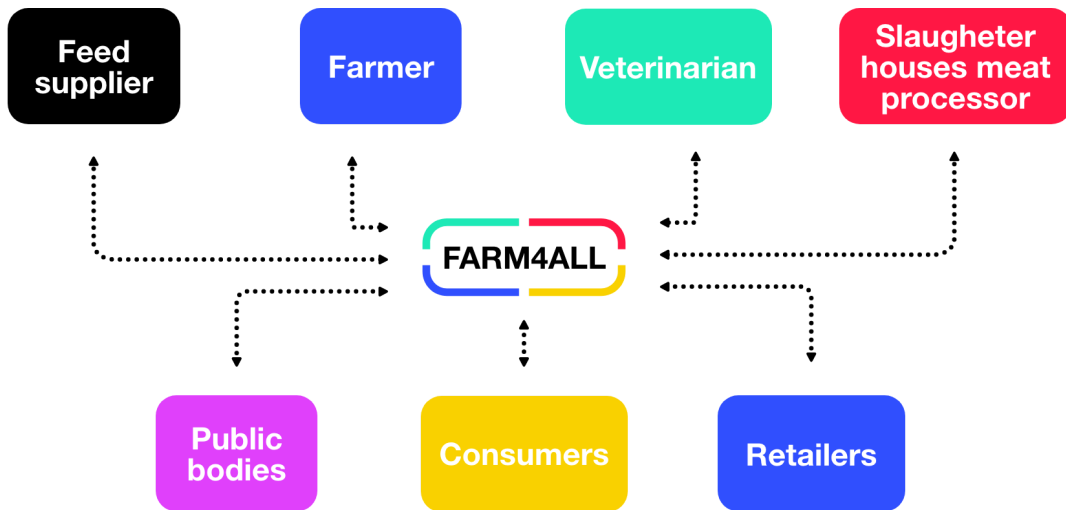


## Farm4all

Platform for data exchange and improvement of the  
livestock chain



Smart Farming

## Farm4all: Platform for data exchange and improvement of the livestock chain.

With the contribution of:



- SensoWave



**BricalVET**  
Servicios Veterinarios

- Bricalvet



- GEPISA



- Cárnicas Martín Caro



- **La Blaquería**



- **FIWARE Space**



- **Cumbres del Guadarrama**

## Challenge & Context

The meat supply chain is a very complex system that involves multiple agents: livestock farms, feedlots, transporters, feed suppliers, veterinarians, slaughterhouses, retailers, consumers, etc. Events occurring at any agent in the chain have huge effects on the industry, on consumers, who demand more information, and on other stakeholders, like public bodies. Nowadays, existing ICT, data and traceability systems collect some data, normally entered manually, from every segment of the supply chain, mainly to assure food safety to consumers. However, the potential for data sharing along the supply chain, upstream and downstream, is much bigger than that. Shared value systems based on data integration and sharing would allow every segment of the supply chain to improve production efficiency, make better decisions, be better informed about product quality, etc.

Cloud data integration services, that are powered by manual inputs but also by IoT devices, are an excellent opportunity to generate and share objective data from every segment of the supply chain. Currently, some farmers, industries, etc. are digitising their businesses, but there is no data interchange. Most times, data lacks interoperability, reusability, openness, etc.

This is why the main challenge of the project is to establish a platform where each of these agents can share information with the aim of benefiting their own businesses as well as improving traceability information that reaches end consumers, thus generating an increase in consumer confidence.

The challenges to be solved in detail are:

- Reluctance of different actors to share their business data while simultaneously complying with the data protection law.
- Interconnecting different data platforms.
- Generation and adaptation of data models that model the physical reality of the services offered by the platform.
- Introduction and use of new technologies by low-tech actors.
- Introduction of technologies based on interoperable data standards such as FIWARE and security mechanisms such as iSHARE.

## **Solution**

Our solution is a data service platform that allows the connection of all agents of the agri-food chain of meat products. This platform connects all these agents (farmers, vets, suppliers, etc.) and allows them to optimise processes and costs while offering higher value-added services. Thanks to this platform, automation will be established along the meat supply chain with the consequent economic savings, e.g.: if the platform detects that an animal requires health services in advance, the service provided by the veterinarian will be more efficient and economical. All these automations are based on the information collected by the agents' ICT systems, IoT devices and open data sources, which are analysed by AI algorithms to generate recommendations.

In addition to these automations that allow the increase of productivity, the platform offers an improved traceability service based on blockchain that can be offered to consumers (final consumers, supermarkets, and industry) of meat products and to supervisory agents of the process (public administrations). This improved traceability service will offer much more information (which is a trend on the part of society) than is legally required. This information can also include good livestock practices, environmental analytics, etc., based on data. The traceability service is based on the information generated by the agents of the system that is stored in a blockchain structure available in the data provider service, which is accessible through different dashboards-apps developed.

The project partners and their role within the project are described below:

- SENSOWAVE (SENSO). SENSO is a data service provider (data and IoT devices). As a supplier of IoT technology, SENSO provides devices for monitoring animals that are in compliance with FIWARE. Secondly,

SENSO provides traceability services for the data generated by the different actors in the chain. This data will be consumed by other agents through economic exchange or the generation of more data to enrich the product. SENSO will store in its solution, based on blockchain, the information associated with each animal and meat product to offer extended traceability information with respect to the legal requirement, which is increasingly demanded by consumers of meat products. Finally, SENSO as an AI service provider delivers results and recommendations based on the raw data collected by IoT sensors and the manual information entered by other actors in the chain.

- Data service consumers and data providers. The two partners above act in the same way with the platform. On the one hand, they feed the traceability services with data from their operations (veterinarian records, feed records, etc.). On the other hand, with respect to the AI service, they receive improved information on how to carry out their operations.
  - BRICALVET (BRICAL): BRICAL is a company that sells veterinarian services for livestock farmers. Now they run their operations inefficiently using field notebooks.
  - GENERAL DE PIENSOS DE SORIA (GEPISA): which provides feed to livestock farms. Now they run their operations over the phone or through manual registrations.
- Data service consumers. These partners, through the IoT devices, receive recommendations and advice on different aspects of their operations.
  - GANADERÍA CUMBRES DE GUADARRAMA (CUMBRES) and LA BLAQUERÍA (BLAQUE): are technified livestock farms that already have IoT devices.
  - CÁRNICAS MARTÍN CARO S.L. (ICAR): is a company that processes animal carcasses into various meat products.
- Consultancy expertise. FIWARE SPACE DIH's (FISPACE) task is twofold: on the one hand to advise on the implementation of the services using the technology based on FIWARE and i4Trust, while on the other hand to advise on how public administrations could access the information as a consumer agent of the data service.

## How it works

Our solution consists of a platform of shared data from different origins on which a series of services are developed to improve the different processes involved in the livestock process. The platform includes data processing modules that generate recommendations based on the data and are adapted to each type of user (farmer, veterinarian, etc.). Thanks to this data processing, veterinarians or farmers receive recommendations, for example, to improve animal health or welfare. In addition, the platform includes an extended traceability module to include data up to the final consumer. The core of the solution is the Context Broker where all information is harmonised and managed. Around this component, a whole series of software modules are deployed, including data analysis, data integration, security, visualisation and apps, historical storage and more.

Four basic elements of the solution are distinguished:

- Context information management. A centralised cloud solution will be developed that will be integrated with the information systems of each of the project partners
- Data processing algorithm. It is in charge of generating recommendations based on the data.
- Data visualisation interfaces. To display the information and access the results of the service provided, a control panel with different widgets will be developed. In this way, the widgets developed, which will have very specific functions, will be used depending on the needs of the data service consumer.
- Data exchange authorization. Using FIWARE and iSHARE technology, permissioned access to project data and services will be guaranteed.

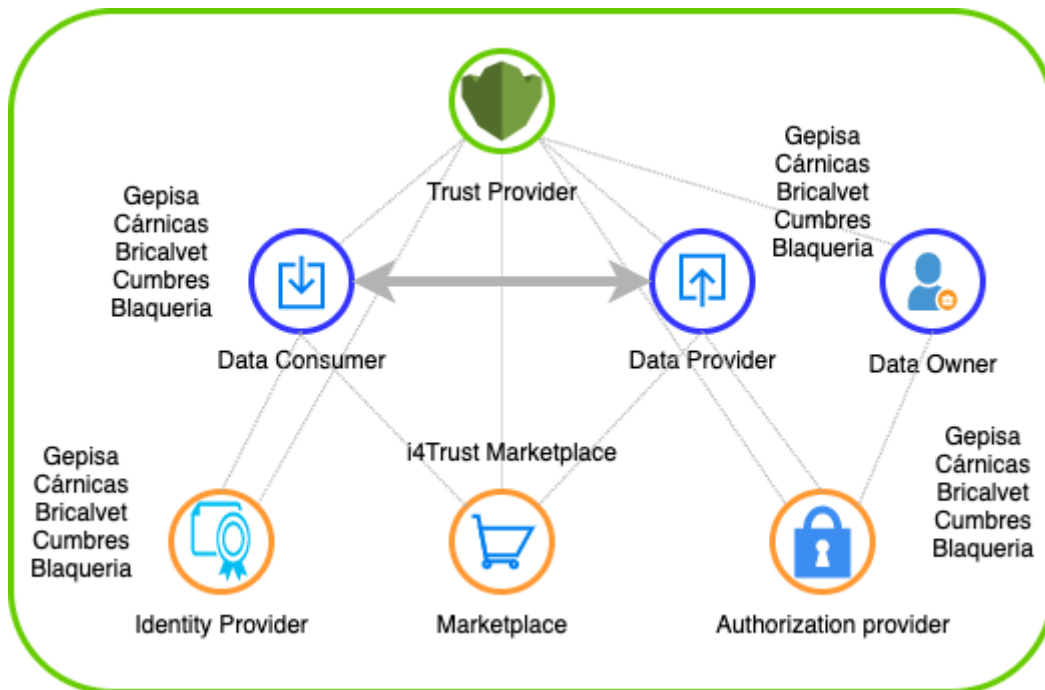


Figure 1. Overall solution description.

Our dataspace is composed of data from the different actors of the livestock chain, including livestock data (animals and management aspects), data from veterinarians, suppliers, etc. It is a common data space in which third parties can intervene as long as they follow the published and approved standard data models.

The use of FIWARE technology as the basis of the platform developed has been fundamental thanks to the facilities it offers in the integration of information from different systems. The use of Orion Context Broker as the central element and orchestrator of the information facilitates the use of other software layers such as data analysis and the generation of recommendations.

iSHARE has good prospects for the use of permissive access to data and operations.

## Benefits & Impact

The platform developed during the project is still in the process of validation and experimentation with end users. Several users are validating the platform prior to the partial or full commercial launch of the service. However, it is important to highlight that the number of users can grow rapidly thanks to the agreements that SENSO has with livestock service commercialisation

companies such as Digitanimal, which already has more than 7000 clients in more than 60 countries. The savings that can be generated in the beef sector annually can represent 25% of their current turnover, and this is approximately the necessary investment to be made by users. In this way, in 3 years, a user who invested 75 euros per animal would have recovered 150. In a farm with 1,000 calves, this means an increase in net profit of 150K euros.

In general, the meat sector as a whole could improve its efficiency and sustainability by 50%. This means that it is possible to reduce the environmental impact (water consumption and GHG emissions) by 50% as a result of adding improvements in various areas thanks to data sharing. This affects the improvement of farm management, but also animal selection for phenotyping, precision feeding, etc.

The EU's farm-to-table strategy and consumers are going to demand more information about products, therefore the agri-food sector and especially the meat sector has to be transformed in the new era of digitalization. This translates into data that must be generated, analysed, stored and finally displayed, covering several links, including more detail on aspects such as animal welfare, or the carbon footprint they generate. To survive, the sector has to transform, but this is possible thanks to new technologies and the creation of data sharing spaces. These spaces will allow visibility to all agents, especially farmers, who are already creating direct links with consumers. It represents a challenge and a cost for those involved in the sector. The data generated will have dual use in some cases, on the one hand offering information to consumers and control bodies, but on the other, it will help the agents themselves to be more efficient.

The impact on the SMEs participating in the project is:

- SENSIO. As the technological partner of the project and developer of the tool, it is the partner on which the realisation of the project has the greatest impact. Thanks to it, SENSIO will market the solution either directly or through partners to increase its sales level by around 30%. To this end, an important commercial and marketing launch phase will be carried out once the project is completed.
- Industry partners (Bricavet, GEPISA, Cárnicas Martín Caro). Industry players benefit from the use of such tools to facilitate their operations. Processes can be improved resulting in time savings of up to 30%.
- Farmer partners (Cumbres del Guadarrama, La Blaquería). Livestock partners see a direct benefit in the increased selling price of products



with improved traceability. The selling price has increased by 30%, but it remains to be seen how this translates into the company's final turnover.

## **Added value through i4Trust**

Business mentoring, combining Miro's template with the help of work sessions with the mentor, has been of great help. It has helped us explore to better understand the ecosystem and reflect on the role that each of the actors involved can play. This has been essential to define a strategy to follow around the generation and sharing of data, as well as the creation of new services among all and for the total benefit of the sector.

Value-adds created during the project are:

- Improving decision making and efficiency (reducing losses and increasing revenues) at farm level. For this, the animals must have the best sanitary and welfare conditions. In addition, the diet can be adapted to the animals to improve fattening. The implementation of this solution allows individual monitoring of these parameters, improving operating profits by 30%. The analysis of the data can help improve genetic selection, looking for the animals that are more immune to suffering diseases, with better capacities for social adaptation to the flock, and with the greatest capacity for fattening.
- The proposed solution will reduce the time spent on paperwork, centralise all data collection, adapting the farm for future food-consumer standards (traceability).
- Providing enhanced traceability services for meat products

The use of i4Trust technology has been key to the development of the livestock data exchange platform developed during the project. In particular, the use of FIWARE technology enables the rapid deployment of solutions and interoperability to and from third party systems. The use of standard data models also facilitates the deployment of software layers that add value on top of the data. Finally, the permissive access to the data and the operations offered.

## **Next steps (if applicable)**

### **Collaborations and strategic partnerships**

Manufacturers like Digitanimal are strategic partners, and then of course veterinarians and feed manufacturers. Other partners could be included, for example, cooperatives and farming unions and breeder associations, which provide training and advisory services and support to improve efficiency.

It is also worth exploring possible collaborations with entities that certify IGP seals, quality, animal welfare, etc.

### **Networking strategy**

The networking strategy must work at three levels: Data, Infrastructure and Market places, also following this order by relevance and time.

Algorithms will improve with data, especially if they are tagged.

At the infrastructure level, providing tools that take into account the particularities of the farm when giving recommendations will enrich the services provided by third parties.

### **Creation of a marketplace**

Where all the parties that participate can have visibility will help all parties. The marketplace can help match actors based on their location, domain expertise, interest, etc.

### **Follow-up project**

As detailed in both the sustainability plan and this document, SENSO will continue to maintain, improve and commercialise the technical developments of the project.

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## **Categories**

### **User(s):**

livestock farmers, veterinarians, feed suppliers, public bodies, meat industries

### **Key words:**

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Founding Partners



iSHARE



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