



**PPP Annual Report 2019**

PPP projects which are under supervision of the “Topsectoren” must report annually on the scientific content and financial progress. This form is used to report the progress of the content of the project. PPP projects that finish in 2019 should make use of a different form: “PPP-final report.”

**The annual report will be published on the TKI / topsector website. Therefore, please ensure that there is no confidential information in the annual report.**

Please, submit the report before 15 February 2020 to **Hans van der Kolk**

<b>General information</b>	
PPP-number	TKI-AF-18084
Title	SFI: Internet of Food
Theme	-
Implementing institute	University of Technology Eindhoven (TU/e) Wageningen Foods & Biobased Research
Project leader research (name + e-mail address)	Jakob de Vlieg ( <a href="mailto:j.d.vlieg@tue.nl">j.d.vlieg@tue.nl</a> ), Theo Verkleij ( <a href="mailto:theo.verkleij@wur.nl">theo.verkleij@wur.nl</a> )
Coordinator (on behalf of private partners)	Michiel Gribnau, Unilever R&D Wageningen
Project-website address	-
Start date	1 september 2019
Final date	31 augustus 2021

**Approval by the coordinator of the consortium**

The annual report must be discussed with the coordinator of the consortium. The “TKI’s” appreciate additional comments concerning the annual report.

Assessment of the report by the coordinator on behalf of the consortium:	X_ Approved Not approved
Additional comments concerning the annual report:	

**Summary of the project**

Problem definition	<p>With the ever faster changing consumer demands, food industry needs to speed up its innovation and production process to become more efficient and more sustainable.</p> <p>This requires <i>i</i>) better sensing technologies for the development and improvement of production processes (e.g. smart sensor (networks) that can react, predict, reconfigure, etc) and <i>ii</i>) more exhaustive usage and sharing of available and future data and models via a linked data infrastructure.</p>
Project goals	<p>The objectives of this project are</p> <ol style="list-style-type: none"> <li>1) define and set up a digital infrastructure to allow (conditional) sharing of data and models from different computational sources and different data and model owners</li> <li>2) to set the first steps for developing improved sensing systems in food production &amp; data driven innovation processes</li> </ol>

	3) to create a learning community to educate future digital food experts.
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<b>Results</b>	
Planned results 2019	<p><u>Planned Results WP1</u> Q3-2019: A core data resource list containing all relevant data sources in context of selected use (business) cases incl. selection of data science architecture able to manage data and models.</p> <p><u>Planned results WP2</u> Q3-2019: Overview of (traded) products in Dutch food industry (short report) Q3/Q4-2019: Agreed list with selected Key product segments</p> <p><u>Planned Results WP3</u> Preparations for the action based learning workshops</p>
Achieved results 2019	<p><u>Achieved results WP1</u> Data resources have been shared by the companies and the knowledge has been enquired in one-to-one discussions. Based on the outcome of knowledge elicitation for data exchange, the existing ontologies have been identified for reuse. Integrative data science approach for WP1 selected based on FAIR principles and a Microservice Architecture to deal with many (distributed) data sources &amp; measurements from several sensing technologies. A key goal of the future digital strategy is to ensure interoperability and reusability by developing metadata that is machine readable and annotated with resolvable vocabularies/ontologies for (semi)automated integration with other data sources and models. A key challenge is the development of sensitive algorithms to deal with noisy &amp; incomplete data sets. Therefore it is essential to focus/limit WP1 to data sources and models of selected use and business cases. Summary of achievements:</p> <ul style="list-style-type: none"> <li>• Defined use cases for demonstrating how a model sharing platform can be used to make the food production more sustainable</li> <li>• An agreed upon set of requirements for the model sharing platform prototype</li> <li>• An digital strategy based on FAIR principles and an underlying microservice architecture for model sharing platform prototype (as input for demo) was selected</li> </ul> <p><u>Achieved results WP2</u> An overview of traded food ingredients and products is derived from CBS (Verkopen; industriële producten naar productgroep, ProdCom, categorieën 101-108). This dataset, however, is not complete. However, further completing this dataset is beyond the scope of this project. We have decided to fill some details for key product segments later in the project. A first inventory of sensors and sensor systems was made with a broad scope. It was decided to limit the scope of further sensor analysis to emerging technologies. In work sessions with all involved partners, focus cases were chosen: stability of powders and properties of mayonnaise. These will be further analysed in 2020.</p> <p><u>Achieved results WP3</u> The topics for the first two learning communities have been defined as 1) Transparency and accountability of AI and 2) Data Sovereignty. The preparations for the actual sessions have started.</p>

Planned results 2020	<p><u>Planned results WP1</u>  Requirements for model exchange between companies/institutes will be discussed and tested, incl. metadata fields, input output parameters for models will be identified for the first prototype for model sharing ontology. The ontology for data sharing will be developed to ensure interoperability and reusability of data and models. This based on developing metadata that is machine readable and annotated with resolvable vocabularies/ontologies for (semi)automated integration with other data sources and models.  Summary:  Q2-2020: First prototype version of the ontology  Q2-2020: Research infrastructure demo (1st version) for data exchange between companies/institutes, including recommendations for improvements and plan for next project(s).  Q2-2020: Research infrastructure demo (1st version) for model exchange between companies/institutes.</p> <p><u>Planned results WP2</u>  Q1-2020: Generic inventory of sensor systems (report).  Q3-2020: Quantified process flow diagrams for selected key products, including essential and measurable attributes (report)</p> <p><u>Planned results WP3</u>  Q2-2020: Action based learning workshop Transparency and accountability of Artificial Intelligence  Q3-2020: Action based learning workshop Data Sovereignty</p>
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<b>Deliverables/products in 2019</b> (provide the titles and /or a brief description of the products/deliverables or a link to a website.)	
<u>Scientific articles:</u>	-
<u>External reports:</u>	-
<u>Articles in professional journals/magazines:</u>	-
<u>(Poster) presentations at workshops, seminars, or symposia.</u> Abstract submitted and accepted for the EUROPACT 2020 conference.	
<u>TV/ radio / social media / newspaper:</u>	-

Remaining deliverables (techniques, devices, methods, etc.):

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