soil health, detect plant diseases and pests, track livestock, and improve supply chain efficiency. Data-driven technologies also support precision agriculture, enabling farmers to make informed decisions regarding fertilization, seeding, and crop protection, leading to increased productivity and resource efficiency.

The agricultural data market operates through various business models. Data may be collected and processed by private companies, research institutions, government agencies, or through collaborations between multiple stakeholders. Data providers often offer subscription-based services, data analytics tools, or platform access to farmers and other users who require agricultural insights and decision support.

In addition to primary data sources, there are also data marketplaces and platforms that facilitate the exchange of agricultural data. These platforms act as intermediaries, connecting data providers with data consumers. Farmers and agribusinesses can choose to share their data on these platforms, either for free or for a fee, allowing others to access and utilize the information for research, analytics, or product development purposes.

The agricultural data market presents both opportunities and challenges. On the positive side, the availability and utilization of agricultural data can lead to increased productivity, improved sustainability, and more informed decision-making in the sector. It can also drive innovation by enabling the development of data-driven solutions and services.

However, challenges exist in terms of data ownership, privacy, and data sharing. Agricultural data often involves sensitive and proprietary information, raising concerns about who owns the data and how it is protected. Issues related to data privacy, data security, and intellectual property rights need to be carefully addressed to ensure trust and fair practices in the agricultural data market.

Furthermore, the agricultural data market needs to address interoperability and standardization challenges. Different data sources may have varying formats, structures, and quality, making it challenging to integrate and analyse data from multiple sources effectively. Establishing common standards and protocols for data sharing and interoperability is crucial to maximize the value and usability of agricultural data.

In summary, the agricultural data market is a growing sector that leverages data and technology to improve agricultural practices and decision-making. It offers opportunities for increased productivity, sustainability, and innovation. However, careful attention must be

paid to data ownership, privacy, security, and interoperability to ensure the responsible and effective utilization of agricultural data.

Agri Data – What is usually used or collected

When talking about Agricultural Data, different kinds of information might pop-up in someone's mind. Normally, agricultural data are strictly associated with farms, their production, inputs and outputs. Nonetheless, it is important to remember that farming, agricultural platforms and IoT sensors used in the sector need and generally exploit other data, which are strictly related to agriculture, such as air humidity, temperature, geolocalisation, farmers' name and contact, and others. This can be easily seen by giving a quick look at the Eurostat website (picture on the left).

But if on one hand it is true that dataset on farming structure and production exist around Europe, on the other hand those data may not always be relevant for farmers themselves.

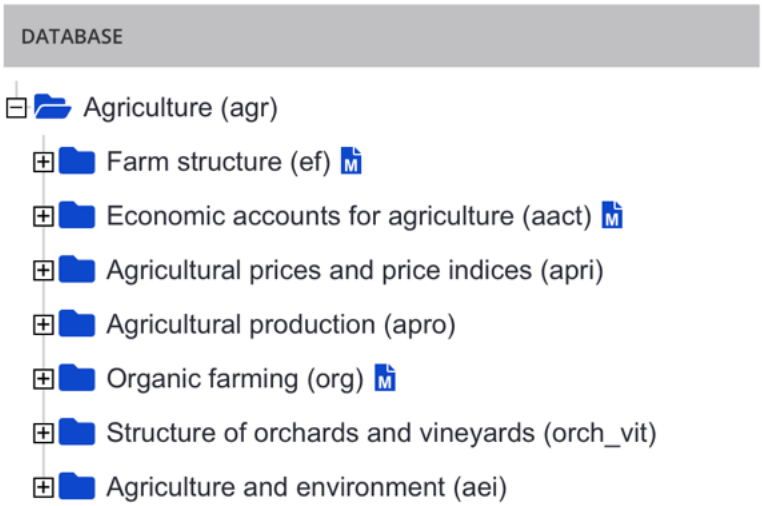


Figure 20: Source: Eurostat

For this reason, it may still be relevant to study and identify, overall, in Europe but also around the world, which data may be significant for farmers and their stakeholders to gather.

Data Needed by Farmers

Outside of the EU, a study of 2010 on Indian Farmers by Mittal, Surabhi & Gandhi, Sanjay & Tripathi, Gaurav[37] highlighted what were in that context the data that farmers needed the most:

[37] https://www.researchgate.net/publication/46435402_Socio-Economic_Impact_of_Mobile_Phones_on_Indian_Agriculture/download, Mittal, Surabhi & Gandhi, Sanjay & Tripathi, Gaurav. (2010). Socio-Economic Impact of Mobile Phones on Indian Agriculture. Indian Council for Research on International Economic Relations, New Delhi, India, Indian Council for Research on International Economic Relations, New Delhi Working Papers.

5.3.1 By Farmers

The interviews and focus groups in different areas indicated that producers had a wide range of information needs, which varied through the growing season. However, the broad categories of information required were common to all of them, irrespective of their location and crops. These categories were:

a) *know-how*, which helps a farmer with fundamental information such as what to plant and which seed varieties to use
b) *contextual information* such as weather, best practice for cultivation in the locality and
c) *market information* such as prices, demand indicators, and logistical information. These are presented in Figure 2 and Table 7.

Figure 2: Information needs of farmers through the agricultural cycle

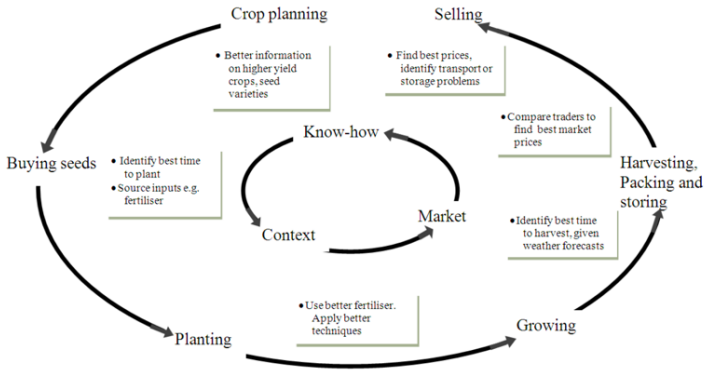


Figure 21: Source: GrowingReturns

According to an interview of the Agree advisory committee carried out by the EDF (Environmental Defense Fund) in 2015, Big Data play a major role in addressing challenges such as sustainable farming and growing population. While the vast majority of farmers and ranchers have done great work maintaining or increasing soil health using conservation practices alone, measurement tools will be instrumental for ensuring a sustainable farming future. In order to maintain yields and meet the food demands of a growing population while also protecting natural resources, we will need to make additional changes – and data tools can help us determine what these changes should be. For example, we need to measure not just bushels or pounds grown but also what happened to the soil, water and air to get that production level. For example, high levels of organic matter in the soil often lead to better yields, and fertilizer optimization can improve water quality[38].

- Field boundaries: Accurate and up-to-date field boundary data enables farmers to have a clear understanding of their land area and manage their operations efficiently.
- Crop types and rotations: Information about the types of crops grown in each field and their rotation history helps farmers plan their planting schedules, manage crop rotations effectively, and optimize inputs accordingly.

[38] https://blogs.edf.org/growingreturns/2015/02/11/a-farmers-perspective-4-reasons-why-collecting-data-is-important/

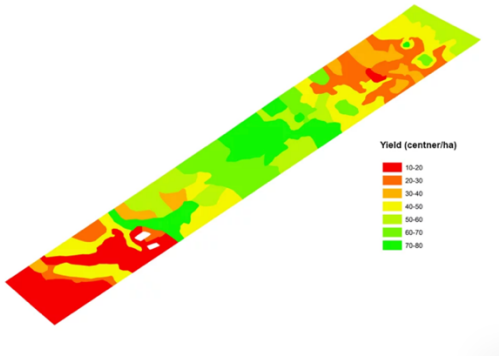
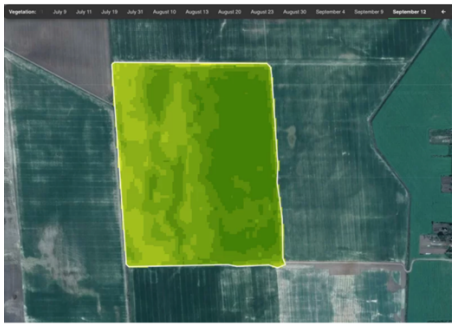


Figure 22: Source: Onesoil

- Crop health monitoring: Data related to crop health, including indicators such as plant vigor, diseases, and pests, allows farmers to identify potential issues early on and take appropriate measures to protect and optimize crop growth.
- Soil data: Soil composition, fertility levels, and moisture content are essential pieces of information for farmers. This data helps them determine optimal planting techniques, irrigation schedules, and nutrient management practices.



Display of vegetation index in OneSoil Scouting app

Figure 23: Source: OneSoil

- Weather data: Access to accurate weather information is crucial for farmers to make timely decisions regarding irrigation, fertilization, pest control, and other weather-dependent activities. Weather data allows farmers to mitigate risks and optimize resource allocation.
- Field performance metrics: Data on yield, productivity, and performance of specific fields or crops helps farmers evaluate their practices, identify areas for improvement, and make data-driven decisions to enhance overall farm performance.
- Equipment monitoring: Data from farm machinery and equipment, such as fuel consumption, working hours, and maintenance schedules, assists farmers in optimizing equipment usage, minimizing downtime, and ensuring efficient operations.
- Market and pricing information: Real-time market data and pricing trends enable farmers to make informed decisions regarding crop marketing, timing of sales, and selecting the most profitable crops[39].

According to CropLife[40], the best existing agri apps are:

[39] https://blog.onesoil.ai/en/what-data-farmer-needs

[40] https://www.croplife.com/editorial/best-agriculture-apps/#slide=92696-81611-6

- Crop X
- Smartwyre
- The GROWERS
- Climate FieldView
- FieldAnalytics
- And others.

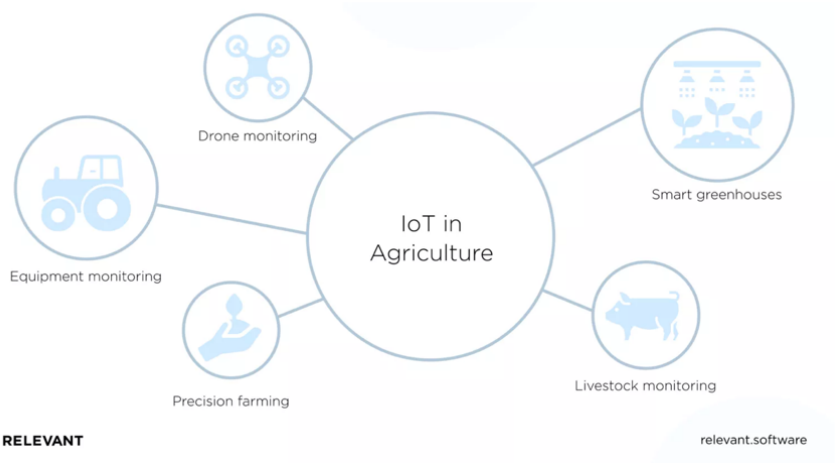
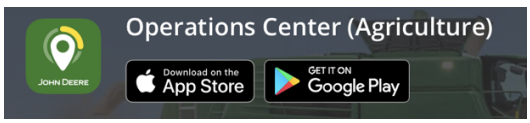


Figure 24: Source: CropLife

The article highlights the apps strengths and explains why they became so common among agriculture. According to the analysis, efficient smart agriculture relies on accurate terrain data and its visualization, enabling farmers to assess completed work and plan future actions. To manage the vast amounts of information associated with multiple fields, it is crucial for measurements to be conveniently presented, uniformly formatted, and easily processed and analysed. Certain apps allow farmers to upload various data, such as fertilizer usage, spraying, and harvesting, which can be visualized through maps. The visualization parameters can be adjusted based on the vehicle's onboard computer settings. These maps provide farmers with a quick evaluation of work efficiency and quality.

Moreover, satellite monitoring can complement field-installed sensors by providing preliminary information. Since sensor installation and sampling are expensive and resource-intensive, they are best performed in problem areas. Apps offering vegetation analysis provide preliminary data, enabling controlled sampling and predictive analytics for smart farming, granting access to extensive historical data on soil moisture, temperature fluctuations, vegetation indexes, precipitation, and other parameters. This empowers them to assess site potential, calculate risks, plan precision irrigation, and more, even before commencing work.



A prime example of successful app integration in agriculture is the John Deere Operations Center. This open platform seamlessly integrates with numerous agricultural apps, including

Intelinair's AGMRI, Golden Harvest's E-Luminate Mobile, and GeoPard. By connecting farm data directly to the Operations Center, users can import field boundaries, yield maps, and other relevant information.
The integration with AGMRI enables data-driven decision-making by alerting users to emergence issues, weed growth, nutrient deficiencies, weather damage, and other factors impacting the current season and beyond.
Furthermore, the integration between AGMRI and the John Deere Operations Center has facilitated collaborations with industry leaders like Yara North America and its Adapt-N nitrogen management tool. Through this integration, variable rate information can be sent to machines, optimizing nitrogen usage and promoting sustainable crop growth by applying the right amount of nitrogen precisely where it is needed for each corn plant.
Overall, we can understand that farmers are interested by apps that are:

- User friendly
- Easily integrated with other apps and data
- Containing different types of information (production, yields, soil quality, but also climate-related data, market prices, and other)
- Transparent, safe and secure
- Providing forecasts or tools to improve monitor and improve the production.

Nonetheless, *despite all the advantages of smart farming and the use of advanced technologies, this concept faces some challenges:*

Lack of Internet. *To implement smart ag technologies, you need a stable Internet connection. Unfortunately, it is not available in all regions in an equal way.*

Low awareness. *Modern systems require fine-tuning and knowing the features of their operation. Some farmers do not fully understand the benefits of using smart farming technologies or do not know how to work effectively with them.*

Lack of unification. *Many suppliers and machinery manufacturers make it difficult to arrange a single system since their equipment may not be compatible. Smooth integration of equipment and software requires standardization of the technologies used.*

Lack of scalability. *Both small farmers and large corporations should be able to use the same technologies, just at different scales. Easily scalable solutions would mean easier and faster production expansion.*
When implementing intelligent systems, farmers and service providers should take into account the described challenges for smart farming and do everything possible to minimize their impact on production[41]*.*

IoT Applications Examples - Inmarsat
Inmarsat plc is the dominant provider of global mobile satellite communication services. Since 1979, Inmarsat has been delivering dependable voice and high-speed data communication solutions to governments, businesses, and other organizations. They offer a diverse range of services that can

[41] https://eos.com/blog/smart-farming/#:~:text=Among%20the%20most%20effective%20and,Smart%20farming%20sensors. *https://www.nature.com/articles/s41893-020-00631-0*

be utilized on land, at sea, or in the air. With a presence in over 60 locations worldwide, Inmarsat operates in key ports and commercial hubs across every continent.

- MINFARMTECH has introduced the MF 200 and MF 400 IoT Satellite Bridge solutions, which allow data from sensors operating on low-power wide-area networks (LoRaWAN™) to be optimized for transmission over Inmarsat's IsatData Pro (IDP) satellite service. This marks the first time that such sensor data can be efficiently transmitted via Inmarsat's satellite[42] network.
- AgroAlarm (Animal Welfare): is a solution designed to ensure farmers are notified if anything happens to their buildings. The solution enables secure, reliable monitoring and alarm notifications for intensive farming[43].

Data Needed by Stakeholders

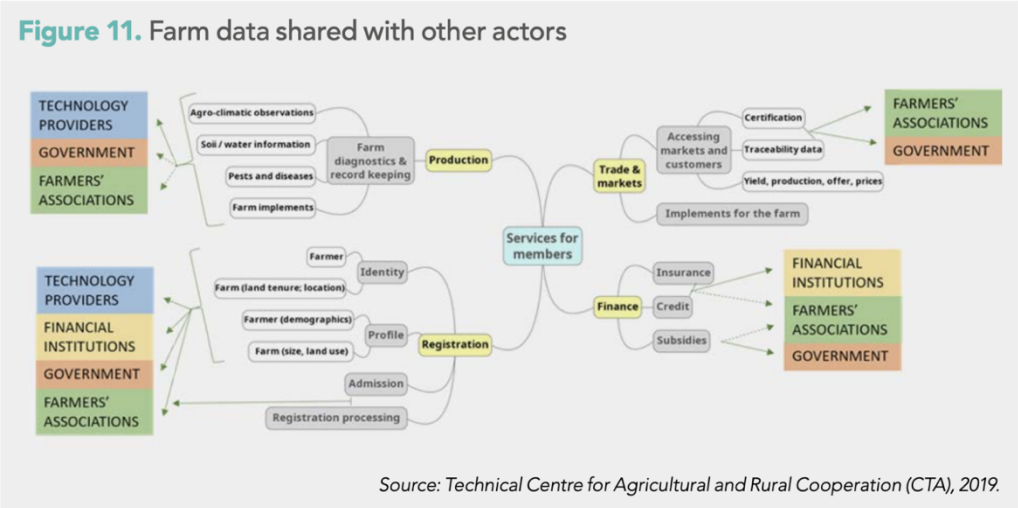


Figure 25: Source: FAO

According to the image above (taken from the FAO report), the main stakeholders that are interested in agricultural data can be divided in four main categories.

- Government
- Farmers' Associations
- Tech providers
- Financial Institutions

To the four groups we may add a fifth, the researchers, who may not have a direct connection to the farmers but may be interested – for different reasons – in studying agricultural data.

Governments

Governments have a major interest in agriculture, first for food security reasons (countries strive to maintain food security by promoting agricultural productivity, reducing dependency on food imports, and ensuring access to affordable and nutritious food for their citizens.), and

[42] https://www.inmarsat.com/content/dam/inmarsat/corporate/documents/enterprise/solutions-services/asp-programme/Inmarsat_Enterprise_Minfarm%20Tech_March_2021_EN.pdf.downloadasset.pdf

[43] https://www.inmarsat.com/content/dam/inmarsat/corporate/documents/enterprise/insights/Inmarsat%20Case%20Study%20-%20Pinc%20Agro.pdf.downloadasset.pdf

it *is crucial to economic growth: accounting for 4% of global gross domestic product (GDP) and in some least developing countries, it can account for more than 25% of GDP*[44].
As the sector plays a vital role in a country's structure, governments need to monitor the changes in production, inputs and outputs, to check how much they need to import to guarantee enough products to their citizens, or how much they can sell and export. We have to remember that governments can have different interests at the state level, province, regional or local. The data the offices need may depend on the needs of the single office, on the area, on the time period and more.
Overall, the governments may be interested in data such as:

- Crop Production;
- Land Use;
- Soil Data;
- Pests and Diseases monitoring.

Financial Institutions

Financial Institutions may or not be related to some governmental structure. Normally, they should provide farmers and producers with financial aids and support measures. When working with the government, they may allocate resources to boost up the production, subsidize farmers in specific moments/for a specific scope. On the other hand, other financial institutions may be there to help farmers investing and develop. To do so, they normally need information such as:

- the localisation of the farm
- the name of the farmer and production information
- Depending on the reasons to allocate resources, the bank account information, the identity of the farmer, and other personal data.

Data Mapping – Conclusion

The analysis of the DIVINE SoTA legislation seemed to reveal a significant regulatory gap in the Private Data Sector, posing various implications and challenges. These implications create concerns regarding data security and privacy, accountability, data protection standards, innovation, potential discriminatory practices, and international data transfers. Moreover, limited data accessibility and interoperability, but also trust emerged as a critical factor in data sharing, necessitating the establishment of a transparent certification scheme for data space participants. However, a standardized EU-wide framework for accrediting data providers, consumers, and intermediaries is currently absent.

[44] https://www.worldbank.org/en/topic/agriculture/overview

CHAPTER IV - TIMELINE of Application of Current and Future Legislation

In the environment of policy analysis and decision-making, governance reports play a pivotal role in providing accurate and comprehensive information to stakeholders. One crucial element in such reports is a timeline that outlines the application of current legislation. This timeline may serve as a valuable tool for understanding the evolution of regulatory frameworks and their impact on various sectors.

The study of current, as well as future legislation offers an essential context for understanding the progression of regulatory measures. It will enable individuals with interest in DIVINE or similar projects to trace the development of policies and laws, including their inception, implementation, and potential amendments. By providing a chronological framework, the timeline helps stakeholders grasp the underlying motivations, societal needs, and political dynamics that have shaped the current regulatory landscape. Specifically, a detail timeline may be useful to:

- Better understanding the context in which the project is being developed: by examining the sequence of events and milestones, policymakers and analysts can identify patterns, trends, and potential gaps in the regulatory framework. This perspective empowers decision-makers to make informed assessments, evaluate the impact of past policies, and identify areas that require improvement or revision.
- Facilitating Strategic Planning: A timeline outlining the application of current and future legislation serves as a valuable tool for strategic planning. It provides a roadmap for policymakers, businesses, and other stakeholders to anticipate forthcoming changes and adapt their strategies accordingly. By identifying key milestones and deadlines, organisations can proactively align their operations, policies, and investments with the evolving legal landscape. Strategic planning also benefits from an understanding of past regulatory shifts. A timeline helps stakeholders identify precedents, evaluate the outcomes of past legislative actions, and predict potential future developments. Armed with this knowledge, businesses can make informed decisions about resource allocation, risk management, and long-term viability. Moreover, a comprehensive timeline enables stakeholders to consider potential synergies or conflicts between different legislative initiatives, thus enabling them to devise coherent and effective strategies.
- Enhancing Accountability: Including a timeline in reports enhances accountability among policymakers and regulatory bodies. Transparency and accountability are crucial elements of good governance, ensuring that decision-makers remain responsive to the needs and expectations of the public. A comprehensive timeline promotes accountability by clearly documenting the actions taken by legislative bodies, executive authorities, and regulatory agencies.
- By comparing the projected timeline with the actual implementation, stakeholders can identify delays, inefficiencies, or inconsistencies, thereby holding decision-makers accountable for their actions or inactions.

Thus, for all the above-mentioned reasons, the insertion of a timeline showcasing the application of current and future legislation plays a pivotal role in DIVINE's data governance analysis and decision-making.

In the next page you will find a timeline indication, in chronological order, the application date of the legislation analysed int the SOTA analysis chapter, as well as the date of proposal of the AI Act and Data Act. Due to their proposal form, both acts will need to be closely monitored during the development and implementation of DIVINE's project, in order to make sure the structure of the data-sharing platform is in line and respects the requirements set out in the documents.

Moreover, as it is clearly shown in the image, we need to account for the fact that DIVINE's project will be completed and concluded in September 2025. Due to the project's length, it will be necessary – in order to develop a proper and up-to-date data governance system – to account for eventual changes in the current legislation, such as new implementing acts or repealing articles, or the proposal on new rules, and the timeline will need to be modified accordingly.

On the other hand, the timeline image does not show and contains information regarding non-legally binding texts (such as the COPA COGECA Code of Conduct on Agricultural Data Sharing or the Business to Govern Data Sharing for Public Interest). This choice was taken for two reasons:

- First, as they do not have force of law, companies are not obliged to apply them. As a result, there is no real date of entering into force or application of the texts.

Second, the fact of adding every regulation, law, directive, communication, and code of conduct relating to the agri-data-sharing sector all in the same timeline would require a much larger space than the one used for the representation below. Moreover, by adding accessory elements to the image, the stakeholders and readers' understanding may be negatively impacted, as they would be overwhelmed by too much information.

TIMELINE

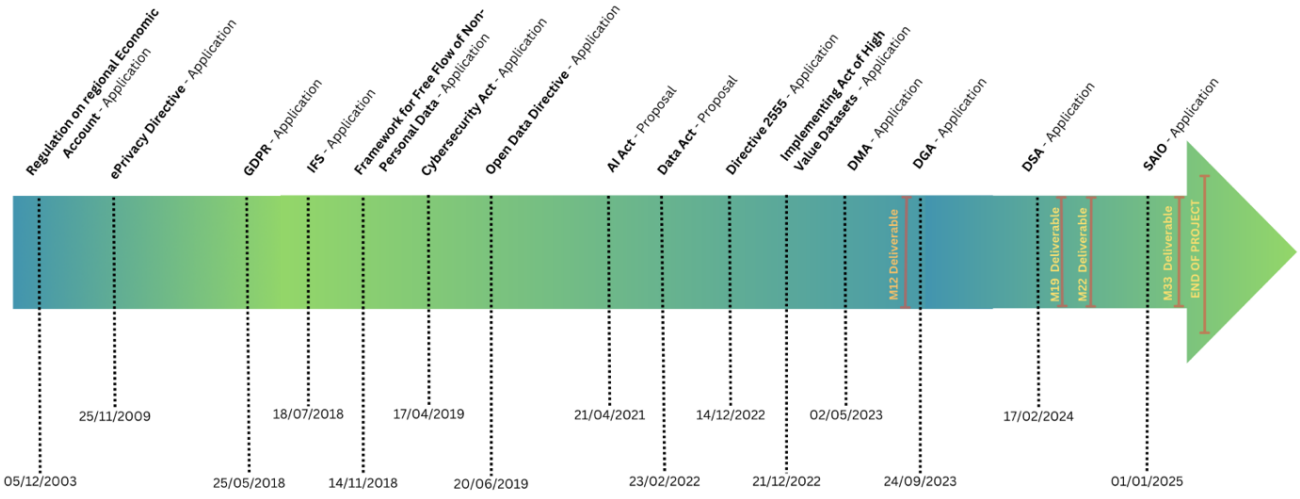


Figure 26: Timeline of Application of EU Regulations and Policies, Source: Own

CHAPTER V- Analysis of Similar Projects

Exploring and analyzing existing projects, whether successful or unsuccessful, can greatly benefit the structure and implementation of DIVINE's data sharing platform. By studying similar platforms and projects, valuable insights can be gained to inform the development process. This approach allows for the identification of positive aspects that can be incorporated into DIVINE, as well as negative aspects that need to be addressed or avoided.

The focus of the analysis will primarily be on projects within the European Union (EU) area. This is because the data governance, rules, laws, and directives applicable in the EU are likely to align closely with those that will be applied in DIVINE. By examining EU projects, DIVINE can ensure compliance with relevant regulations and leverage best practices from successful endeavors.

However, it is also important to consider analyzing non-EU projects in the future. While the EU projects offer valuable insights, looking beyond the EU can provide a broader perspective and potentially bring additional benefits to the development of the DIVINE platform. By exploring global projects, DIVINE can learn from both positive and negative examples from different regions, gaining a more comprehensive understanding of effective approaches and potential pitfalls. Analyzing external projects allows DIVINE to tap into a wider range of experiences and knowledge. It offers an opportunity to observe innovative solutions, emerging trends, and successful strategies that may not be present in EU projects alone. Additionally, studying global projects enables DIVINE to identify potential challenges or shortcomings that may have been encountered in other jurisdictions. This broader analysis can contribute to the development of a robust and adaptable platform that takes into account diverse perspectives and experiences.

Below you will find a comprehensive list of the studied platforms:

<u>EU Platforms:</u>

- AG DataHub
  - Agriconsent
  - API-Agro
- DJust Connect
- Agrirouter
- Agrimetrics
- Fiware
- EHDS
- IACS

AG Datahub

Ag Datahub is a company created with the aim of *providing agriculture with a shared and sovereign technological infrastructure to guarantee the development of digital agriculture in France and Europe*[45].

Its actors amount at 113000 individuals in France, and its market evolution increased of 28% in the last 6 years. Its work is being supported by French public authorities and is participating in European Project aiming at promote agricultural sovereignty such as GAIA-X, AgriDataspace, Data4Food and others.

In the agricultural sector, the company offers different platforms to help farmers collect and secure their data, as well as solutions to deploy agricultural data and design projects.

The main solutions proposed consist in three different applications:

- AgriConsent (AgriTrust)
- API-Agro
- Capdata

The differences, characteristics and usages of the applications depend on the farmer or company's needs. While AgriTurst has the scope of protecting the privacy and sensitive data, API-agro is more useful when sharing data: *API-Agro is the first French platform for agricultural data exchange. It is the trusted third party for all players in the agricultural sector*[46].

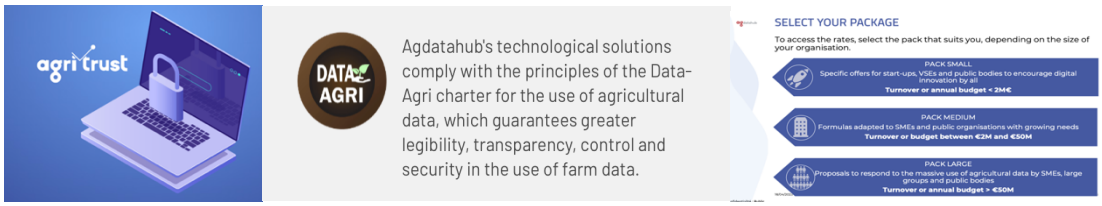
On the other hand, Capdata is defined as a *tailor-made support for agri-data project*: the application allows business to get in touch and discuss with experts on how to best proceed to implement new projects or technologies.

In developing the structure for DIVINE's agricultural data sharing platform, the AgriTrust and API-Agro solutions should be kept into account and analysed in light of DIVINE's needs.

[45] https://agdatahub.eu/en/entreprise/#territoires/

[46] https://agdatahub.eu/en/api-agro/

AgriConsent (Agritrust)



Objective

Agritrust is free portal that was designed for farmers to secure digital exchanges with their partners. It is free, simple and secure tool that enables farms control over their digital identities and consents simply. Agritrust is based on the digital identity of the farm, designed to save time and make online procedures more secure. The portal is for now accessible only for French farmers.

Agritrust was developed by Agdatahub, a company founded and supported by the agricultural profession. That is, free digital tools for farmers and based on the first digital identity solution developed specifically for the agricultural sector.

To do this, Agdatahub worked in co-innovation with Orange Business Services and IN Groupe (formerly Imprimerie Nationale). The combined expertise of these three French companies now makes it possible to make Agritrust available to the 380,000 farms spread over the national territory.

Data sharing and/or agricultural data

Agritrust is tool in form of mobile application, the digital identity of farm is the basis. It is saved securely in a mobile application and this identity is established through FranceConnect and the Register of Agricultural Assets.
The agricultural digital identity makes it possible to associate in the Agritrust application the identity of the farmer (natural person) and the identity of his holding (legal person). This combination allows to carry out secure, authenticated and instantaneous exchanges with the partners.
Since the future European regulations on non-personal data (including the Data Governance Act applicable from September 2023) will require software publishers to verify mandatory consent before any exchange of non-personal data, they will have to ask for consent before circulating professional data to third parties.
Agdatahub's technological solutions comply with the principles of the Data-Agri agricultural data charter, guaranteeing greater readability, transparency, control and security around the use of farm data. *Quick to create and totally free for farmers, whether they are breeders, farmers, wine growers or market gardeners, the Agritrust digital identity module from Agdatahub is intended for partners of farms, companies or public authorities. The agricultural digital identity allows them to:*

- *Ensuring that the consent of farms to the use of their data is taken into account*
- *Make the steps of registration and provision of administrative evidence instantaneous*
- *Simplify and accelerate dematerialized transactions in complete confidence (CAP teledeclarations, signature of production sales contracts, etc.[47]).*

The service has different offers which are sold at different prices, based on the company's needs and dimensions.

[47] https://agdatahub.eu/en/solutions-agriconsent/

API-Agro

API-Agro is the first French platform for agricultural data exchange. It is the trusted third party for all players in the agricultural sector. Thanks to the adapted framework that we have put in place, our data exchange platform ensures the intermediation between issuers and purchasers of qualified agricultural or environmental data. This data is offered in the form of files or APIs (application programming interfaces) according to fully customizable acquisition conditions. The advanced features of the API-Agro platform and its intuitive interface allow rapid appropriation by users and simplify the distribution or sourcing of agricultural data.

API-Agro, is an agricultural data exchange platform which offers several key benefits and useful tools for companies and organisations in the agricultural sector, as it allows for:

- Share data in a secure way: the data holder is given control over his data destination and usage by setting its own conditions.
- Expose and gain data visibility: by making datasets available on the API-Agro platform, the exposure allows to showcase expertise, exchange knowledge, and find potential business opportunities within a trusted framework.
- Maintain control over data: API-Agro acts as a trusted third party, ensuring the security of data exchanges. The platform verifies the identity of registered members, qualifying both data senders and buyers.
- Add value and develop new uses for data: The API-Agro platform offers a dashboard and catalog where it is possible to cross-reference data sources, customize offerings, and update data. A support team is available to assist in managing and structuring data offers, as well as exploring potential monetization opportunities. Additional services, such as algorithms and data visualization, help assess the quality and scope of data, unlocking its full potential.
- Make secure transactions: API-Agro ensures secure transactions between data providers and users. The platform verifies the reliability of data providers, whether the data is offered for free or for a fee.

In API-Agro case, different sales option exists: in fact, it is possible to buy a specific version of the platform and service which is relating only to one agricultural sector (Ruminant, Crops or Viticulture), or, if the business includes multiple sectors, it is possible to purchase a larger comprehensive version.

DjustConnect

Objective

DjustConnect originated as an EFRO (European Fund for Regional Development) project, called Datahub for AgroFood, with the support of its founding companies (AVEVE, Boerenbond, CRV, DGZ and Milcobel) and grew into a fully mature platform, successfully connecting data-users and farmers, enabling data-driven applications to thrive.

DjustConnect is a neutral data exchange platform, hosted by ILVO (Flanders Research Institute for Agriculture, Fisheries and Food) available for all data users in the Agrifood sector. DjustConnect wants to provide a means of data exchange respecting data ownership, farmers and providing decision power, regarding the data exchange, to the different parties involved.

To enable stakeholders to make the correct decisions regarding which party they share/request data from/with, all data requests have to be clearly declared and well explained. Additionally, DjustConnect provides an individual clear overview presenting all data exchanges currently approved or disapproved.

The platform guarantees only data to be exchanged once the required permissions are given and to stop data exchange once a permission is revoked. This is translated in the legal contracts which have to be honoured to be part of the DjustConnect ecosystem.

Data sharing and/or agricultural data?

Data is not stored by Djust Connect. If necessary, data is retrieved from the data provider and delivered to the data consumer. There is no direct contact between either parties. This way DjustConnect ensures safety for everyone and guarantees that exchange of data only happens with permission of the farmer.

Sharing data via DjustConnect is therefore in accordance with this Code of Conduct. This way, there is only one central digital contract that clearly defines the rules and technical infrastructure and ensures that data can only be shared after explicit consent and under the conditions specified in the data request.

The platform is suitable for everyone who wants to contribute to innovative agriculture through data sharing with respect for farmers. Data sharing has great advantages because farmers can get smarter digital tools, optimal service or less administration in return. However, it is not always easy to keep a clear overview of who has access to which part of farmer's data. DjustConnect provides control over data sharing so that Farmer can decide who has access to his data. This way he can safely manage his data and safely enjoy all the benefits of his data.

Agrirouter

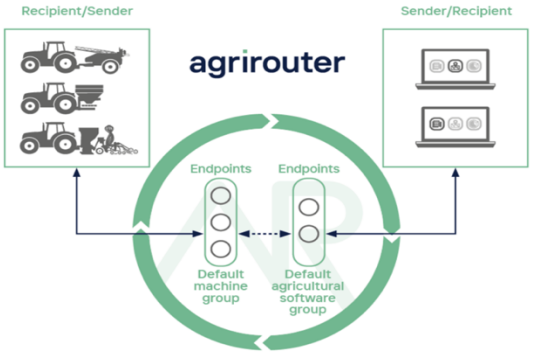
Agrirouter is a data exchange platform specifically designed for the agricultural sector. It acts as a centralized hub for sharing data and connecting various agricultural machinery, equipment, and software applications. Developed by the German company DKE-Data, Agrirouter enables seamless and secure data transfer between different stakeholders in the agricultural value chain, including farmers, agricultural machinery manufacturers, software providers, and service providers.

The primary purpose of Agrirouter is to facilitate the exchange of data and information in real-time, allowing for improved collaboration and interoperability among different agricultural technologies. It helps farmers and other stakeholders streamline their operations, optimize resource management, and enhance decision-making processes.

Agrirouter operates on a cloud-based infrastructure, providing a scalable and flexible solution for data exchange. It utilizes standardized interfaces and protocols to ensure compatibility and seamless integration with a wide range of agricultural machinery and software systems. By connecting to Agrirouter, farmers can collect, manage, and share data from their machinery and farm management software with other authorized parties, such as agricultural consultants, contractors, or farm advisors.

The platform offers a secure environment for data transmission, employing encryption and authentication mechanisms to protect the privacy and integrity of the shared information. It also allows users to define access rights and control the flow of data, ensuring that sensitive information is only accessible to authorized recipients.

Agrirouter supports various types of data, including field-related information (such as field boundaries, crop types, and yield data), machinery data (such as equipment settings and performance metrics), weather data, and other relevant agronomic data. Through Agrirouter, users can transfer this data in a standardized format, eliminating the need for manual data entry and reducing data silos.



One of the key advantages of Agrirouter is its vendor-neutral approach, enabling interoperability between different brands and types of agricultural machinery and software systems. This openness promotes collaboration and choice for farmers, allowing them to select the tools and technologies that best suit their needs without being limited by compatibility issues.

Overall, Agrirouter simplifies data exchange and integration in agriculture, enabling stakeholders to leverage the power of data-driven insights, optimize operations, and make more informed decisions for sustainable and efficient farming practices.

Agrimetrics

Agrimetrics is a UK-based organisation that specializes in agricultural data and analytics. It serves as a data marketplace and analytics platform, providing valuable insights and solutions to support decision-making in the agricultural sector.

The primary objective of Agrimetrics is to collect, integrate, and analyse agricultural data from various sources, such as farms, weather stations, satellite imagery, market data, and other relevant sources. By harnessing the power of data science, Agrimetrics aims to unlock the potential of this information to drive innovation, productivity, and sustainability in agriculture.

Agrimetrics offers a range of services and solutions that leverage agricultural data:

- Data Integration: Agrimetrics aggregates and integrates disparate data sets from multiple sources, allowing for a holistic and comprehensive view of the agricultural landscape. This includes data on crops, livestock, weather patterns, soil health, market trends, and more.
- Data Analytics and Modeling: Agrimetrics employs advanced analytics techniques, machine learning algorithms, and statistical models to derive meaningful insights from agricultural data. These insights can help farmers, policymakers, and other stakeholders make informed decisions related to crop management, disease control, yield optimization, resource allocation, and market forecasting.
- Decision Support Tools: Agrimetrics develops decision support tools and applications that utilize the analysed data to provide actionable recommendations and guidance to farmers. These tools can assist in crop planning, risk assessment, pest management, irrigation scheduling, and other crucial aspects of agricultural operations.
- Research and Innovation: the app collaborates with academic institutions, research organisations, and industry partners to drive innovation in the agricultural sector. By providing access to high-quality and standardized data, Agrimetrics supports research initiatives addressing key challenges in farming, sustainability, and food security.
- Data Marketplace: operating in a data marketplace where users can access and exchange agricultural data, it enables farmers, researchers, agribusinesses, and other stakeholders to discover and acquire relevant data sets for their specific needs, fostering collaboration and data-driven decision-making.

Overall, Agrimetrics plays a crucial role in bridging the gap between agri-data stakeholders. By facilitating data-driven insights and promoting data sharing, it enhances the productivity, efficiency, and sustainability of the agricultural industry while fostering innovation and collaboration across the sector.

JoinData

"We want to decide who sees our data"
JoinData is a cooperative and a data-sharing platform based in the Netherlands that focuses on facilitating the exchange of agricultural data between different stakeholders in the farming sector. It aims to promote collaboration, innovation, and sustainability by enabling farmers, agribusinesses, and other relevant parties to securely share and utilize agricultural data.
The main objective of JoinData is to overcome the barriers and challenges associated with data silos in the agricultural industry. It provides a standardized framework and infrastructure for collecting, integrating, and sharing diverse types of agricultural data, including field data, crop information, weather data, livestock data, and more.
JoinData operates as a cooperative, meaning that its members actively participate and contribute to the platform. The cooperative model ensures that the interests of all stakeholders are represented, fostering a collaborative and transparent approach to data sharing.
The platform offers several key features and benefits:
First, JoinData allows for the integration of data from different sources, such as farm management systems, machinery, sensors, and third-party data providers. It harmonises the data to ensure consistency and compatibility, enabling users to gain a comprehensive view of their agricultural operations.
Second, the app prioritises data privacy and security, implementing measures to protect sensitive information. It is built in compliance with relevant data protection and privacy regulations, such as the General Data Protection Regulation (GDPR), to protect the rights and interests of data owners and users. It gives users control over their data, allowing them to define access rights and permissions for data sharing. This ensures that data is only shared with authorized parties and under agreed-upon conditions.
Third, it facilitates data exchange and collaboration among its members: Farmers can securely share their data with trusted partners, such as researchers, agronomists, or supply chain participants, to foster innovation, improve decision-making, and enhance operational efficiency.
Moreover, JoinData provides tools and services that enable users to derive insights from shared data. It offers analytics capabilities, data visualization, and decision support tools that help farmers optimize their practices, improve resource allocation, and implement sustainable farming strategies.

By breaking down data barriers and promoting collaboration, JoinData aims to drive innovation, sustainability, and efficiency in the agricultural sector. It empowers farmers and stakeholders to make data-driven decisions, optimize their operations, and collectively address challenges related to farming practices, environmental stewardship, and food production

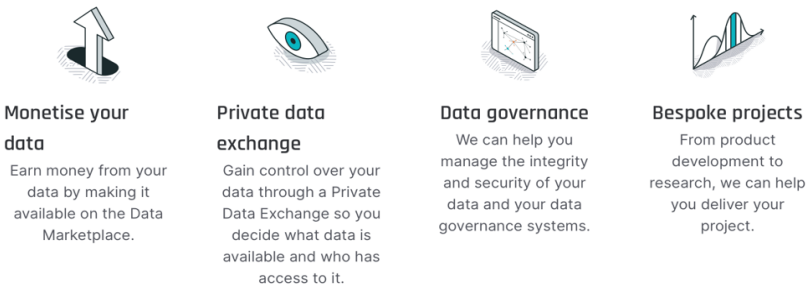
FIWARE

FIWARE is an open-source platform designed to facilitate the development of smart applications and services for various domains, such as smart cities, agriculture, healthcare, transportation, and more. It provides a standardized framework and a set of reusable components that enable developers to build scalable, interoperable, and future-proof solutions.

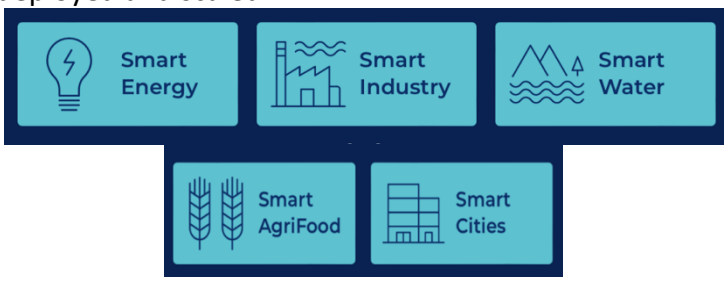
At its core, FIWARE offers a collection of generic enablers, which are software building blocks that address common challenges in developing smart applications. These enablers include components for data management, context awareness, security, identity management, IoT connectivity, and more. They are designed to be loosely coupled, allowing developers to choose and combine the specific enablers that best suit their requirements.

One of the key concepts in FIWARE is the use of context information. Context represents the real-time state of the environment, including data from sensors, devices, and other sources. FIWARE provides mechanisms for acquiring, processing, and analyzing context information, enabling developers to create applications that can make intelligent decisions based on the current context.

Moreover, the app follows a set of open standards and APIs, ensuring interoperability between different systems and avoiding vendor lock-in. It supports various protocols and data models, allowing seamless integration with existing technologies and infrastructures. This flexibility enables developers to leverage their existing investments while gradually adopting new technologies.



In addition to the technical components, FIWARE also fosters a collaborative ecosystem of developers, companies, cities, and organisations. It promotes the sharing of knowledge, best practices, and solutions through its open-source community. This collaborative approach helps accelerate innovation and enables the creation of a wide range of smart applications that can be easily deployed and scaled.



Smart Agrifood initiative aims to address challenges in the agriculture and food sectors, among which the *Wireless broadband coverage in rural zones, Lack of standards regarding IoT protocols, Lack of standards for interoperability*[48]. Moreover, the developers made sure that the existence of a Smart Agrifood community encouraged collaboration among stakeholders, including farmers, researchers, technology providers, and policymakers. The tool promotes the sharing of knowledge, experiences, and best practices through forums, workshops, and hackathons, and several generic Enablers are accessible to facilitate the processing, analysis, and visualization of context information, enabling the implementation of intelligent functionalities in various applications. For instance, the Wirecloud Generic Enabler provides a robust web mashup platform that simplifies the creation of customizable operational dashboards, allowing end users to personalize them according to their needs. On the other hand, the FogFlow Generic Enabler serves as a distributed execution framework, specifically designed to support dynamic processing flows across cloud and edge computing environments.

[48] https://www.fiware.org/community/smart-agrifood/

Conclusion

In conclusion, this report provides a comprehensive analysis of agri-data-sharing governance models, policies, and regulations at the European level. Having examined the legislative system and conducted a state-of-the-art analysis, the report offers valuable insights for DIVINE and stakeholders in the agricultural sector. Understanding the legal and regulatory landscape surrounding data sharing and governance helps in the decision-making process and the development of strategies that ensure compliance while maximizing the benefits of data sharing.

Ultimately, this analysis contributes to the successful implementation of DIVINE's data sharing platform and the advancement of data-driven practices in the agricultural domain and will serve as a base for the implementation and adaptation of EU legislation system into the reference structure for the creation of DIVINE’s agri-data sharing platform.

Next Sections & Further Work

The comprehensive analysis carried out in this Deliverable (6.1) focusing on the EU legislation over data sharing policies represents a crucial first step in developing DIVINE's data governance model. The detailed SoTA legislation analysis will be further developed and applied by Deliverable 6.2, whose scope is to create user manual including guidelines crafted on how to best assist stakeholders in effectively applying the data governance model presented in the current deliverable. A summary of the main regulation needed to be accounted for DIVINE architecture and structure can be found in Annex 6.

In terms of next steps towards the completion of DIVINE and further WP6 Task 1 Deliverables, the current analysis will be implemented as it follows:

1. Continuous monitoring of the legislative environment. New regulation might be added up to the analysis, others may be removed. Proposals modifications will be accounted for, and the text reviewed accordingly;
2. Link with Policy Makers. To further develop the data governance model and appropriately adapt it to better serve the scope of DIVINE, meetings, as well as events and discussions will be organised between WP6 and policy makers. Not only their own experience might bring new insights to the project, but their input and feedback will be extremely valuable to ensure the alignment od DIVINE data governance framework with policy.
3. Deepened analysis on legislation gaps and farmers' trust.
4. Further analyse the role of Data Intermediary Services and Data Intermediation Services, and how DIVINE can help into implementing their roles in a dataspace ecosystem.

Annex

1 – Data Governance Mapping – Introductive Questions

Starting from the first point "*Does it Process electronic Data?"*, the question refers back to the Framework for free Flow of non-Personal Data, whose primary objective, as defined in Article 1, is to guarantee the unrestricted movement of data that is not personal data within the Union, and applies to all entities that handle electronic data. In DIVINE's case, we are aware of the fact that the biggest part of the data collected will be gathered through electronic means. The rules that are thus set out in the Regulation (EU) 2018/180 will need to be carefully considered and taken into account when structuring the platform.
The second question "*Does it use IoT Products?"* is instead a mention to the new and ongoing Data Act proposal, which – according to the latest version updated in February 2023 and approved by the European Parliament - aims at providing users with simpler access to the data they produce while, on the corporate front, the text permits companies to determine which data can be shared in relation to creating a service, as well as including measures to safeguard trade secrets. This means that, in case DIVINE gathers and owns users' data which are collected through IoT services, it will have to respect the rules laid out in the Data Act to grant users the necessary rights.
The proposal also states that it wants to *make data available by data holders to public sector bodies or Union institutions, agencies or bodies, where there is an exceptional need, for the performance of a task carried out in the public interest*. In this context, when in the scope of performing analysis for the general EU welfare, DIVINE (if structured as a public body or similar) is allowed to require data holders to share a certain and defined amount of data.
Moreover, the new Act will implement the measures laid out in Directive 2016/943 – and will thus need to be kept into account when dealing with data covered by trade secret.
However, as the text is still in the form of a proposal, it imperative to observe the evolution on the document over the next months, and specifically over the whole duration of the development and deployment of DIVINE project.
The third question "*Does it develop a new AI tool?"* is instead relevant with relation to the so-called AI Act. The AI act is a proposal made by the commission in 2021 to regulate the use and development of AI in the European Union. The proposed regulation focuses mainly on establishing a framework and a structure to develop and use new Artificial Intelligence products. In DIVINE's case, even if the development of an AI technology does not enter in the specific scope of the project, the platform may be developed on a new Intelligence. In this case, all the rules laid out in the proposal will have to be attentively considered, and it will be required, before using and introducing the new AI on the platform, to classify the technology according to its risk level, carry out different tests, and experiment in sandboxes obtaining positive results.
As it is the case with the Data Act proposal, in order to correctly structure the data governance in the scope of DIVINE, the AI Act and its modifications over time will be carefully monitored during the whole development of the project.

2 - Data Governance Mapping – Other Definitions to Keep in Mind

Trade Secret / Intellectual Property / Copyright

Trade secret laws are designed to protect confidential business information that gives an organization a competitive advantage. This can include things like customer lists, manufacturing processes, and business plans. If an organization can prove that a piece of information meets the criteria for a trade secret, they can prevent others from using, disclosing, or selling that information.

Intellectual property laws are designed to protect creative works like music, art, and literature.

Copyright laws, in particular, provide creators with the exclusive right to use and distribute their work. This means that anyone who wants to use the work in question must obtain permission from the creator or pay a licensing fee.

- **Data Access**: Different stakeholders may need access to more information than others. In such cases, the data holder can decide to allow multiple levels of secured access to their data;
- **Data Use**: The data holder can choose, based on different aspects (type of data, needs, obligations) to allow stakeholders to manipulate or not certain data.
- **Data Share**: The data holder can decide with who and to which amount he wants to share its data.

Other Definitions to keep in mind are:

- **Data Originator**: The person who creates the data;
- **Data User**: *A natural or legal person that receives data from the data holder or provider via an agreement with the data originator*;
- **Data Provider**: *A natural or legal person that under an agreement delivers data to the Data User and/or Data Originator*;
- **Data Recipient**: *means a legal or natural person, acting for purposes which are related to that person's trade, business, craft or profession, other than the user of a product or related service, to whom the data holder makes data available, including a third party following a request by the user to the data holder or in accordance with a legal obligation under Union law or national legislation implementing Union law.*

3 - *Competition & Markets – Does the current regulation cover all the markets?*

The Digital Markets Act and Digital Service Act aim to regulate different types of online intermediary services, but they do not cover all the markets.

In fact, the Digital Service Act focuses on online intermediary services that are based within the European Union and provide services such as online marketplaces, social media platforms, and search engines. However, the Act does not cover all online services. For example, it does not regulate online services that are not based in the EU or those that do not provide intermediary services.

Similarly, the Digital Markets Act targets larger online platforms that act as gatekeepers to the digital economy, such as search engines, social media platforms, and online marketplaces. However, the Act does not cover all online platforms. It only applies to those platforms that meet specific criteria, such as having significant market power, and the Act does not apply to smaller online platforms.

It is worth noting that the regulations provided by the Digital Markets Act and Digital Service Act are specific to the European Union. While these regulations may have an impact on businesses that operate outside the EU, they do not have the same legal force outside of the EU; the two acts then regulate specific types of online intermediary services and do not cover all the markets. Other regulations may apply to different types of online services, and it is important to be aware of the regulations that apply to a specific business or industry when exchanging or sharing data.

As the DIVINE data governance analysis aims to provide a comprehensive understanding of the regulatory framework related to data sharing in the agricultural sector, it is crucial to identify any legislative gaps that may impact the structure and development of the agri data sharing platform.

One of the key areas of focus in this analysis is the study of the digital markets and the existing regulations related to it. This involves a detailed examination of the laws and regulations that govern online intermediary services and the digital economy. It is essential to have a thorough understanding of these regulations to ensure that the agri data sharing platform is developed in compliance with all relevant legal requirements.

Furthermore, it is important to keep in mind that regulations and laws related to the digital economy are constantly evolving. As such, this analysis is an ongoing process that requires continuous updates and reviews to ensure that the project takes into account all relevant legislative aspects. The DIVINE data governance analysis will need to be continually refined and developed in the next months and phases of the project to reflect any changes in legislation or regulation. Moreover, identifying regulation gaps is another important aspect of the DIVINE data governance analysis. These gaps can occur when the existing regulations fail to address certain aspects of data sharing or when there are inconsistencies between different laws and regulations. Identifying such gaps is essential for the project to develop strategies to fill those gaps and ensure that the agri data sharing platform is developed in compliance with all relevant legal requirements.

The importance of understanding the regulatory framework related to data sharing cannot be overstated. Failure to comply with relevant laws and regulations can result in legal penalties and reputational damage for the project. Additionally, compliance with regulatory requirements is essential for building trust with stakeholders and ensuring the long-term success of the agri data sharing platform.

Compliance with regulatory requirements is essential for the project's long-term success, and failure to comply can have severe legal and reputational consequences. Therefore, it is crucial to conduct a comprehensive analysis of the regulatory framework related to data sharing and continuously update it to ensure compliance with all relevant laws and regulations.

In the next months, the following aspects will need to be considered and analysed:

- What is the structure of digital markets?
- What legislation regulates them (except the one already analysed)?
- Are there any regulatory gaps? If yes, where?
- In case some gaps are identified, are there solutions we can use? How do extra-EU countries deal with the problem (if they do)?

4 – Data Governance Mapping - What is Data?

Data refers to any information that can be collected, processed, and analysed. It can be in the form of numbers, words, images, or any other type of input that can be used to make informed decisions. The use of data has become increasingly important in today's digital age, with businesses and individuals relying on data to make informed decisions and improve their performance.

Data can be classified into two main categories: structured and unstructured. Structured data refers to information that is organised into a specific format and can be easily processed by computers. Examples of structured data include sales figures, customer demographics, and inventory lists. Unstructured data, on the other hand, refers to information that does not have a specific format and is difficult to process automatically. Examples of unstructured data include social media posts, customer feedback, and video footage.

Today, businesses rely on data to make informed decisions and improve their performance. For example, an e-commerce website may use data to analyse customer behavior and optimize their sales process. Governments also use data to make informed decisions about public policy and resource allocation. Healthcare providers use data to develop treatment plans and improve patient outcomes.

Agri-Data

Agriculture is one of the oldest and most important sectors in the world, and it is critical for global food production and food security. With the world's population projected to reach 9.7 billion by 2050, there is an urgent need to increase agricultural productivity and efficiency. To achieve this, there is a growing emphasis on the use of data and information and communications technology (ICT) in agriculture, and DIVINE's work is strictly in relationship with this goal. Smallholder farmers represent the majority of the agriculture sector, and they are the most important contributors to global food production. However, they face significant challenges, such as low productivity, lack of access to finance and markets, and the impact of climate change. The use of data and ICTs presents an opportunity to address these challenges and increase agricultural productivity and efficiency.

For example, access to accurate and timely information can help farmers make informed decisions about crop management, pest control, and water management. This information can be collected through a variety of sources, including weather data, satellite imagery, and sensors in the field. This data can be analysed using machine learning algorithms to provide insights and recommendations to farmers.

Financial services are also critical for smallholder farmers, and access to credit is often limited. However, data on crop yields, land ownership, and credit histories can be used to build a reliable credit profile and deliver loans to farmers more easily.

Market access is another challenge faced by smallholder farmers, and data on market prices, demand, and supply can help farmers make informed decisions about what to grow and when to sell. This information can also be used to connect farmers with buyers and create more efficient and transparent markets.

5 - The European Data Act and its connection to other directives and regulations.

The European Data Act is consistent with existing rules on the processing of personal data, including the General Data Protection Regulation ('GDPR'),and protecting the private life and the confidentiality of communications, as well as any (personal and non-personal) data stored in and accessed from terminal equipment (the ePrivacy Directive), that will be replaced by the ePrivacy Regulation currently the subject of legislative negotiations. This proposal complements existing rights, specifically rights regarding data generated by a user's product connected to a publicly available electronic communications network.

The Free Flow of Non-Personal Data Regulation put in place a key building block of the European data economy, by ensuring that non-personal data can be stored, processed and transferred anywhere in the Union. It also presented a self-regulatory approach to the problem of 'vendor lock-in' at the level of providers of data processing services, by introducing codes of conduct to facilitate switching data between cloud services (the industry-developed 'Switching Cloud Providers and Porting Data (SWIPO)' Codes of Conduct). The European Data Act further builds on this, helping businesses and citizens to make the most of the right to switch cloud providers and port data. It is also fully consistent with the Unfair Contract Terms Directive as regards contract law. With regard to cloud services, as the self-regulatory approach seems not to have affected market dynamics significantly, this proposal presents a regulatory approach to the problem highlighted in the Free Flow of Non-Personal Data Regulation.

The Open Data Directive sets out minimum rules on the re-use of data held by the public sector and of publicly funded research data made publicly available through repositories.
The European Data Act complements the Data Governance Act, which aims to facilitate the voluntary sharing of data by individuals and businesses and harmonises conditions for the use of certain public sector data, without altering material rights on the data or established data access and usage rights.

The European Data Act complements the proposal for a Digital Markets Act, which requires certain providers of core platform services identified as 'gatekeepers' to provide, inter alia, more effective portability of data generated through business and end users' activities[49].

[49] https://www.eu-data-act.com

6 - SUMMARY TABLE – Main regulation to be considered for the development of the DIVINE ADSE.

Type of Policy	Topic Covered	Regulation
Regulation for Framework	Farm to Fork Strategy	
	CAP	***Regulation 2021/2115*** ***Regulation 2022/1475*** ***Regulation 2021/2116*** ***Regulation 1308/2013*** ***Regulation 2021/2117***
Regulation for Data	Digital Services Act	***Regulation EU 2022/2065*** ***Regulation EU 2022/1925***
	Artificial Intelligence Act	***Proposal – AI Act***
	General Data Protection (GDPR)	***Regulation EU 2016/679***
	Open Data	***Open Data Directive 2019/1024***
	Data Privacy	***E-privacy directive 200/136***
	Shared Data	***Proposal – Data Act***
	Cybersecurity Act	***Regulation (EU) 2019/881***
	Framework for Free Flow of non-Personal Data	***Regulation (EU) 2018/180***
Regulation for Agri data	Eurostat	***Regulation 138/2004***
		Saio & IFS
	Private Data Sharing	***COPA – COGECA EU Code of Conduct****

*Does not have Force of Law

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