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

Deliverable D6.5

Title: Deliverable D6.5

Title: Agri data sharing policy framework adoption manual and guidelines - Release 2

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Abstract: With the following Deliverable DIVINE aims at providing the second, updated version of the guidelines manual completed in September 2023. The current file not only focuses and reviews the D6.2, but it also accounts for pilot's feedbacks and changes in the EU regulatory environment (D6.1 and D6.3).

The following pages represent then a deliverable extracting policy recommendations and pragmatic guidelines to be followed whenever developing agri-data sharing platforms.

Disclaimer

Revision History

Date	Rev.	Description	Partner
30/02/2023	0.1	Initial ToC	FE
15/07/2024	0.1	First Full Draft	FE,CREA,VICOM,KGZS
19/07/2024	0.1	First Revision	ICCS, UCD, DIGI
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Glossary - Acronyms

ADSE	Agricultural Data Space Ecosystem
AI	Artificial Intelligence
Art.	Article
BBB	Burden by Farms
BBS	Burden by Survey
B2G	Business to Government
CAP	Common Agricultural Policy
CREA	Consiglio per la Ricerca in agricoltura e l'analisi dell'Economia Agraria
D	Deliverable
DMA	Digital Markets Act
DSA	Digital Service Act
EAA	Economic Accounts for Agriculture
EC	European Commission
EP	European Parliament
EU	European Union
F2F	Farm to Fork
FE	Farm Europe
GA	Grant Agreement
GDPR	General Data Protection Regulation
IFS	Integrated Farm Statistics
KGZS	Kmetijsko gozdarske zbornice Slovenije
KPI	Key Performance Indicator
M	Month
SAIO	Statistics on agricultural inputs and outputs
SME	Small-Medium Enterprise

WP	Work Package

1. Introduction

The current deliverable, situated within the framework of Work Package 6 (WP6), plays a pivotal role in advancing the objectives outlined within the project. WP6, designed to analyse the existing policies and regulations governing the Agri-Data Sector at the EU level, stands as a critical component in shaping the Data Governance Model of the DIVINE project. Its goal is to not only review these policies and regulations, but also to craft policy guidelines that will serve as the guiding principles for DIVINE pilots and stakeholders.

Within this analysis, WP6 aims to shed light on the challenges surrounding data sharing, pinpointing weaknesses, and identifying regulatory gaps that may slow down the flow of information within the agricultural data landscape. In fact, as it was highlighted in D6.1, differences between the high number of regulations impacting the public sector data and, on the other hand, the lack of regulation regarding the private sector data, do not facilitate and promote data sharing among different organizations.

By analysing these issues, the WP6 team aims to pave the way for more robust and efficient data-sharing mechanisms that underpin the DIVINE project's success.

Furthermore, the scope of WP6 extends beyond regulatory compliance, as it aims to ensure that the project's development aligns with existing legal frameworks, safeguarding user and farmer privacy—an imperative cornerstone in today's data-driven landscape. By following these legal and ethical standards, DIVINE not only protects and guarantees the rights of its users, but also promotes trust among farmers and the wider public. This trust, in turn, is instrumental in fostering the adoption and acceptance of the project, ultimately contributing to its long-term sustainability and impact within the agricultural sector.

1.a. Overview of the objectives

D6.5 has the task of presenting a comprehensive overview of applicable regulatory requirements and design principles that have been extracted from previous tasks. Additionally, the text focuses on the development of data-sharing models and policies – and their adaptation into updated policies and guidelines that will allow interested stakeholders and third parties to adopt DIVINE's policy model easily. Moreover, D6.5 is produced in strict collaboration with D6.4, which will implement and integrate in the DIVINE ADSE the policies analysed in this deliverable. Both documents' final release is expected to occur just before the beginning of the second pilot round. Notably, D6.5 builds upon the outputs of Tasks 6.1 [Deli6.1] and 6.2 [Deli6.2].

According to the GA: *This is the output [...] to be used by the pilots, but also to enable the DIVINE policy framework adoption outside the project. It corresponds to its final release expected right before the pilot round 2 kick-off.*

Thaks to its scope, D6.5 represents the operational implementation of the groundwork laid down in D6.1 and D6.2, which were delivered on M9. However, it's crucial to recognize that D6.5 will produce a further adaptation and tailoring based on the outcomes of the pilot projects. This adaptation will be documented within a comprehensive report.

1.b. Context and Background

The Deliverable aims at clarifying and tailoring the policies analysed in D6.1 as well as the guidelines produced in D6.2, with the objective to facilitate the policy take up in the project and promote farmer's trust in data sharing. The outcomes and impact of this deliverable will be studied and further evaluated in D6.6.

As a reminder, you will find in the image below a timeline and description of the Deliverables due from WP6. As the current text is being published after D6.1, 6.2 and 6.3 it will account for all the major documents findings. Moreover, the reader must be aware of the fact that the current report will be published on M22, together with D6.4.

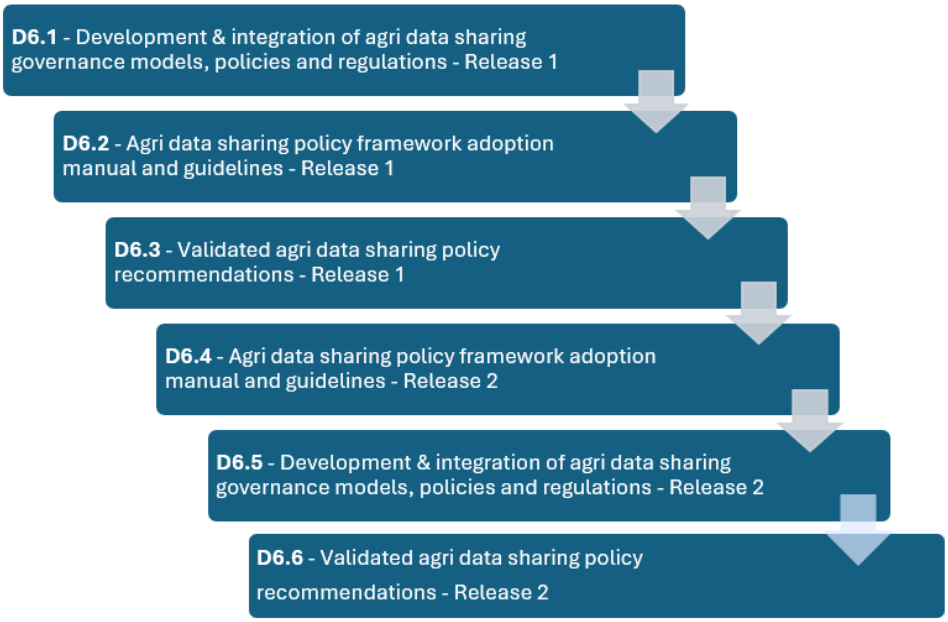

Figure 1 - WP6 Deliverables and Timeline. Source: Own

To provide a comprehensive overview of the future work and the evolving nature of Work Package 6 (WP6) within DIVINE, it's essential to remind the foundational concepts of Data Governance, developed in D6.1 and D6.2, in which considerable attention has been directed towards understanding and incorporating relevant regulations and directives pertaining to three key domains:

1. **Data Collection, Sharing, and Processing:** This encompasses regulations governing the collection, sharing, and processing of data within the agricultural sector. These regulations are instrumental in shaping the framework for data management within DIVINE's Agri data space.
2. **Agricultural Practices:** Regulations concerning agricultural practices play a pivotal role in ensuring that the data collected and shared within DIVINE adhere to industry standards and best practices. By integrating these regulations, DIVINE aims to promote sustainable and efficient agricultural practices.

3. **Agricultural Data:** Specific regulations related to the handling and utilization of agricultural data are crucial for safeguarding the integrity and privacy of farmers' information. DIVINE recognizes the importance of complying with these regulations to maintain the trust and confidence of stakeholders.

It's really important to highlight that even though DIVINE is dealing with different sorts of rules and regulations, the main aim is to make things easier for farmers by alleviating their burdens, not harder. The overall goal is to make sure that:

- **Policies on Data Management are Compliant to Rules:** By aligning with relevant regulations, DIVINE aims to establish robust policies and protocols for data management that are in full compliance with legal requirements. This ensures transparency and accountability in the handling of agricultural data.
- **Clear and Concise Measures Increase Farmers' Trust**: DIVINE acknowledges the concerns surrounding data sharing among farmers, particularly regarding control and potential exploitation. Clear and concise measures are essential for instilling confidence among farmers, assuring them that their data is handled responsibly and ethically within the confines of the project.
- Promote the take up of a project

By addressing these fundamental principles of Data Governance, DIVINE wants to create a collaborative and trusted environment within its Agri data space, to facilitate data sharing while safeguarding the interests and rights of farmers and stakeholders alike.

1.c. Scope, Method, and Added Value

The upcoming Deliverable for DIVINE is a pivotal moment in to assess and promote the take up of its Agri-Data-Space. It represents a crucial step forward in our efforts to improve data management within the agricultural sector. This document serves as a bridge between theory and practice, allowing us to refine our policies and regulations based on real-world experiences. By incorporating feedback from diverse stakeholders and pilot projects, we can ensure that our rules align with the practical needs of those working in the field.

The value of this deliverable lies in its ability to facilitate a more robust governance model and policy framework. By analysing the insights gathered from pilot projects, we can identify areas for improvement and tailor our approach accordingly. In the next chapters, policy recommendations and guidelines will be adapted with a major adherence to DIVINE’s case.

The method outlined in this report is derived from the groundwork laid in the previous WP Deliverables. This initial step involved the identification, categorization, and analysis of relevant regulations pertinent to data governance within the context of DIVINE's operations. The focus of the regulatory analysis was on two different points: first, to delineate and understand the regulatory landscape governing data processing, and second, to identify opportunities for the integration of EU regulations and best practices

into DIVINE's data ecosystem. The final objective is to ensure the robust safeguarding of farmers' data, thereby enhancing their trust in the system.

Thus, starting with the Data Governance Policies and regulations laid down in D6.1 and D6.2, put together with the Pilots' feedbacks and monitoring captured in D6.3, the following Deliverable aims at reviewing and adapting the Policies and regulations to the real needs of farmers.

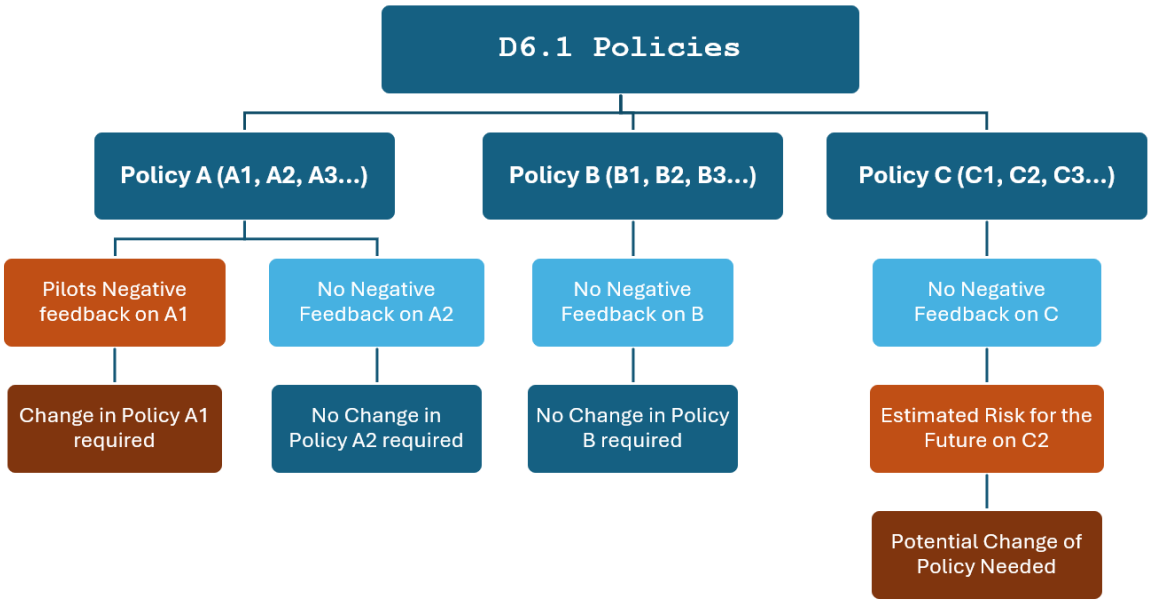

Figure 2: Scheme of WP6 policy revision process. Source: Own

The deliverable will then be structured as follows:

1. Section 2 shows a recap of the main exchanges that WP6 had with Pilots during the past months, highlighting DIVINE's strengths and weaknesses.
2. Section 3 focuses on explaining the need of DIVINE's policies adaptation to the farmers' needs, paving the way and introducing the following sections.
3. Section 4 represents the core of the deliverable, where the policies are reviewed, and guidelines tailored to DIVINE's needs are extracted.
4. Section 5, the last section, reminds the importance of gaining farmer's trust, and provides insights on how to increase data exchanges in the EU agricultural sector.

The methodological approach adopted not only facilitates the integration of EU rules and best practices, but also ensures alignment with DIVINE's overarching objective of fostering trust and confidence among farmers regarding the handling of their data. Through a rigorous analysis of regulations and their implications, DIVINE is aiming at developing a tailored Data Governance model that not only meets

regulatory requirements but also aligns with industry best practices, thereby laying the groundwork for a robust and ethically sound data ecosystem.

2. Exchanges With Farmers

Data Collected and Expectations

D6.3 had the goal of evaluating the policies impact on the projects Pilots, focusing on three main indicators: Sustainability, Competitivity and Social Impact.

Overall, the four pilots have collected baseline data, and are thus not in the position to prove the positive impact of DIVINE governance data model on the three aspects. However, the four of them mentioned that positive outcomes in the three areas were expected.

In particular, KZGS put into practice specific KPIs to monitor the project sustainability and Competitivity. While not having specific measures put into practice, the other pilots foresee an amelioration of the social conditions of the farmers thanks to the increased use of technology – thus reducing working times and alleviating the bureaucratic burden, and lower use of pesticides, thus improving the Sustainability of the project, as well as more productive lands and soils, thanks to the development of predictive models.

In the Annex Section you can find the pilots' response recapitulative table inserted in D6.3.

2.a. Results on the exchanges with farmers: Sustainability

Overall, even if Sustainability does not seem to be the focal point for most of the pilots, good results in increased biodiversity and environment may be obtained.

In fact, although across the four pilots there is still a lack of concrete data to definitively demonstrate whether sustainability has improved or declined since the projects began, positive results are expected in at least three cases. However, while preliminary data from the launch phase are available, they are insufficient for a comprehensive assessment.

On the other hand, although specific indicators or KPIs are absent in some pilots, their data offer valuable opportunities to establish baselines for future sustainability measurement. Historical data from sources like weather stations, IoT sensors, and satellite imagery can serve as crucial reference points for comparison. For example, data on weather patterns and soil moisture can inform irrigation strategies, reducing water usage and alleviating the leaching of nitrates into the soil.

Furthermore, some pilots are evaluating carbon footprints through platforms like the dataspace platform, enabling farmers to track their footprint and compare it to benchmarking values. While quantifiable results are pending, it is expected that environmental impact will be positive as farmers optimize profits and costs, leading to reduced chemical inputs through resource optimization.

However, challenges remain regarding measurement methods and data availability. Lack of standardized metrics makes it difficult to accurately evaluate improvements or deteriorating conditions. Nonetheless, tracking changes in fertilizer and diesel usage over time allows for comparison and ideally reveals progress towards sustainability.

In conclusion, while each pilot faces unique challenges, they collectively represent significant steps toward promoting sustainability in agriculture. Through continued data gathering, technological innovation, and collaborative efforts, these pilots have the potential to drive meaningful and positive changes in global sustainability practices.

2.b. Results on the exchanges with farmers: Competitivity

Policies and strategies are being implemented to enhance farmers' competitiveness, though challenges exist in evaluating their effectiveness. Benchmarking tools are being developed to compare farm performance and guide improvement actions, with the aim of increasing competitiveness. While tangible means to evaluate competitiveness may be lacking in some cases, indirect benefits are anticipated.

In Ireland, for instance, where farmers typically operate as price takers, specific means to evaluate competitiveness within the pilot program may be limited. However, tools implemented to optimize fertilizer and pesticide usage, improve crop health, and increase resilience against challenges like climate change are expected to enhance efficiency and profitability. Additionally, the introduction of technology into agriculture can attract younger generations, fostering innovation and competitiveness.

Despite the potential benefits, concrete data to support these assertions is currently unavailable, pending further data collection and analysis. Similarly, in some pilot programs, the absence of KPIs or measures designed to monitor competitiveness poses challenges. However, advancements in data collection and satellite imagery models are expected to yield benefits such as reduced water consumption, improved crop productivity, and enhanced decision-making.

Overall, the pilot projects contribute to competitiveness by addressing critical challenges in agriculture, promoting sustainable practices, and fostering innovation and technology adoption. While direct evaluation methods may be lacking, the comprehensive approach to data collection and expected benefits position these projects as leaders in driving sustainable and competitive agricultural practices.

2.c. Result of the exchanges with farmers: Social Impact

While specific indicators or KPIs to measure social impact may be lacking in some pilot programs, they offer opportunities for significant improvements in farmers' daily routines. By promoting automation of monitoring processes, these pilots aim to reduce individual fatigue and modernize traditional farming practices, thereby improving work-life balance and promoting innovation.

The implementation of DIVINE is expected to bring practical benefits to farmers, making their lives easier and less stressful. Automation of tasks like field measurements will save time and effort, allowing farmers to focus on other activities. This increased efficiency not only saves money but also enables a better work-life balance, allowing more time for family and personal interests.

Moreover, the introduction of technology into farming can attract younger people and newcomers to the sector, driving innovation and growth. While specific measures to monitor social impact may not be in place, indirect benefits are anticipated. These include improved quality of life for farmers and enhanced

social standing within their communities. Additionally, competitive local farming is predicted to provide regional goods preferred by consumers, further enhancing farmers' social situation.

While concrete data on social impact may not be immediately available, the second phase of pilot deployment is expected to provide clearer information and measurable results. Overall, these pilot programs represent significant steps toward improving the social well-being of farmers and fostering sustainable and innovative agricultural practices.

2.d. Results of the survey

Despite challenges, initial pilot rounds have not encountered major issues with data sharing and access, indicating effective collaborative frameworks among stakeholders. A "Data Governance Survey" was conducted to evaluate data governance models, revealing insights into data types used and sharing practices among pilots.

Overall, data collection proceeded smoothly in the first round, with no significant issues reported. However, concerns were raised regarding farmers' trust in sharing their data openly. While existing measures aim to safeguard privacy, farmers express a preference for greater control over their data due to concerns about data ownership and management.

Addressing these concerns requires tailoring regulations, providing clear policies, and enhancing transparency in data processing. Education and awareness initiatives are vital to bridging the gap between technical details and farmers' understanding, ensuring they feel comfortable and informed about data-sharing processes.

3	*Participating farmers are OK with sharing the data if they are anonymized and used for the purpose of benchmarking organized by advisory service KGZS.*
4	*They are inclined to help with the project, though as usual, they are not that positive to the sharing of data, due to the sheer amount of competitiveness in this field.*

Table 5: Pilots Concerns

Figure 3: Pilots reporting on the lack of farmers' trust. Source: D6.3

3. Adaptation and Tailoring to Pilot Outcomes

The following chapter is dedicated to the analysis and study of the pilots' outcomes and underscores the advantages of a more practical adaptation to the polices to the specific pilots' necessity.

3.a Integration of Pilot Outcomes into D6.5

Regulation and regulatory compliance plays a pivotal role when shaping a new data space. In fact, a non-respect of the rules will have negative consequences on the project as a whole, hindering its development and the trust of (in the case of DIVINE) farmers, but also stakeholders and other platform users. Below are some of the positive aspects and advantages to consider deriving from implementing a proper regulatory framework.

3.a.i. Increased operativity and faster processes

Implementing improved data sharing policies can have a significant impact on farmers, particularly in terms of increased operativity and faster processes by improving collaboration, resource management, decision-making, market access and education. With improved data sharing policies farmers have opportunity to collaborate with researchers, agricultural advisors, and other farmers sharing insights and innovations.

- This collective data then fosters the development of new technologies and techniques.
- Accessing to a collective data also fasters processes of research and the development of new crop varieties that are pest-resistant and farming technologies adapted to specific conditions.
- Resource management is improved with efficient use of inputs, for example data on soil fertility and crop performance helps efficient application of fertilizers and pesticides. With introduction of better data sharing policies we can improve resource management and thus lower costs and minimize environmental impacts.
- Decision making is also enhanced as accessing real-time data on weather conditions, soil condition, crop development stage, allows farmers to decide faster and more precisely on planting, irrigation, fertilization, and pest control, leading to optimized use of resources and increased crops. Sharing data on weather conditions, crop status and market trends helps farmers to better foresee and reduce risks more effectively. Data-driven technologies like IoT devices, drones, and automated machinery rely on accurate data to function optimally.
- Better data sharing ensures these technologies operate efficiently, reducing labour and operational costs. Sharing data on equipment performance helps in predicting failures and scheduling maintenance, thereby minimizing downtime and prolonging the lifespan of machinery.
- Data sharing in the supply chain, improves market access, transparency and traceability. This can enhance supply efficiency, improve food safety, reduce losses, and ensure fair pricing. In this case farmers gain faster access to data regarding demand on the market, price movements, and consumer demands, enabling them to adjust their production plans efficiently. On the basis of all the above also decision makers, governments and other agricultural bodies can also improve and develop more effective policies based on comprehensive data.

3.a.ii Reducing the administrative burden

An increased and efficient data governance model, adapted to the needs of its main users, can allow for a reduction of the administrative burden bared by farmers.

The literature on measuring the statistical burden on businesses is extensive, and a review of it can be found in the Handbook on Methodology of Modern Business Statistics (Eurostat, 2014) [HaMe23]. Identifying perceived burdens is even more complex as it may depend on many aspects, such as survey design, respondent characteristics, and other external factors. It is possible to narrow down the factors that contribute to creating burden on two main classes:

- Real/objective factors, mainly due to the time taken to provide the answers;
- Subjective factors, linked to what is "perceived" as a burden by interviewees.

Furthermore, burdens can be considered from two different perspectives:

  - Burden by Survey (BBS), i.e. the weight that the single survey imposes on the companies involved;
  - Burden by farms (BBB), i.e. the total amount of the burden generated by all investigations in which a company is involved.

The reduction of the statistical burden on companies is one of the objectives of statistical surveys and can be pursued through the coordination of samples which leads to not bothering the same companies in subsequent replications of the same survey or in other surveys from the same source, naturally compatible with the need for statistical production required by community regulations. The reduction of the burden on businesses could take place through the simplification of the questionnaires for the variables available from administrative sources. Some hypotheses for reducing the burden linked to the survey of companies:

- Reduction of the questions in the questionnaire (for example details on employment, labor costs, personnel and costs of external personnel and some breakdowns of items in the income statement);
- Reduction of the sample size, taking into account in the design phase the survey of the availability of administrative sources and the possibility of releasing some restrictions.

3.a.iii Increased Data Privacy and sovereignty safeguard

With the Self-Sovereign Identities model proposed for managing identities in the DIVINE ecosystem, all users have the advantage of owning and managing their own identity. This is a significant advantage over other traditional identity management models, such as centralised or federated, where there are one or more entities that store user information, so they do not know if there is fraudulent use of personal information, and are susceptible to attacks on their servers or databases to steal user information.

The SSI model solves these problems by placing the user at the centre of the system, so that they are the owners and managers of their own identity through the personal management of a digital wallet, in which Verifiable Credentials signed by trusted Issuers are stored.

The main problem with this system, which may appear in DIVINE with the pilots, is that it is a highly novel identity management model, so most of them have no knowledge of it and may have problems interacting with the system and learning to use the tools and modules related to identity management. For example, for DIVINE, a Digital Wallet has been developed as a phone app (Android devices) for users to manage their Verifiable Credentials and interact with the DIVINE ecosystem: Request roles and permissions in an application, submit credentials... However, to adapt to the needs of pilots, a web service has been developed as a Wallet, which has the same functionalities as the phone app, but is accessible via the web. In this way, DIVINE participants, including pilots, are not obliged to install an external application on their phones.

4. Data Governance Models

The following chapter will focus on the real analysis of the Feedbacks provided by Pilots. Based on the WP5 Leader responses and on the Pilots use of the Guidelines proposed in D6.2, the deep analysis of regulation realised in D6.1 will be reviewed, updated and re-discussed, selecting the most appropriate regulations and increasing the quality of the policy advices.

4.a. Data Governance Models

During the course of DIVINE's development, especially with the initial delivery of D6.1 and 6.1, the focus within WP6 has been on nurturing a prosper and safe environment to farmers. This involved a thorough examination of existing agricultural data regulations and the creation of a user-friendly guidelines manual, the aim of which is to simplify the process for future participants looking to join the DIVINE agridata sharing platform.

The advantages of these production are multiple:

1. Firstly, by conducting a detailed analysis of the regulatory landscape, DIVINE can strategically allocate resources. This means prioritizing areas with less regulatory coverage, allowing for improvements in services such as enhancing security measures and implementing appropriate policies to safeguard user data.
2. Secondly, by studying current laws and ongoing projects, we gain valuable insights into the broader objectives of the EU. This provides clarity on compliance requirements, ensuring DIVINE operates within the confines of regulatory frameworks.
3. Furthermore, our approach enables us to formulate policies that are not only informed by best practices but are primarily rooted in regulatory mandates. This ensures the establishment of a robust architecture for DIVINE's systems, emphasizing data sovereignty and protection—a crucial concern for farmers.
4. Lastly, the provision of user-friendly guidelines simplifies the adoption process for participants. This approach encourages farmer engagement and underscores DIVINE's commitment to promoting responsible data sharing practices.

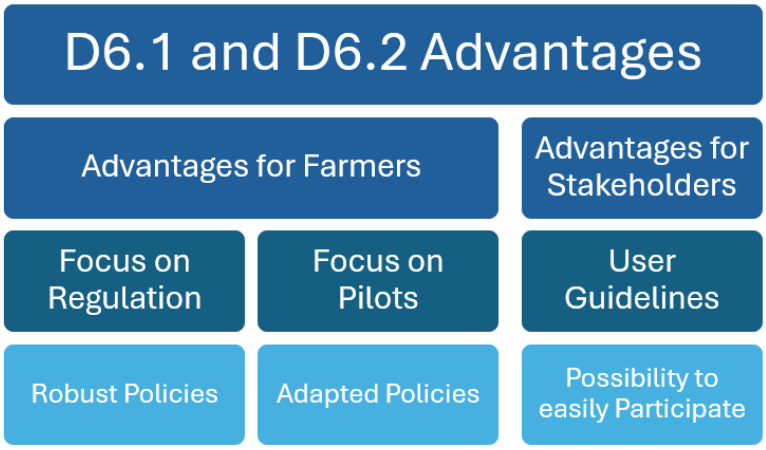

Figure 4: Benefits of Data Governance. Source: Own

As a recap, the following table summarises the main regulations accounted for in the development of the data governance:

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	***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*** [BuWi20]

Table 1: Regulations accounted for data Governance. Source: D6.1

4.b. - Regulation Updates

The following section will be developed containing any new information relating to the regulations analysed in D6.1 and 6.2, and eventual other texts and information that was highlighted as missing/relevant.

4.b.i Data act

The 2022 Proposal

The Data Act proposal, updated in February 2022, aimed to foster a competitive data market while safeguarding justice in the digital sector and encouraging data-driven innovation. Key provisions included:

1. Allowing users of connected devices access to the data generated by these devices, ensuring fair sharing with third parties for innovative services.
2. Protecting SMEs from unfair contractual terms in data sharing agreements, with model contracts to assist negotiation.
3. Enabling public sector access to private sector data for emergencies or legal mandates, minimizing burden on businesses.
4. Facilitating customer switching between cloud data services providers and preventing unlawful data transfers.
5. Defining stakeholders covered by the regulation, including manufacturers, data holders, recipients, and public sector bodies.
6. Mandating IoT technology providers to make collected data available to users, impacting sectors like agriculture.
7. Ensuring non-discriminatory data access and protection of small companies.
8. Enabling authorities to access data in exceptional circumstances with notification to data subjects.
9. Promoting data interoperability, with requirements for service providers to facilitate easy switching and compatibility.
10. Imposing restrictions on switching fees for data processing services providers.

The 2024 Situation

Since February 2022, the Data Act Proposal (EC) has undergone several changes and developments. On June of the same year, both the Committee of Regions and the EU Economic and social Committee

expressed and adopted their opinion on the proposal, while the EP plenary adopted the report on March 2023. *Following trilogue negotiations, Council and Parliament reached a political agreement on the final text in June 2023.*

Overall, the following was agreed:

1. Private Sector bodies will have to share information with public sector bodies for exceptional needs or research purposes;
1. Promote interoperability;
2. Avoid lock in effect, making sure customers have the right to switch between cloud services;
3. Makes sure individuals have the right to use and share the data generated from them, even when the connected device producer remains the data owner.
4. The text entered into force on the 11th January 2024.

4.b.ii - Common Agricultural Policy

A small parenthesis needs to be opened on the current CAP regulation. While no real legislation changes have been put into place yet, we are aware of the recent developments and farmers' protests that took place in 2024 across the EU.

On April 4th, 2024, the European Parliament approved a revision of the current CAP, originally set to be in place from 2023 to 2027, in response to these protests.

In terms of main changes, the new CAP should account for:

- The CAP review, initially proposed by the European Commission in mid-March, modifies several environmental and climate standards that determine subsidy eligibility. A significant change is allowing leeway for farmers who fail to meet CAP requirements due to extreme weather.
- *Smaller farms to be exempt from controls and penalties for non-compliance with some of the rules (EP)* [SpRe22], [EuPa24].

We cannot, at the moment of the publication of this deliverable, describe in detail what those changes will be and how the CAP will evolve. However, we can and will continue to monitor its development and account for eventual Regulation changes in D6.6.

4.c. - Guidelines adaptation

The following section aims at identifying the regulations and texts that are relevant for the development of the Guidelines manual in DIVINE. We start by gathering the guidelines provided in D6.2, and we review them based on their focus and rationale in DIVINE. As it was the case for D6.1 and D6.2, the guidelines are divided in three macro categories: Agriculture Regulation, Data Regulation, and Agri Data Regulation.

4.c.i Agriculture Regulation

Regulation 2021/2115 and Regulation 2021/2117

Issue	Strengthen the rules on labelling in the wine sector

Recommendation	Clear, accurate and complete labelling should be raised so that wine producers improve their reputation by increasing consumer trust in making more informed and conscious choices
Rationale in DIVINE	Label transparency can also help prevent fraud and counterfeiting in the wine sector. Being able to trace the source of the grapes and guarantee the accuracy of the information on the label can protect consumers from low-quality or counterfeit products. The new rules on wine labelling therefore create more environmentally friendly conditions, fair and competitive for the producers, where the quality of the wine is appreciated and recognized. In this sense, the increase in transparency of information about labelling along the supply chain makes it more reliable to build a system for sharing data on the risk of fraud and more complete data that allow decision makers to plan risk mitigation strategies. fraud more effectively.

Regulation 2021/2116

Issue	Filling the gap in agricultural data for the evaluation of CAP strategic plans and the provision of information for monitoring and evaluation
Recommendation	Limit the difficulty of accessing individual beneficiary data for policy analysis purposes to improve the sourcing and provision of agricultural data as well as optimize their use to improve policy definition and monitoring
Rationale in DIVINE	Farmers are reluctant to share data for reasons including: the risk of it being shared for other purposes, a lack of clarity on what "personal data" means and a general resistance to modern technologies thus creating reliable methodologies and harmonized data sets to monitor agricultural performance. Creating reliable methodologies and harmonized datasets to monitor agricultural performance and contribute to improving data infrastructures and data use can fill this gap

Regulation 2022/1475

Issue	Increase data sharing for the monitoring of agricultural resources

Recommendations	Facilitate the collection of agronomic performance data to monitor trends in the economic performance of farm
Rationale in DIVINE	Although the Commission uses a significant amount of economic, environmental, climate and social data, current data and tools do not produce some important pieces of information needed for evidence-based policy making. In this sense, DIVINE will produce validated algorithms, products, workflows and a roadmap to support the monitoring of agricultural resources

Regulation 1308/2013

Issue	Increasing farmers' trust in the processing of personal data for monitoring and evaluation purposes
Recommendation	Reduce farmers' scepticism about the collection, use and conservation of personal data for monitoring and policy evaluation purposes
Rationale in DIVINE	Making policy decisions requires a variety of data from different sources and subsequent analysis. There are huge amounts of data for the design, monitoring and evaluation of the CAP but they do not consider important elements that are necessary to develop a policy on the basis of solid evidence. DIVINE intervenes to reduce obstacles such as the lack of standardization and limitations due to data aggregation which reduce the availability and usability of the data itself.

4.c.ii - Data Regulation

Regulation EU 2022/2065– Digital Services Act (DSA)

Focus	Regulation 22/2065 regulates the behaviour of intermediary services (divided into “mere conduit services”, “hosting services”, and “caching services”) and establishes their roles and responsibilities.
Recommendation	Depending on the type of “intermediary service” DIVINE will develop into, rules and recommendation change. ● Overall, the service should: ● Include in its framework a specific Code of Conduct;

	● Allow users to report any suspicious or fraudulent behaviour identified; ● To guarantee data sovereignty, delete from the platform data for which the source is no longer available. ● Restrict Data access, where necessary (e.g. Personal Data, or any other data on the request of the farmer). In case of a "Large online Platform", rules are stricter and include: ● Using transparent and easy-to-read interfaces; ● Establish "Trust Flaggers" to monitor eventual illegal practices; ● Make sure consumers and traders' information is safe.
Rationale in DIVINE	Even if no specific mention is done with relation to agriculture, regulation 22/2065 applies to the DIVINE project as it aims at regulating online platforms.

Regulation EU 2022/1925 – Digital Markets Act (DMA)

Focus	Regulating the behaviour of the so called "Gatekeepers", defining the rules for collecting, storing and sharing data.
Rationale in DIVINE	To be defined a "Gatekeeper" a platform needs to respect certain dimensional conditions. It is unlikely that DIVINE will be concerned by these regulatory requirements.

Artificial Intelligence Act (AI Act)

Focus	Regulating the development of new AI technologies.
Rationale in DIVINE	The regulation does not seem to have a major impact on the development of DIVINE, given the fact that it aims at regulating newly developed AI.

Regulation EU 2016/679 – General Data Protection Rights (GDPR)

Focus	The goal of the regulation EU 2016/679 is to *harmonize 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].
Recommendation	Lawful, Transparent, and Fair Processing: ● Explicit consent is required for processing sensitive data (health, sex life, orientation, ethnicity, religious beliefs), and these data will be collected only for specific, legitimate purposes (Contract performance, legal obligations, vital interests, public interest). It should be stored only as long as necessary and must be confidential. ● Data subjects have the right to access, rectify, erase their data, and restrict processing, and controllers' identity must be known. ● Actions taken by data subjects should be free of charge. ● Data must have a proper portability. Data Protection Measures: ● Implement risk-avoidance measures to prevent accidental or unlawful destruction, alteration, or access to data. ● Notify data subjects of any personal data breaches.
Rationale in DIVINE	Even if the regulation does not focus on the agricultural sector specifically, the regulation is of vital importance to guarantee the protection of famers' personal data, promoting a trustful environment.

Directive EU 2019/1024 – Open Data Directive

Focus	Directive 2019/1024, whose objective is to guarantee availability and facilitate re-use of public data, must be applied to all existing documents held by the public sector.
Rationale in DIVINE	As mentioned above, the Directive relates to the Public Sector data, and should thus not have a strong and direct impact the DIVINE platform.

Directive 200/136 – e-Privacy Directive *

Focus	The directive objective is to harmonize the provisions of the Member States to ensure a consistent level of protection for fundamental rights and freedoms, particularly the right to privacy and confidentiality, concerning the processing of personal data in the electronic communication sector.
Recommendation	● Communicate to the data subject of eventual personal data breaches; ● Make sure only authorized personnel has access to specific information; ● Make sure there is no connection between the ID of a data subject with his personal phone number.
Rationale in DIVINE	The regulation is relevant because it applies to data storage systems (electronic communication networks as defined by section 32 of the Communications Act). The platform created by the project will store this data.

Data Act

Focus	Promote data sharing in the EU, by allowing for further data exchange between private and public sector.
Recommendation	● Prepare a model contract to propose to farmers when logging in for the first time on the platform, explaining how the data space works. Make sure to provide an appropriate protection to SMEs data. ● Interoperability: Make sure the data uploaded on the DIVINE data space can be easily shared outside the platform. ● Transparency: make sure that the data shared by IoT providers have the farmer's consent.
Rationale in DIVINE	The Data Act represent the first attempt of the EU to regulate the non-personal data sharing. It aims at increasing the EU's competitivity through a higher digitalization level. The text is of relevance in DIVINE as it is nowadays the main text to account for private (non-personal) data processing.

Cybersecurity Act

Focus	*The regulation defines the behaviour of different bodies – MS and organisms working for them - in supporting public sector bodies to improve the prevention, detection and analysis of cyber threats*.
Rationale in DIVINE	The regulation focuses on public bodies and MS – identifying their behaviour to support Cybersecurity in public bodies. The regulation does not strictly relate to DIVINE.

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

Focus	*Ensuring the free flow of data other than personal data within the Union.*
Rationale in DIVINE	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, as the main point suggest establishing a Code of Conduct.

Regulation (EU) 2022/868 - Data Governance Act

Focus	The Data Governance Act (DGA) aims to make more data available for reuse and facilitate data sharing across areas such as agriculture for the benefit of EU citizens and businesses, stimulating innovation.
Recommendation	When allowing data exchanges with third countries, DIVINE will need to make sure the third country group is complying with regulations applicable in the EU in terms of privacy, safety and sovereignty.
Rationale in DIVINE	The main scope of the DGA is to regulate the use and facilitate the exchange at the EU level of non-personal data. While the regulation focuses more on Public Sector Held data rather than privately held data, it establishes basic rules to data sharing outside of the EU.

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

Focus	The report examines the potential advantages and obstacles of data sharing between businesses and government entities. It highlights the significant positive effect this data sharing can have on public welfare and provides key recommendations to ensure that B2G data sharing is performed responsibly, sustainably, and on a large scale across the EU.

Recommendation	The B2G Data sharing guidance consists in a report and does not have force of law. However, in order to promote data exchange at the EU level, DIVINE could: ● Conduct its own in-house analysis or host external researchers and then share with the public the insights that emerge from that analysis. ● Partially share defined data trusted third parties. ● In any case, farmers should be aware of these exchanges taking place and express their agreement on the matter.
Rationale in DIVINE	This report is particularly relevant for initiatives like DIVINE, which aim to foster data sharing among agricultural stakeholders, by providing insights into overcoming challenges and implementing effective data-sharing solutions.

4.c.iii - Agri-Data Regulation

Regulation (EC) No 138/2004 - Economic accounts for agriculture in the Community

Focus	This Regulation sets up the economic accounts for agriculture in the Community (EAA) and provides a methodology based on common standards, definitions, classifications and accounting rules. It also provides time limits for the transmission of the agricultural accounts compiled in accordance with the EAA methodology.
Recommendation	The objective is to produce high-quality statistics that meet users' needs and improve harmonization and coherence of European agricultural statistics. Main use of these statistics is related to the activity of monitor and evaluate the Common Agricultural Policy (CAP) and other important EU policies, supporting policy-making. It proposes a new integrated, flexible, and modular framework for agricultural statistics to increase their response speed to new data requirements.
Rationale in DIVINE	The regulation is relevant for DIVINE because it provides guidelines for collecting, storing, and standardizing agricultural data, ensuring its shareability with the European Commission and other Member States.

Regulation (EU) 2022/2379 - Statistics on agricultural input and output (SAIO)

Focus	This 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. It enhances knowledge of agricultural production and practices in relation to the Common Agricultural Policy (CAP), Green deal for Europe, and Farm to fork strategy. It refers to data on agricultural outputs and inputs, collected from farms, administrative sources, intermediates, wholesale entities, and market organizations. These aggregated statistics do not have micro data transmission to Eurostat but require adaptation of statistical processes.
Recommendation	The goal is to simplify the system and improve data quality, efficiency, and adaptability. It is the result of a collaborative effort by the European Statistical System Committee and Eurostat, aiming to produce high-quality statistics that meet users' needs, integrate agriculture and environmental statistics, and enhance consistency and harmonization across European agricultural statistics. The Framework SAIO foresees consist of: 1. aggregated crop and animal production statistics; 2. agri-environmental statistics on fertilizers, nutrient balances and pesticides; 3. agricultural price statistics.
Rationale in DIVINE	The regulation is relevant because it applies to the collection of different statistics and provides indications on definitions, data requirements and information on statistical population and observation units.

Regulation (EU) 2018/1091 - Integrated farm statistics (IFS)

Focus	This Regulation establishes 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. It provides guidelines on data related to farms, orchards, and vineyards. The main aim is to define so-called "core structural data", for which measurements have to be taken in the form of census or can be carried out on samples. The list of these core data is divided in macro-categories: 1. General Variables (E.g. Geographical Location, farmer's ID, Legal Person, etc.…) 2. Variables related to Land (expressed in ha) 3. Variables related to Livestock (expressed in heads) The regulation also introduces new data about irrigation, manure, nutrient use, and livestock management. It also requires module data collection in different ways and times. This approach enables Member States to reduce sample sizes, set up surveys more flexibly, and reduce the statistical burden.
Recommendation	The IFS defines not only which type of data should be collected but introduces also data quality requirements [Art. 11], as well as harmonized rules on timelines [Art. 10, 12].
Rationale in DIVINE	The regulation is relevant for DIVINE because it provides information on what is available in agricultural statistics especially related to farm structures at different levels, census or sample, and at different times.

Copa – Cogeca: EU Code of conduct on agricultural data sharing by contractual agreement

Focus	The EU code of conduct on agricultural data sharing is a joint effort by multiple organizations to promote transparency and mutual trust in agri-data sharing within the agri-food chain. It provides guidance on contractual relations and the use of agricultural data, focusing on non-personal data.
Recommendation	The EU Code of Conduct on agricultural data sharing provides guidance on the use of agricultural data, particularly the rights to access and the use of data. The code introduces default principles divided into five categories:

	1. Attribution of the underlying rights to derive data (data ownership); 2. Data access, control and portability; 3. Data protection and transparency; 4. Privacy and security; 5. Liability and intellectual property rights. Compliance with the Code of Conduct is voluntary, and it predominantly focuses on non-personal data. Thus, the processing of all that data that can be linked to an identifiable person falls under the General Data Protection Regulation. It grants a leading role to data originators in controlling access to and use of data from their business and emphasizes the importance of transparency in data sharing relationships between farmers and agribusinesses. To achieve this goal, it is essential to establish a protocol on data protection and safeguards for individual originators, not allowing unauthorized sharing with third parties.
Rationale in DIVINE	As the code provides a series of definitions related to software application, anonymization of data, personal data, metadata, data availability etc. It is very useful to the scopes of DIVINE. Also, it is a good guidance in terms of rules established, even if on voluntary basis.

5. Recommendations for Further Data Governance Adaptation

5.a. Increasing Farmer's trust

5.a.i. Why increasing Farmer's Trust?

The agri-food sector is entering the era of agriculture powered by digitalization. The farmer remains at the centre of the collection, treatment and management of agricultural data. Digital agriculture can create value by applying data-based solutions:

- To improve resource efficiency, productivity, environmental processes, animal health and welfare and provide tools to mitigate climate change;
- To meet dynamic markets and consumer expectations;
- To cut administrative and bureaucratic costs;
- To deliver better and more profitable living conditions for rural communities.

To exploit all the potential benefits, data sharing among different stakeholders must be conducted following fair and transparent rules. The increasing exchange of data represents a major challenge for the EU agri-food sector and raises issues relating to confidentiality, data protection, intellectual property, data attribution, trust/power relationships, storage, retention, use and security.

The nature of agricultural data is highly specific but very diverse and the economic value it generates both for farmers and the entire value chain requires that the necessary guarantees be established. Due to this feature, it is difficult to monitor who is authorized to share data and which of these are shared. There is a common political vision, which assumes that increasing data sharing is only possible by making it mandatory, due to creators' reluctance to share data. It is therefore essential to define the key principles of data rights, whether ownership, access or reuse rights.

Furthermore, it is known that transparency and accountability are necessary to gain farmers' trust. The lack of transparency and clarity on issues such as data ownership, portability, privacy, trust and accountability in the commercial relationships that govern smart agriculture are contributing to farmers' reluctance to engage in the widespread sharing of agricultural data. At the centre of the concerns is the lack of trust between farmers as data contributors and those third parties who collect, aggregate and share their data. Since these technologies collect a large amount of farm data, farmers are concerned about the privacy of their data. Farmers are concerned about unauthorized access, harvesting, and sharing of their data with third parties by agricultural technology providers. Furthermore, the ambiguity of agreements and legal frameworks on data collection, processing and sharing can lead to practical uncertainties regarding data privacy. Additionally, this situation is exacerbated by the lack of adoption of best practices and standards for protecting corporate data.

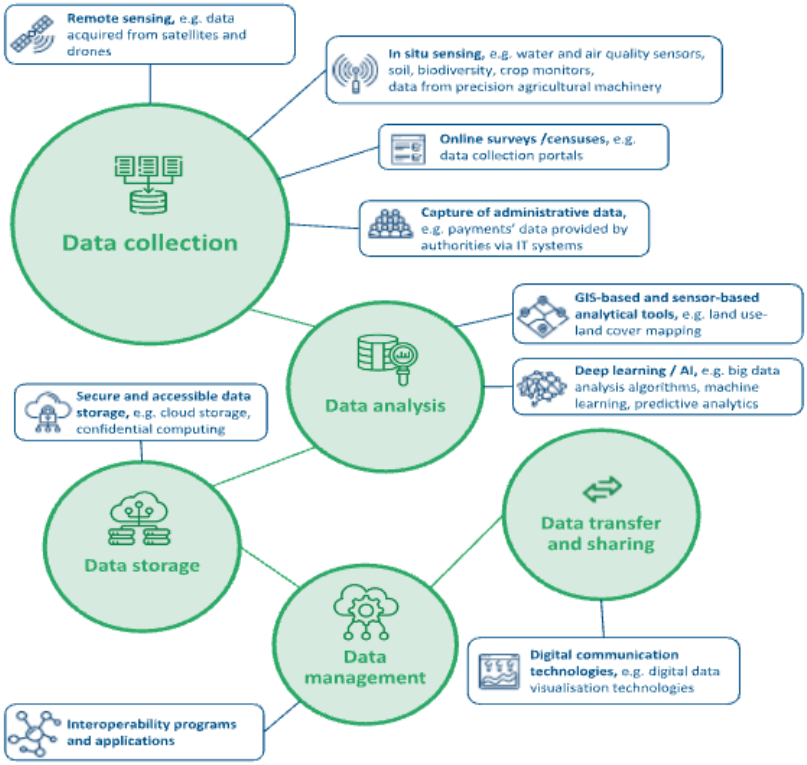

Figure 5: Digital technologies for agriculture data. Source: ECA

In this regard, the EU code of conduct, whose membership is voluntary, intervenes. Many laws potentially impact the ownership, control of and access to data. In such a context, it is important to examine farmers' attitudes to collecting, controlling, sharing and using their farm data. At a central level, recommendations are needed on how to address these concerns and facilitate better adoption of agricultural technologies (Fig.1), focusing on the need to change the social architecture of relationships between agricultural data and help build trust in the adoption of systems of smart farming. One of the biggest concerns is transparency and distributional concerns about who in the supply chain will benefit from access to and use of "farmer data." These concerns create scepticism about their value among some industry stakeholders, particularly farmers [WiSa19].

In the context of European agricultural policy, the objectives of strengthening the digital ecosystem, spreading the use of digital tools and facilitating the use of digital technologies have been defined with the strategy for digitalization contained in the National Strategic Plan. A recent provision harmonizes the information collected by companies according to a common standard that allows for the digitalization of all administrative data linked to the CAP. In the DIVINE project we want to gain a more informed overview of what is needed to promote greater trust in enterprise data sharing and whether currently available codes, principles and guidelines intended to govern enterprise data sharing offer sufficient support to ensure that the collaboration of the farmer is essential for the successful outcome of the survey and the farmer should be informed about the purpose of the survey and invited to participate ii) the trust between farmers and advisors , iii) there are no precise indications in the EU regulations on how create this

relationship , iv) to improve this relationship of trust, advisors are chosen on the basis of their professional and technical skills and their knowledge of the territory , v) correlation between the confidentiality and data quality requirements techniques and methods for interpersonal communication between advisors and farmers.

5.a.ii. How to build trust? A literature Review

A study conducted by Clare S. Sullivan et al. [SuGe24] revealed that factors influencing data sharing are interconnected and revolve around trust. In this systematic literature review authors analysed 59 research articles up until February 2024 in order to identify the most prominent drivers and barriers of agricultural data sharing. The most prominent barriers identified were:

- The lack of transparency: the lack of clarity on data ownership and legal rights of use and concerns with maintaining data privacy and technical security.
- Systemic issues including the lack of trust were also identified as prominent concerns.

Findings highlighted the complexity of factors that influence participation in agricultural data sharing. This analysis emphasises the importance of balancing policies and practices that encourage innovation across the agri-value chain while fostering trust and protecting farmers' interests. Making use of trusted stakeholders in the data-sharing chain to foster engagement and being transparent about what data will be shared with whom is critical.

Multiple other studies have reached similar conclusions: sharing data has proven to be a complex socio-technical process fraught with stakeholder concerns. These concerns include:

- Challenges of data privacy and interoperability;
- Unclear data governance;
- Mistrust of who will benefit from shared data.

While smart farming adoption studies focus on trust in the technology, the topic of trust in data sharing is different. It is a perception of what farmers think will happen with their data once it is shared, including how others will use it, for what purpose, and what might be the repercussions. Clare S. Sullivan et. al.[1] note that one theory may be that trust is taken care of with policies, codes of conduct, and regulations, but drawing on social science research, Van der Burg et. al. argue that contracts only maintain trust that was previously built through relationships. Building trust in relationships takes time, and many papers focused on the importance of involving stakeholders that were already trusted by farmers in the data sharing process. Studies found that farmers were most comfortable sharing data with other farmers or researchers, and least comfortable sharing data with the government. Clear communication of data sharing benefits and risks was identified as an enabler of data sharing because it increased stakeholders' awareness of the data value proposition. This can be accomplished through trusted data intermediaries,

[1] See Note 8.

whether that is a designated staff person on the farm, agronomist, or data analysts that is trained to work with agricultural stakeholders.

Lack of Trust and Relationships

Lack of trust between stakeholders and the complex power imbalance that exists across the agri-food chain are the most prominent socio-economic barriers identified at the relational level. These two challenges seem to be intertwined. Studies have found that farmers reported uncertainty and fear about the fate of the data they generated once they left the farm, creating a sense of "lost control" and mistrust towards data aggregators. The mistrust was attributed to not knowing who would benefit from their data, how the data would be used and the impact it would have on competition [Bril23].

Sullivan et. al. found that in many cases, trust in data sharing and fear of misuse was dependent on who the data was shared with.

- For example, growers were found to be most comfortable sharing data with other farmers, farm organisations, or university researchers, and least willing to share data with government or technology providers. There were reported fears of the government misusing data such as using selective data to misrepresent an industry or form unjust policies, or using data for surveillance.
- Concerns of agricultural companies misusing data were centred around the possibility of raising or lowering prices based on farm input and output data they had aggregated.
- The literature also found that farmers are generally unaware of, or do not understand the contract terms they are signing due to lack of transparency and have little trust in protection guidelines.

Lack of Trust and Technology

The imbalance between individual farmers and agricultural technology providers in terms of size of operation, bargaining power, level of knowledge about data, and access to technologies has resulted in a situation where farmers are at the mercy of large technology providers. According to [TuRi22] the disparity between the data literacy of farmers and agricultural technology providers perpetuates this inequality. Other studies, such as [SeCo23], identified mistrust in the data-sharing process as a major obstacle when sharing data within digital agriculture or creating a shared data space.

Due to the complex socio-technical nature of data sharing, it is difficult to separate the individual factors influencing willingness to share data. While farmers are concerned about data privacy, they know very little about the terms and conditions in agreements with service providers due to lack of communication and transparency of policies. Clarification of data sovereignty or policies that protect farmers rights may help enable data sharing, but these contracts can only be used to maintain trust that has already been built through relationship and communication.

Trust or lack of trust is a factor that spans socio-economic, systemic, technical, and legal categories and is a major factor affecting willingness to share data. According to Sullivan et. al.[2] for data sharing to be further adopted within the agricultural sector, trust needs to be addressed from multiple angles, insights

[2] See Note 8.

from the literature suggest that clear communication, face-to-face meetings, leveraging pre-existing trustful relationships, including farmers in technology research and data governance decisions, neutral data intermediaries, and transparency in data sharing policies can help foster trust. The literature suggests that farmers' willingness to partake in data sharing will vary depending on which stakeholder group are aggregating the data (government, researchers, private industry). Therefore, incorporating trusted partners, transparency, and shared responsibility around data governance are a priority for the future of data sharing.

Lack of Trust – A focus on Dairy Production in Slovenia

Literature data regarding the benchmarking of dairy production indicate a rather high level of trust between providers of more advanced information technologies and farmers. This is probably related to the introduction of modern technological solutions (milking robots, mixing control technique with recording of exact quantities, motion sensors, rumination...) in newly invested barns for highly productive dairy cows.

However, there are no data or surveys on the trust that is or is not established between the advisory service and farmers.

We determined some of these parameters experientially during the implementation of industry circles in our Slovenian pilot. The general rule is that young farm takers and breeders who, due to the obligation from the co-financing of investments on the farm, already manage simple accounting at the FADN farm decide to participate in industry circles to a greater extent. According to our experience in the past years of conducting circles, it was extremely difficult to attract older farm owners to the workshops, who are breeders with good or excellent results and excellent breeding knowledge, but are not skilled in keeping records, especially cost records, which are the basis for performing a comparative analysis.

However, with more traditional breeders there is always a distrust that their breeding data will appear in some financial audits, which will result in an additional tax burden on the farm, so they are visibly not in favour of sharing their data. There were fewer of these concerns among younger breeders.

Overall, during the implementation of the workshops, especially at the beginning when a lot of data on dairy cow husbandry was collected, the main reason for refusing to participate was the farmers' lack of time and/or their perception that comparing the results between farms would not bring any progress on their farm. The small size of Slovenia and the small number of dairy farms managing FADN accounting was also a limiting factor. Nevertheless, we managed to convince some undecided breeders to attend the workshops. And when, at the second stage of the workshop, a comparative analysis was carried out within a certain group, linked to a specific breed and arable or grassland area, the breeders commented positively on the results of the comparison.

Another reason for the refusal to participate was also the lack of knowledge between the advisory service and the farmers. A review of gender representation shows an absolute predominance of male workshop participants. In conversations with the participants, we found that records and data entry are mainly

managed by women, especially the recording of incoming invoices and the issuing of invoices for the crops/products sold. Likewise, women mainly monitor quality and fertility parameters (nutrient content, SCC in milk, calving cycles, inseminations...). However, when it is necessary to attend trainings or workshops such as this "dairy benchmarking", the participants are men. In most cases, men are also the decision-makers for the purchase of special machines, robots, and software.

In our pilot, we identified the following problems, which will need to be eliminated or reduced by the consulting service in the future:

- First of all, there is insufficient awareness among farmers on the fact that, during the workshops, additional knowledge and solutions are acquired. Breeders were ready to share their practical experience with other workshop participants, fostering a positive dialogue increasing farmers' skills and improving farmers practices.
- The second problem is the belief that collecting and sharing data will not bring any progress for the dairy farm, as farmers' work is undervalued and the society does not recognize the true price of the products and the daily effort that farmers put into their herds and animals. However, during the second workshop with a data expert, presented specific parameters and metrics that contribute to the success of the most successful farm: by showing concrete examples, the manager demonstrated how data collection and sharing can lead to tangible improvements and success on a dairy farm.
- The third obstacle was particularly evident on dairy farms, which are also producing and marketing basic arable crops. These farms oscillate between one type of production and another, as recently profitability tends more towards agricultural production, and livestock and animal products are increasingly under critical scrutiny. In the future, in order to continue the workshops, we will definitely need to attract new breeders of the younger generation who have a medium- or long-term plan to keep milking cows.

Confidence in the advisory service and data processors will need to be increased by building knowledge, and we can achieve this by training advisors and farmers in these topics, by strengthening awareness that open and transparent collection, control, processing and analytical interpretation of data can contribute to individual the success of each individual farm. Of course, all this with strict consideration of the protection of personal and other data and on the basis of improved contracts or agreements between farmers and data collectors, processors and sharers.

6. Conclusion

As highlighted throughout this deliverable, DIVINE's data governance has been shaped to meet the needs of both farmers and the project itself. This approach not only benefits the project, but also supports the EU's goal of enhancing the competitiveness and social conditions of the agricultural data sector.

The policies detailed in D6.2 have been thoroughly reviewed, taking into account the evolving social and political context, including developments in the Data Act and recent changes to the Common Agricultural Policy (CAP). Additionally, we have extracted straightforward guidelines to ease future data space development in the EU, reducing the legislative burden on farmers, stakeholders, and platform developers.

In the final chapters and through our literature review on building trust in agriculture, we have proposed further solutions to enhance, promote, and explore data exchange within the EU and the agri-food sector. The findings from the Slovenian pilots show a growing willingness, particularly among young farmers, to adopt new IoT technologies and share data. They recognize that this will provide valuable insights to improve their productivity, management, and social life.

The insights from this deliverable will continue to be updated and will serve as a crucial foundation for the final WP6 Deliverable, D6.6.

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Annex

1. D6.3 Pilots' monitoring

Questions Asked	Pilot 1 KZGS	Pilot 2 UCD	Pilot 3 NP	Pilot 4 ADSC
Is any specific measure/KPI established to measure the policies and the project sustainability?	YES	NO	NO	NO
If yes, can you provide concrete results?	NO	NO	NO	NO
Is there an indirect impact of the Pilot on sustainability?	YES	YES	YES	YES
If yes, can you provide concrete results?	NO	NO	NO	NO
Are there any other comments or information on Sustainability you can give?	Some data on carbon footprints will be available after Pilots Round 2.	Too early to talk about results, only baseline values have been collected.	Some data may be available after Pilots Round 2.	The data collected from the sensors can be used as future benchmark
Is any specific measure/KPI established to measure the policies and the project potential increased competitivity?	YES	NO	NO	NO
If yes, can you provide concrete results?	NO	NO	NO	NO
Is there an indirect impact of the Pilot on competitivity?	YES	YES	YES	YES
If yes, can you provide concrete results?	NO	NO	NO	NO
Are there any other comments or information on	The benchmark results will only be	Too early to say if the results will be	Competitivity depends on	The data collected from

the Pilot Competitivity you can give?	visible after the completion of the next pilot rounds.	positive – these evaluations may require a much longer time span.	how the tools are advertised, not part of the main focus of the Pilot.	the sensors can be used as future benchmark
Is any specific measure/KPI established to measure the policies and the project Social Impact?	NO	NO	NO	NO
If yes, can you provide concrete results?	NO	NO	NO	NO
Is there an indirect impact of the Pilot on Social Impact?	YES	YES	YES	MAYBE
If yes, can you provide concrete results?	NO	NO	NO	NO
Are there any other comments or information on Social Impact you can give?	Not at the core of the Pilot, there may be indirect results later on.	Results will be available after the next Pilots Round.	Results will be available after the next Pilots Round.	Potential Benefits may be highlighted later on.

Table 4: Pilot's Answers on Policy Sustainability, Competitivity and Social Impact. Source: Own