

DATA ECONOMY AND AGRIFOOD DATA SPACE

Let's talk about data-driven agrifood business

Food product manufacturing has long made use of data in its processes. Now, agritech and precision farming enable the acquisition and analysis of data in the primary production part of the value chain as well. In the future, accurate information about food products (metadata) will travel from farm to fork and integrate the whole food chain into the data economy.

The high volume of data along the food chain poses a challenge for the agrifood business: there are over 10 million farms¹

in Europe alone and the supply chains are complex. Efficient use of the data in the sector's business development sets new requirements for data processing and management. We need new solutions and regulations for data ownership.

This fact sheet sheds light on the new European Strategy for Data that sets forth infrastructural data spaces for 9 sectors². Agriculture is one of them. The agrifood business is entering a new era of transparent data sharing – let's find out how to get there.

Hello, reader!

You're holding a fact sheet produced by Food Tech Platform, an Allied ICT Finland network orchestrated by the University of Turku. This leaflet provides you with an easily approachable overview of the data-driven agrifood business. It covers the topic from four different points of view:

Keep reading to find out

- what kind of food metadata consumers value
- which business models thrive in the new data economy
- how Europe is paving the way towards a fair and safe data ecosystem
- why the innovation Europe needs is not only technological, but infrastructural as well

See last page
for a quick
summary!



CONSUMER
BEHAVIOR



BUSINESS



LEGISLATION



SCIENCE &
RESEARCH



CONSUMERS

Consumers want their food with a pinch of data

If the economy is becoming increasingly data-driven, then so are the consumers. They want to know if the food on their plates is sustainable, healthy and safe. The environmental impacts of food production, such as carbon dioxide emissions and the effect of production on biodiversity are among the highest priorities for consumers.

For example, from 2019 to 2020, the amount of American consumers prioritizing sustainable food choices grew by 23%³. In Europe, over a third of consumers (38.9%) support regulations that require farmers and food producers to comply with stricter sustainability standards, and more than half (57%) are in favor of compulsory sustainability information on food labels⁴.

Data on nutritional values, food safety and origin is sought after as well, and plays a significant part in people's purchase decisions. For example, in Finland, a recent study of 1020 participants showed that every other Finn was willing to pay 10% more for a dairy or meat product that originated from well-treated animals⁵. According to previous research⁶, consumers are willing to pay more for food with high quality metadata on credence attributes. Credence attributes signal the quality of products and can only be verified with data. This kind of metadata also makes food products more valuable to consumers⁷.

EXAMPLES OF CREDECE ATTRIBUTES⁸:

- Food safety
- Organic
- Fair trade
- Carbon neutral
- Locally grown
- Place of origin
- Animal welfare

Unfortunately, this valuable and even profitable food metadata often goes to waste because of questionable labeling decisions. According to a study on consumer perceptions of eco-labels, the complexity of the message and large number of closely related labels can make consumers lose interest in, or misperceive the data⁹.

How, then, do you transform the data collected along the agrifood chain into useful information for consumers? Farmers, manufacturers and policymakers need to cooperate and use mutually shared definitions and standards. They should also adopt a more consumer-centric approach when it comes to communicating data-based credence attributes¹⁰. Especially since there are lots of people who are willing and able to pay more for clear information.



BUSINESS

A heads-up for companies: food data increases value and profit

With more food metadata available to consumers, the food business has the potential to transition from a solely material-driven economy to a data-driven one. Companies need to know which data adds value in which markets, product categories and different operational target groups. The rules of the data economy apply in the food industry just like in any other industry.

Food producers able to offer products

backed up by data will increase their value. A study¹¹ conducted in New Zealand showed significant potential gains for the credence attribute of organic (increase of 42% to 67%) and pasture-fed (increase of 36% to 49%) dairy products. Carbon-neutral products are also more profitable (increase of 11% to 25%).

In addition to boosting the consumer demand, food metadata could be valuable for many different actors along the value

chain, such as banks and crop insurers¹². Obviously, data could also help optimize the farming and manufacturing process and increase profitability.

As the agrifood domain has only recently started to generate suitable amounts of data, a new potential market for food metadata has not yet been occupied by any of the big tech players. However, some of the leading agritech and farm input companies, such as John Deere, Bayer, and Yara, have noticed the possibility of positioning themselves as market leaders in agrifood data.

The budding new data market for the food industry also shines light on a refreshing

business model: cooperatives. Owned by their members, cooperatives could offer a more inclusive way of utilizing data. Organized into 'data co-ops', members could share and commercialize data from their farms or equipment using a cooperative governance structure.

Essentially, cooperative members would have a stake in the data space instead of being clients on a platform owned by a large company with the risk of vendor-lock. In the cooperative business model, data producers could provide their data to interested buyers through the data space and gain value from it in exchange¹³.



LEGISLATION

The European Strategy for Data encourages collaboration

The EU considers data a key leverage point in steering agriculture and the food system towards more sustainable practices. Data-intensive agriculture could help us reach the Agenda 2030 Sustainable Development Goals by making agrifood systems more productive, socially inclusive and transparent, for instance¹⁴.

Previously, the EU has been criticized for lagging behind in legislation. But when it comes to developing transparent and safe use of data in different European domains, the Union is a leader. It has created a vision of a fair data economy and develops its own infrastructure models based on European values, such as safety, sovereignty and openness.

There's still a lot of work to be done with value creation models in different data ecosystems and the data economy in general. Not much research exists on these topics yet and there is no systematic terminology¹⁵. Below is a brief breakdown of what European policymakers are doing to develop a fair data economy.

- The European Commission published the **European Strategy for Data** in the beginning of 2020. The strategy sets out differ-

ent measures the EU can take to enable the owners of data to capitalize on it themselves. The Data Governance Act, Digital Services Act and Digital Markets Act are part of the strategy.

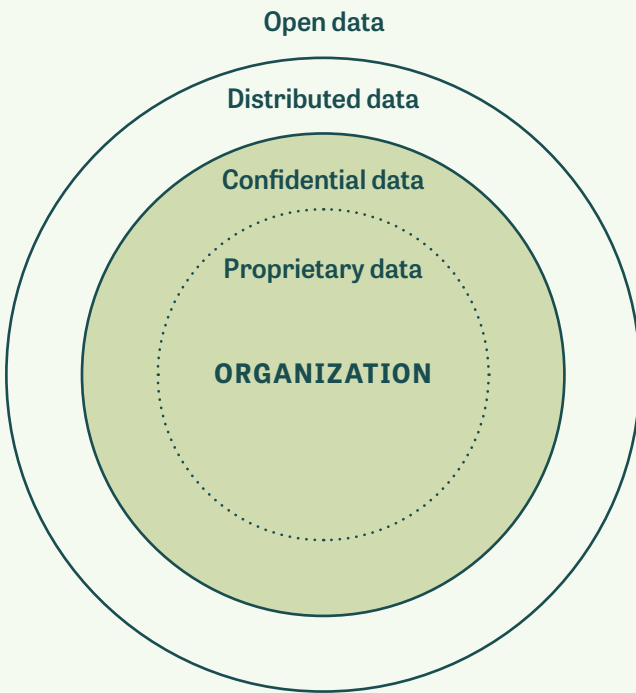
- The strategy lays the groundwork for a new European **data ecosystem**, where different actors can gather and utilize data, innovate, compete and collaborate fairly. The ecosystem brings together and benefits companies, researchers and the public administration¹⁶.
- The data strategy covers nine domains, agriculture being one of them. These domains are called **data spaces**. In adherence to the strategic guidelines, data should be able to travel freely, securely and transparently within and between these data spaces instead of being stuck in silos.

Breaking silos is one of the new data economy's main principles. The data is shared and used according to mutually set rules and legislation, which form a basis for the contractual agreements between data owners and users. Information systems will no longer be designed for a singular purpose, but for wider use¹⁷.

WHAT IS A DATA SPACE?

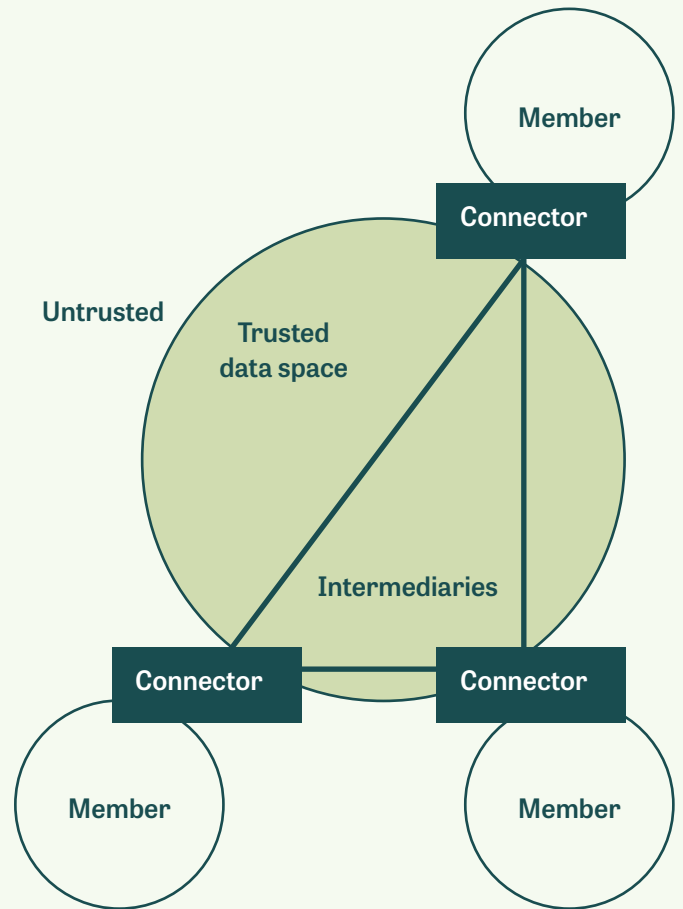
A data space is an infrastructure of data interconnections within a decentralized network of operators. It adheres to European governance principles of secure and sovereign use of data. A data space can be compared to the infrastructure of a public road network: it enables fair interconnectivity for data while respecting data ownership and providing means for self-determined decisions on how and where data is sourced, processed and used within the data infrastructure.

DIFFERENT CATEGORIES OF DATA DEFINED FROM THE PROPRIETOR'S PERSPECTIVE



Graphs: Marko Turpeinen

NETWORK-CENTRIC VIEW ON DATA SPACES



SCIENCE & RESEARCH

The data space acts as an innovative infrastructure

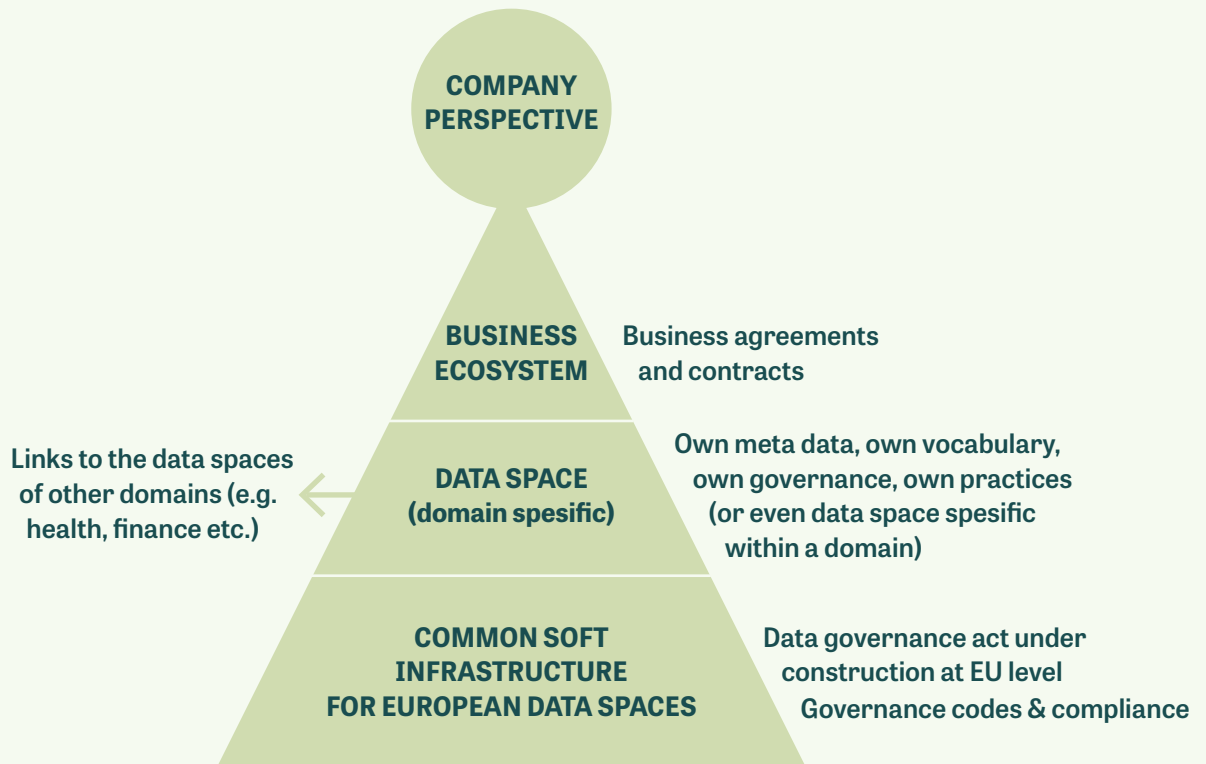
In order for the agriculture sector to fully enter the data economy, it requires a great innovation. This time, however, the innovation is not a new technology, but a new infrastructure. In the age of data-driven agriculture, different organizations need to be able to exchange data in a secure and trustworthy way. It's an essential prerequisite for adding more value to data and developing new business models. This data exchange needs an environment to take place in.

The EU's infrastructure solution for this is the data space mentioned in the previous section on legislation. A data space is a decentralized infrastructure for trustworthy data sharing in data ecosystems. According to a draft made by researchers and policymakers, the data space should consist of three elements: building blocks for effective data exchange, building blocks for data marketplaces where data providers

and consumers can trade data, and a principle of data sovereignty. This means that the data owners would be able to make decisions about how their data is used and shared¹⁸.

A key component of this data space is what researchers and policymakers refer to as a soft infrastructure¹⁹. It should be created in a coordinated way, where all processes ranging from technological to legal are combined. Creating these trustworthy and transparent data infrastructures requires clear legal terms, compliance with standards, and the capability to localize as well as expand data platforms²⁰.

The data economy infrastructure is particularly exciting, since it would be the first of its kind. It's an opportunity for politicians and policymakers, societies, researchers and industries to create a new system based on European values and principles.



The new data economy is built on a collaborative data infrastructure.

Source: Adapted by Laura Forsman from "Open DEI white paper by a task force financed by the European Commission".

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DATA ECONOMY AND AGRIFOOD DATA SPACE

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We hope this leaflet has given you some food for thought. Take your time to digest it! But if you're feeling too full, take these bites with you.

CONSUMER BEHAVIOR



Consumers are willing to pay more for food with quality metadata on credence attributes, such as origin, carbon-neutrality and safety.

BUSINESS



Farmers and food producers able to offer products backed up by data will increase their value. The budding new data market for the food industry provides a good playing field for a refreshing business model: cooperatives.

LEGISLATION



The European Union is building a fair, transparent and shared data economy. The European Strategy of Data has the potential to give Europe a true competitive advantage in data-driven businesses.

SCIENCE & RESEARCH



For the agricultural sector to fully enter the data economy, it needs an innovative new infrastructure. This infrastructure enables data sharing, transparency and sovereignty.

Let's start a dialogue!
Contact the Food Tech Platform Programme Leader Laura Forsman (laura.forsman@utu.fi) and start something exciting.

Food Tech Platform Finland is a food focused research-business network in Finland that brings together companies, startups, science and education communities, and the public sector. Its ambitious aim is to develop a sustainable Food System 2.0. For this purpose, it facilitates the breeding of science-based food innovations and novel business propositions. Food Tech Platform Finland is an Allied ICT Finland powered growth network and is orchestrated by the University of Turku.

