D4Dairy – Digitalisation, Data integration, Detection and Decision support in Dairying

Project description – 8.11.2018

New technologies are revolutionising the dairy industry. In addition to breeding achievements in genomics, information and communication technologies (e.g. Internet of Things, sensor technology) are also finding their way into modern dairy herds. Instead of punctual measurements, sensors record the well-being of the animals in real time or stream current stable conditions. The large amounts of data generated by monitoring ("big data") promise completely new insights into animal health. Digitalisation is a great opportunity, but also a great challenge for the agricultural and food industry. The transdisciplinary, cross-industry COMET project D4Dairy has set itself the goal of further developing digitally supported management for dairy farms that contributes to further improvements in animal health, animal welfare and product quality through data-supported and integrated information systems.

4D - Concept

Digitalisation: Optimisation of dairy industry production processes along the value chain with the exploitation of new digital possibilities.

Data integration: Integration of farm data (central cattle database system (RDV), sensors, feeding, housing climate etc.) and further integration of external data (e.g., slaughter data) with the aim of developing meaningful herd management tools for prevention and production control, quality assurance and workload reduction.

Detection: The application of new statistical approaches (big data analyses), novel devices (sensors, automatic feeding system) and detection methods (infrared spectra of milk, resistance analyses) enables risk factors and informative parameters to be investigated and derived for early detection of diseases and/or proper treatment.

Decision support: Data-based decision-support tools are developed, e.g., whether or not an animal should be dried off with antibiotics. Data on the pathogen status at the farm, disease history of the animal, environmental factors etc. are processed electronically and a proposal—e.g., for veterinarians—is prepared.

Focus of research:

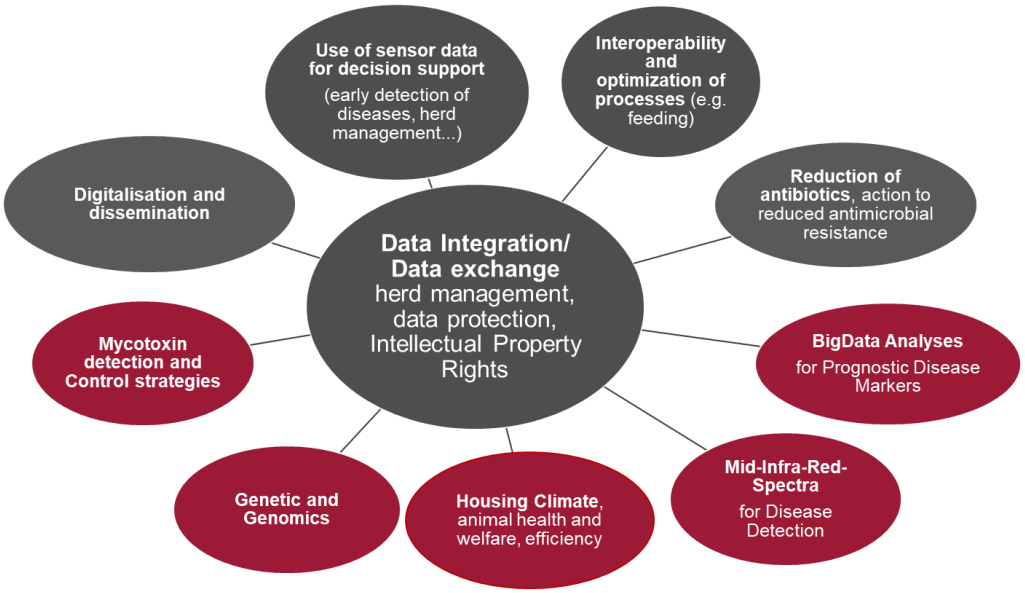

Figure 1: Focus of research within D4Dairy.

The specific objectives of D4Dairy are:

a) Recording and using the large amounts of different data sources on the dairy farm and along the milk value chain.

b) Data integration and data exchange, validation and standardisation, evaluation of different methods of data exchange, taking into account the legal framework, and improvement of interoperability.

c) Complex analyses will be carried out to identify risk factors and new parameters for the early detection of diseases based on MIR spectral data, genomic studies, mycotoxin detection, housing climate and husbandry condition data and the use of big data methods.

d) Development of data-based strategies to reduce the use of antibiotics and to implement quality assurance programmes.

e) Provide the research findings gained from the analyses for use in easy-to-use software tools for farmers to make clear statements and recommendations for action - where possible automated and in real time.

In order to achieve acceptance of an integrated system among farmers and all partners involved, it must be ensured that the data is protected against unauthorised or improper use. To achieve this, questions about data ownership and data security must be comprehensively dealt with and answered.

Expected benefits

- Data exchange (uniform standards,...) - Interoperability of the systems! Only enter data once (calving date, insemination date, etc.)!
- New findings on the development and prevention of diseases
- Simple and meaningful tools for farmers from the large amount of data
- New and better parameters for breeding - higher heritability
- Better tools for early detection of diseases and optimization of herd management (feeding,..)
- Monitoring and improvement of product quality
- Improving the environmental impact through resource savings
- Improving animal health and welfare
- Efficiency gains and improved sustainability

Consortium leader: ZuchtData, Dr. Christa Egger-Danner

Partner of the D4Dairy consortium

In order to tackle these complex and interdisciplinary challenges, D4Dairy is building an internationally competitive, transdisciplinary network of universities, competence centres and research institutes in Austria and abroad, as well as companies along the milk value chain (farmers, breeding organisations, milk processors, animal health services, interest groups, etc.) and - last but not least - national and international technology providers (sensors, feeding, housing climate measurement, data processing). The consortium consists of 31 company partners and 13 scientific partners.

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