

Smart Food Agri-Food Logistics (WP300)

Author: Cor Verdouw, Cor.Verdouw@wur.nl
DLO, tel: +31 (317) 4 84752
P.O. Box 35, 6700 AA Wageningen,
The Netherlands

Date: 23rd January 2012
Work period covered: 2011

Aims and background

The food and agribusiness is an important sector in European logistics with a share in the EU road transport of about 20%. The sector faces specific challenges that heavily impact the required information systems. In particular, there is a high uncertainty regarding fresh product quality as well as available volumes due to variations in the natural production process. As a consequence, the prediction and planning concept and accompanying logistics system needs to be very flexible, enabling last minutes changes and real-locations, but also provide a robust planning. Due to these characteristics the current state of the art of ICT in the agri-food logistics is characterized by large amounts of available data, but there is a poor level of integration and the support for intelligent use of these data is insufficient. The complexity of the current solutions is too high and jeopardizes the development and operation of affordable solutions. As a result, there is a mismatch between the state of information technology in agri-food and the high and increasing need for intelligent solutions that combine interoperability with flexibility and that are both sector-specific and suitable for SMEs. Smart Agri-Food Logistics aims to overcome this mismatch by utilizing the intended development of Future Internet (FI) technologies.

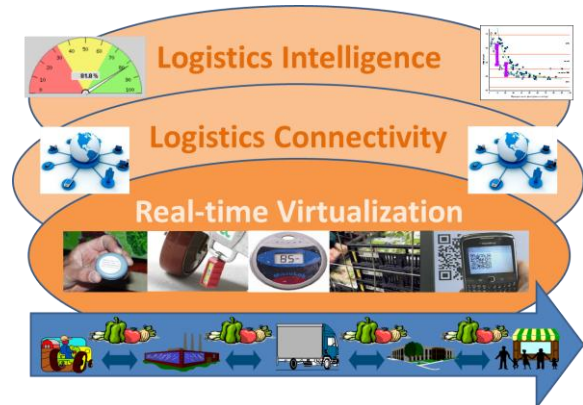
Utilizing the Future Internet for Smart Agri-Food Logistics

The envisaged solutions for Smart Agri-Food Logistics focus on the enhancement of new types of efficient and responsive logistics networks with flexible chain-encompassing tracking and tracing systems and decision support based on that information. These systems effectively virtualise the logistics flows from farm to fork, support a timely and error-free exchange of logistics information and provide functionality for intelligent analysis and reporting of exchanged data to enable early warning and advanced forecasting. Smart Agri-Food Logistics will build on the Future Internet Core Platform that is being developed by the FI-PPP programme. This platform aims at a provision of an innovative infrastructure for cost-effective creation and delivery of versatile digital services, providing high Quality of Service and security guarantees. The basic underlying approach is that the Core Platform will offer reusable and commonly shared capabilities and functionalities (Generic Enablers) which can be flexibly customized, used and combined for many different Usage Areas. **Products** implementing these Generic Enablers can be picked and plugged together with **complementary products** (Specific Enablers) in order to build domain-specific instances. Smart Agri-Food Logistics is intended to be one of those instances (as part of the Smart Agri-Food project).

Results and applications

So far, the Work Package has defined a specification for experimentation on smart-logistics in agri-food supply chains from a user's point of view. It has addressed three basic features of future internet logistics in the agri-food domain (see Figure):

- i) *Real-time virtualization*: decoupling of the physical flows of products and logistics resources (objects), and the information flows for planning, control and coordination/orchestration;
- ii) *Logistics connectivity*: timely and error-free exchange of the information about (lots of) products and logistic resources with other organizations and additional services in order to enable quick response;
- iii) *Logistics intelligence*: intelligent analysis and reporting of the exchanged data to enable early warning and advanced forecasting.



Next, based on the analysis of seven specific application scenarios, an initial set of user requirements is defined and a set of the involved technical enablers is identified, concerning: peer-to-peer services; decoupled/asynchronous transport; mobile services/agents; online profiles; updateable profile for objects; entity authentication/authorisation; automatically add/revoke access rights; identify aggregations of objects; virtual identity; decentralised trust; and mapping of interfaces. These generic enablers are provided to the FI-PPP initiative as input for the realisation of a Future Internet core platform.

The ICT-related functionalities, as defined in the specification for experimentation, will be further considered and elaborated when specifying the conceptual prototypes that are currently in progress.

Significance and benefits

The main contribution is that the Smart Agri-Logistics approach utilizes a generic and standardized internet platform to instantiate specific solutions for logistics information systems in the agri-food sector. As a result, it can overcome current bottlenecks and enables the development and operation of affordable solutions that independent from geographic locations and independent from specific implementation choices. This potentially will boost the application of intelligent information systems for logistics management in agri-food supply chains.

The main added value of such systems for the end users in the agri-food business is the improvement of the efficiency and responsiveness by the real-time management of logistic flows from farm to fork. More specific benefits include:

- Lead-time reduction
- Better service levels
- Less waste, better decay management
- Lower inventory levels
- Better utilization of logistics capacity
- Reduction of GHG emissions and carbon footprint, e.g. decrease of transport kilometres or empty vehicles
- Better competitive position of European agri-food industry
- Surgical response in case of food alert, for quick and precise recall/withdrawal of products

- Better security of food products, avoiding fake products, illicit traffic or threats using food as vector
- Enhanced regulation enforcement control of non-European imported products