

Traceability systems for animal and plant food supply chains based on blockchain technologies

■ **Blockchain** is an informatic system belonging to the **Distributed Ledger Technology** (DLT): it is a distributed database in which each participant to the blockchain owns a copy of the data identical to the one owned by the other participants and any change applied to the ledger is automatically reflected on the other copies and recorded permanently. A **Time Stamp** is then applied to each transaction, to keep record of the temporal sequence of the changes. By means of this technology, applied to the food supply chain, it is possible to track each step of the process, from the raw material to the finished product on the shelves.

■ The analysed model that I have been focusing on is the pork meat supply chain. My company partner is **OPAS**, a consortium of pig farmers based in Carpi (Mo): together, we analysed their supply chain and their internal traceability protocol, which products suit best for a digital traceability model and what is the principal aim for the company. Concerning this last part, they have a different aim from the majority of the other companies, as, normally, blockchain is used to profile the customers who access to the system, whereas OPAS has the transparency as main purpose, in order to **increase customer trust**, with no interest towards gathering data from who access to the digital traceability system.



Advantages in blockchain use

Food producers and consortiums would benefit from digital traceability as well. Better transparency would distinguish the most righteous food producers as they could demonstrate to follow responsible raw material supply and ethical food regulation systems. Furthermore, the use of blockchain could help to consolidate customers' loyalty and help to find new ones

Consumers would have improved knowledge on the origin of the food, which means also more safety as some studies outlined that hormones, antibiotics and chemicals in meat are one of the most important issue in food safety perception. The other advantage is to have an improved certainty to buy products made by following regulations and disciplinaries, which are usually expensive (PDO products). Through a QR code, the digital traceability model can be accessed, in order to receive all the information enclosed in the digital ledger or, at least, all the data that are visible to anyone who enters in the chain.

Third part control agencies, like USDA, EFSA, etc. could access digital traceability in case of adulteration or contamination problems in the food supply chain and food scandals. Food adulteration has been reported in different countries for different food categories. In several cases, a clearer food supply chain traceability could ease market withdrawal as there will be no need to analyse printed document, which helps to speed the tracking operations of the contaminated or adulterated production batch. If a single production lot is interested by the contamination/adulteration, it can be quickly tracked and withdrawn from sale. Furthermore, control agencies could have access to the first information added in the chain and ease the chemical and genetic analysis.

