Interreg CENTRAL EUROPE
European Union
European Regional Development Fund

Transfarm4.0

REPORT TRANSNATIONAL CAPITALIZATION SEMINAR WITH INNOVATION PERFORMERS

D.T1.2.2 Version 1

R.Streimelweger, J. Karner, C. Rechberger

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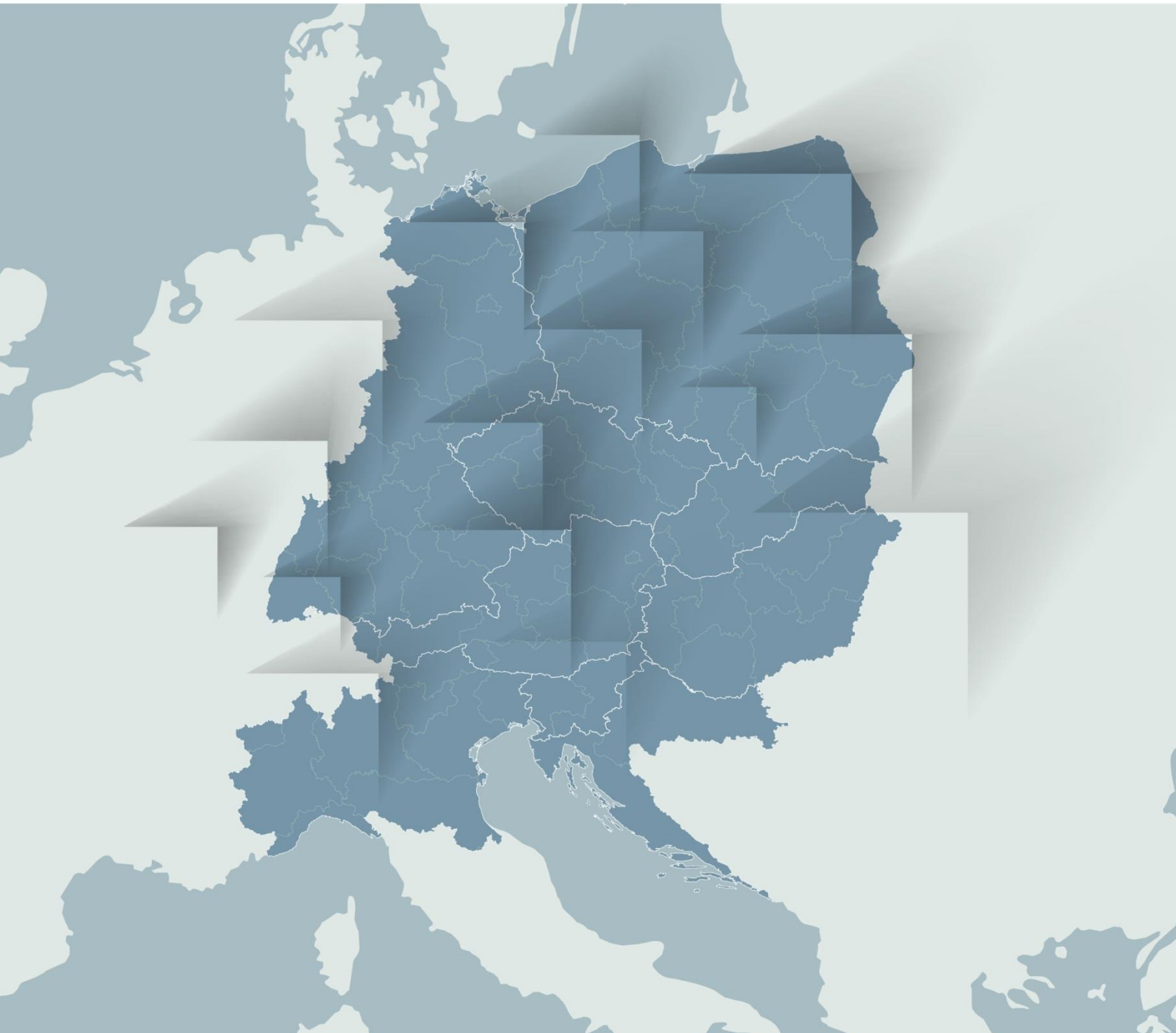


Content

1. Introduction

HBLFA FJ-BLT and Josephinum Research (PP3) have organized on December 4th 2019 an transnational capitalization seminar and it took place at the Linz Center of Mechatronics (LCM) in Linz. External speakers and case studies were involved. The half-day seminar on precision farming made it possible to meet farmers, industrial players, agriculture NGOs, policy-makers, innovation performers, high-profile experts and to learn about positive and negative cooperation key points in transnational projects.

The Participation in the event was free, and an online-registration was requested.

2. Agenda

1) 09:00-12:15 Transnational capitalization seminar with PF innovation performers (D.T1.2.2) (Host FJ - DI Heinrich Prankl)
2) 09:00 - 09:15 Indroduction in goals of the transn. capitalisation seminar - FJ
    - examples of collaborative models between industry + farmers + R&D:
    - key-points (or mistakes) incurred by others networks, to be used when we have to define our TRANSFARM collaborative model / business plan (propaedeutic to the pilot actions) and the role of the innovation broker

3) 09:15-11:15 Presentations from (6 - 8) external experts to present one EU or national project or a valuable experience in the field of precision farming
    - 09:15 - 09:30 Federunacoma external expert
        - **Massimiliano Ruggeri (CEO of Este Technology (on Isobus):** AFarCloud and DataBio H2020 projects
    - 09:30 - 10:00 FRANCISCO JOSEPHINUM external expert
        - **Lukas Handl:**
            1. **"GIS-ELA"**(Geo-information systems for site-specific management aimed at increasing effiency and greening in Austrian agriculture)
            2. **Smart Seeding**
    - 10:00 - 10:15 LINZ CENTER OF MECHATRONICS GMBH external expert
        - **Markus Pichler-Scheder** (Team Leader Analytics)
    - 10:15 - 10:30 UNIVERSITY OF MARIBOR/AE-ROBO external expert
        - **Prof. Cristian Bolzonella:** Project "ROVITIS 4.0"
    - 10:30 - 10:45 SZENT ISTVÁN UNIVERSITY/AGRO ICT CLUSTER external expert
        - **JozsefKranitz and Robert Bors: Eurosmart Llc** ("Practical application of drones in precision agriculture")
    - 10:45 - 11:00 CREA external expert
        - **Prof. F. Marinello**
    - 11:00 - 11:15 KIRG
        - **Filip Mikolajczyk**: CEO of the Hydromont

3. Presentations results

3.1. Massimiliano Ruggeri (CEO of Este Technology (on Isobus): AFarCloud and DataBio H2020 projects

3.1.1. AFarCloud:

- Create a framework to measure all steps in supply chain
- We need more sensors
- 28 functionalities
- AFarCLoud Platform with "Mission Management Tool (MMT)"
- Data are visualised
- Optimal Soil Management: Soil classification -> culture and water classification
- Drones for soil multispectral analyses (RGB, NDRE, CIR, NDVI)
- MMT plan automatically drones flights
- Find optimal harvesting day
- Collars for animal monitoring

3.1.2. AFArCloud collaboration: Lessons learned in that cooperation (key factors for positive (+) and negative (-) cooperation success):

(+)

- Partners in the near are a benefit (geography)
- National network (clusters, etc.)
- People with interest, who want really to create something (a product)

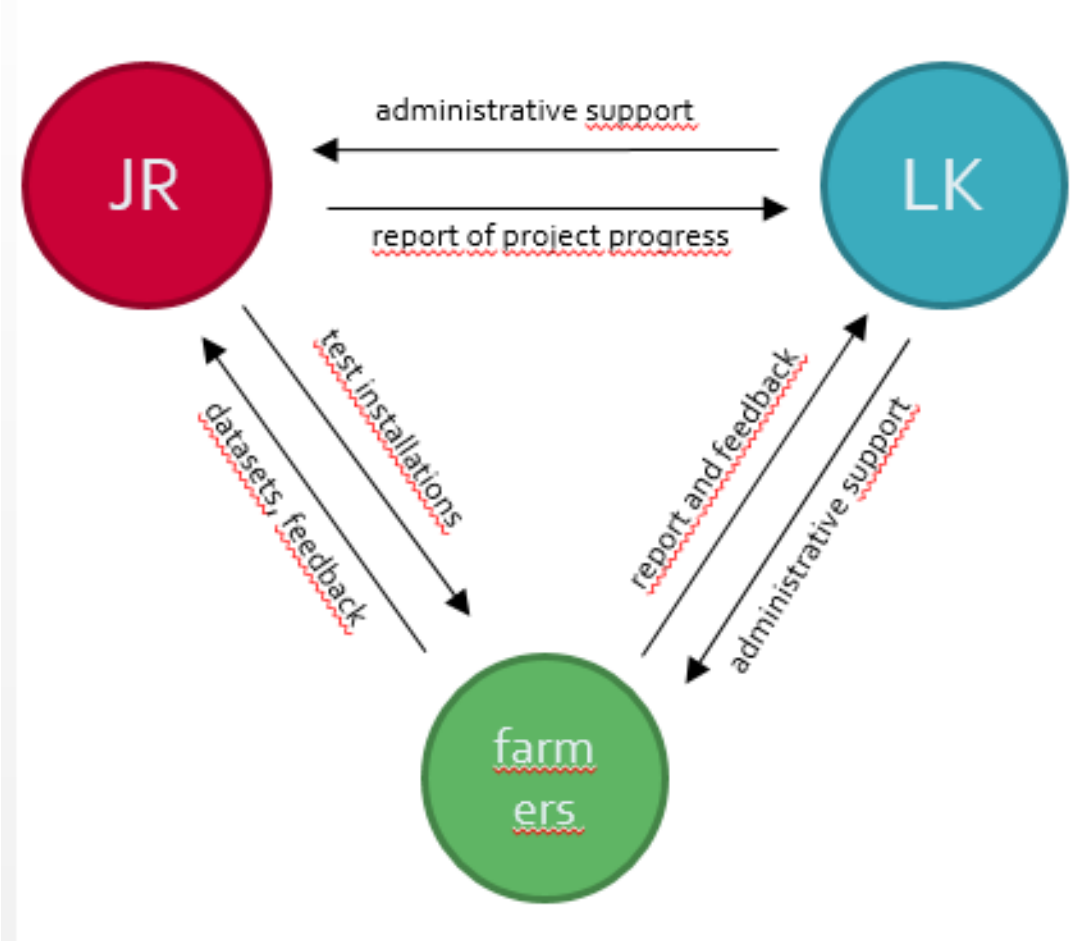
(-)

- Some partners come into the project in an old way (for money)

3.2. Lukas Handl (Josephinum Research):

3.2.1. Project "GIS-ELA"(Geo-information systems for site-specific management aimed at increasing efficiency and greening in Austrian agriculture)

3.2.1.1. GIS-ELA collaboration overview:



3.2.1.2. Collaboration: Lessons learned in that cooperation (key factors for positive (+) and negative (-) cooperation success):

(+)

- Very important to have the people who use the product -> farmer´s demand
- Regularly meetings with farmer -> experience
- Keep it simple

- Plug-in available “Gis-Ela fertilizer”
- practical tests and feedback from farmers
- report of problems in the field
- project meetings with all partners at least once a year

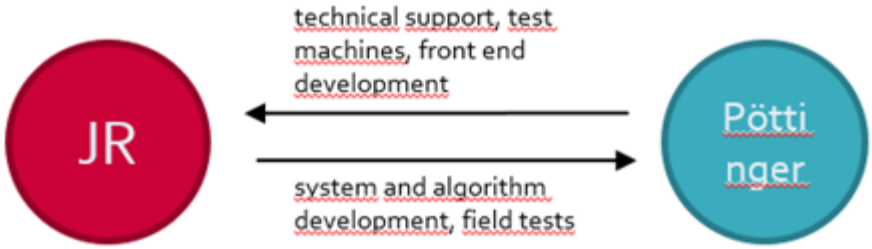
(-)

- big distance to some farmers
- too less recources to aim goals (time and money)

3.2.2. Project "Smart Seeding"

- Project Partner Pöttinger and FJ
- Correct soil roughness -> prevent soil erosion
- Controlling a power harrow

3.2.2.1. Cooperation Overview



3.2.2.2. Collaboration: Lessons learned in that cooperation (key factors for positive (+) and negative (-) cooperation success):

(+)

- Try something on the field: got the help from the company in handling technical problems -> know how from company
- practical tests and feedback from farmers
- report of problems in the field
- project meetings with all partners at least once a year

(-)

- What are the costs of the system or the development?
- big distance to some farmers
- too less recources to aim goals (time and money)

3.3. Markus Pichler-Scheder LCM

3.3.1. Project Driver assistant system in Greenland farming

- With PP Pöttinger – LCM - farmers
- For hay loading -> laser scanner in front of the tractor
- On-line planning
- Robust against
- Driving Speed up to 20 km/h

3.3.1.1. Collaboration: Lessons learned in that cooperation (key factors for positive (+) and negative (-) cooperation success):

- (+)
  - Company provided a test tractor, specifications, test area
  - LCM: system development
  - Pöttinger -> farmers: mowing services
  - Farmers -> Pöttinger: field tests feedback
  - Good support from costumer
  - Quick technical results
  - Very interested & active CEO: prevent going into wrong direction
- (-)
  - Possibility to do tests limited to mowing season
  - No full model of tractor-trailer available

3.3.2. Project SMARTBOW

- Animal surveillance
- Real-time monitoring of locations and wellbeing of animals
- RF ear tag
- Interaction: Smartbow – LCM - farmers

3.3.2.1. Collaboration: Lessons learned in that cooperation (key factors for positive (+) and negative (-) cooperation success):

- (+)
  - Support from partner company (specifications, test stables,..)
  - Farmers -> company: test stables dataset
  - Good support from customer (frequent interaction9
  - Good technical results
  - Successful product available
- (-)
  - Ground truth data and annotation often not easily obtained
  - Decisions from early stage (e.g. battery type) difficult to change later
  - Small farmer benefit of further improvements in certain areas

3.4. Prof. Cristian Bolzonella: Project "ROVITIS 4.0

- Rovitis mean: robots in the vineyards
- Regional project: 50 % of the Italian vineyards
- Yearly field operations huge
- 2 Prototypes: Pantano Rovitis 1 and in Terre Grosse Rovitis 2 (computer vision)
- Solution for small and medium farms
- Sensors: 3D camera + GPS + 3D linear
- Internet: www.rovitisveneto.it

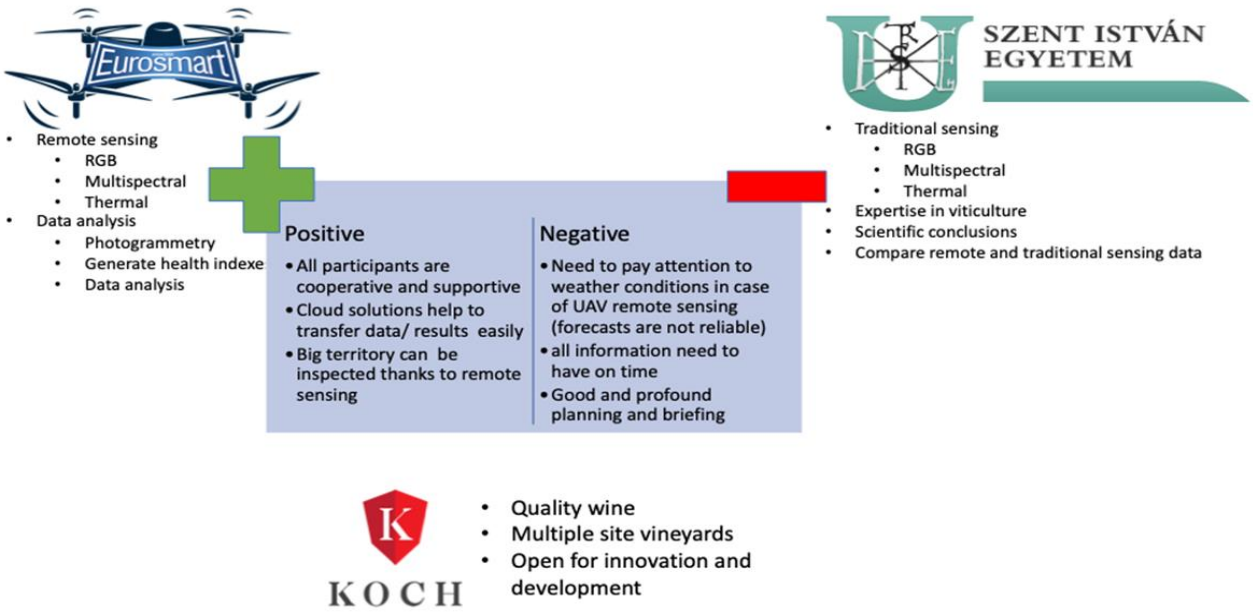
3.4.1. Collaboration: Lessons learned in that cooperation (key factors for positive (+) and negative (-) cooperation success):

- (+)
  - Create a positive little competition between partners
  - Next 3 years test in the field
- (-)
  - No, not in this project

3.5. Jozsef Kranitz and Robert Bors: Eurosmart Llc

- **Eurosmart: family based since 25 years (1994)**
  - Profile: trading with welding kits and equipments
  - UAV division since 2016:
    - Remote sensing in agriculture and energy sector
    - R&D: cloud based solutions and robot arm
  - Co-partners are several universities
- **Benefit:**
  - **Complete solutions + cloud solution for data**
  - **High precision surface**
  - **Aerial photography**
  - **Example: Borota vineyard inspection**

3.5.1. Collaboration Overview



3.5.2. Collaboration: Lessons learned in that cooperation (key factors for positive (+) and negative (-) cooperation success):

- (+)
  - Give some devices to the customer -> giving service
  - Partners (farmers) haven´t time for data analysis
  - You need a good plan -> pre-work time before flight
  - Understand the technology -> not only colored pictures
  - Need of the agricultural knowledge
  - Support of scientific partners

- (-)
  - Understand the technology -> not only colored pictures
  - Traditional approach!
  - Need of the agricultural knowledge

3.6. Prof. F. Marinello

3.6.1. LIFE13 project

- Experimental study for 3 years
- Study area: 23,5 ha divides in 16 plots
- Soil tillage techniques compared
- Application of Precision Farming technologies
- Soil mapping combined with soil samples -> map -> pH, …. -> zone analysis
- Results: crop yield, total energy input and output
- CT…conventional tillage, MT...minimum Tillage, ST…strip tillage, NT...not tillage
- PF raise income
- Water use can be reduced between 15-17% in uniform, lower in conventional
- Synergy between CT and PF to reach high yield
- Project Partner: Together with a company (agricultural machinery)

3.6.2. Collaboration: Lessons learned in that cooperation (key factors for positive (+) and negative (-) cooperation success):

- (+)
  - PF is not only a solution but also an enabling technology
  - PF is very much studied but not enough applied (5% IT, 10% EU)
  - Environmental issues play an important role
  - Big (farm) data will be more and more critical: Lots of data, how we deal with them is a critical factor
  - Based on: company are on the market
  - Producer needs a better feeling, what needs the market
- (-)
  - SWOO(canceled “T”)

3.6.3. How interaction/cooperation in your project looked like between: scientific partners and companies partner (companies-companies or companies-farmers)?

- There was an effective collaboration, where companies were asking for recommendations, in order to improve the design of their machines, and research partners were learning from machinery producers the "feeling" of the market (i.e. the response of the farmers to the new precision based approaches)

3.6.4. Conclusion about Lessons learned in that cooperation (key factors for positive (+) and negative (-) cooperation success):

- Research needs to look for new improvements, but keeping an eye to the real words (i.e. trying to understands what really farmers want to do or are available to try)
- Farmers as well as agricultural machinery producers want to be sure that they profit will increase: this is often difficult because 1-3 years of a project is not a sufficient time

3.7. Filip Mikolajczyk: CEO of the Hydromont

3.7.1. Drones

- Types of drones
- Components -> carbon, frame, motor, speed controller, propeller (3 or 1)
- Sensors, etc.

3.7.2. Collaboration: Lessons learned (key factors for positive (+) and negative (-) cooperation success):

- (+)
  - Very important to share the knowledge
  - Producer needs a better feeling, what needs the market
- (-)
  - Avoid to repeat mistakes

3.8. Round Table: Conclusio of the Transnational Capitalization Seminar (Morning session)

3.8.1. How can we benefit from an international cooperation? Open data

- Problem with open data: competition in the market -> costs
- Same problem with patents
- Different: same problems in different countries, it is very important to share knowledge
- Direct Sensors need a critical mass -> share data optimize the functionality/precise
- Food has to become more value
- Responsibilities private and public
- Global problem -> big data of data
    - Regional problem -> Precision Farming less data, **simplify the process is the only way for PF dissemination (example FarmDok)**
    - Agriculture is a slow system: a change needs generations
- A lots of facts -> you cannot do the same in one country the same way in another country.

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- The farmer needs the basically knowledge in agriculture (stomach feeling). If there where in the future no need of this feeling in the stomach you need any more a school for agriculture-> Technology can assist the farmer, but not remove the farmer through technology
- Cooperation between farmers and scientific institution: agricultural knowledge is more and more important for solve and create solutions
    - Where put the sensors, etc must be done by the technician
    - Which soil is it, etc is the part of the agricultural experts
- Some decision are (automated) by the system and help the farmer
- Collaboration (example in Hungary):
    - Mikosense website von Eurosmart: very easily calculator for indices
    - Collaboration easier between Uni and company, because the easy handling of row data
    - How can we share data from a single farm?
    - USA: farmers data network; the big data collectors are big companies
    - How will it be managed in future, that the profit is shared in future?
- Trust -> trustful cooperation is essential precondition for a successful cooperation