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EUROPEAN AGRICULTURAL MACHINERY

Agriculture 4.0 – the Challenges Ahead & What to Do About Them

Ulrich Adam, CEMA Secretary General

Club of Bologna

Hannover, 12 November 2017

Smart Farming/Digital Farming/Agriculture 4.0: Clearly One of *THE* Biggest Global Opportunities!

GLOBAL OPPORTUNITY REPORT 2016:

Smart Farming is

"…a mature opportunity, adaptable across geographies and scale, and with readily available solutions in the market."

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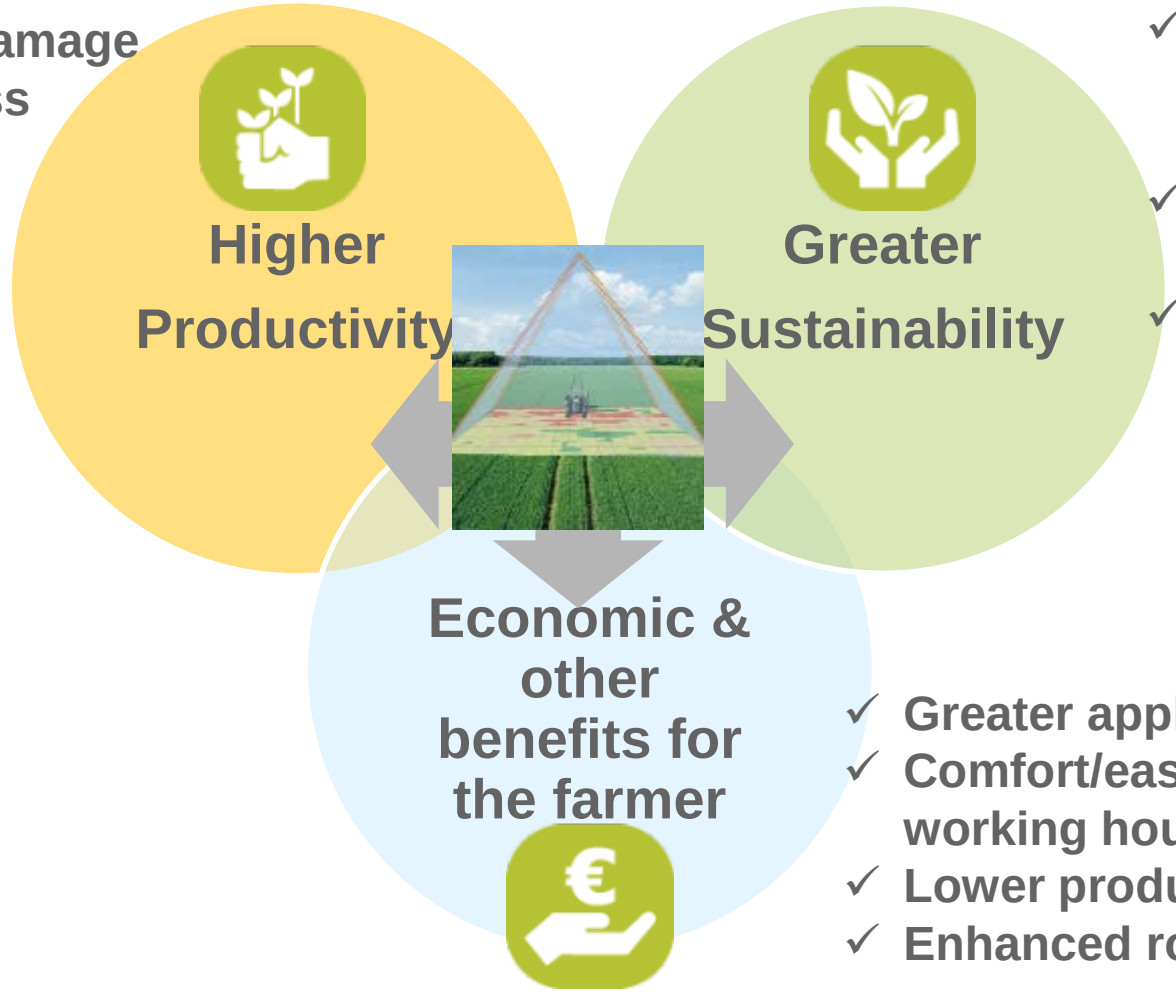
What Do We Mean by Agriculture 4.0…

Information technology for the masses….



Plentiful Benefits: the Environment Will Be Protected by Agriculture 4.0!

- ✓ Higher yield
- ✓ Less crop damage and crop loss



- ✓ Less inputs (fuel, water, fertiliser etc.)
- ✓ Higher use efficiency
- ✓ More environmental protection

- ✓ Greater application speed
- ✓ Comfort/ease of work: reduced working hours (automation)
- ✓ Lower production costs
- ✓ Enhanced road safety

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QUESTION: How Will Agriculture 4.0 Impact the Supply Chain?
ANSWER: All of it!

Better use of IT will…

- Optimise the inputs (Precision Farming)
- Manage mechanisation more efficiently & use of energy resources
- Enhance crop storage techniques & reduce crop losses
- Provide better information about market demand & seasonal fluctuation
- Improve transport & logistics services
- Optimise retailer stocking & storage (less waste)

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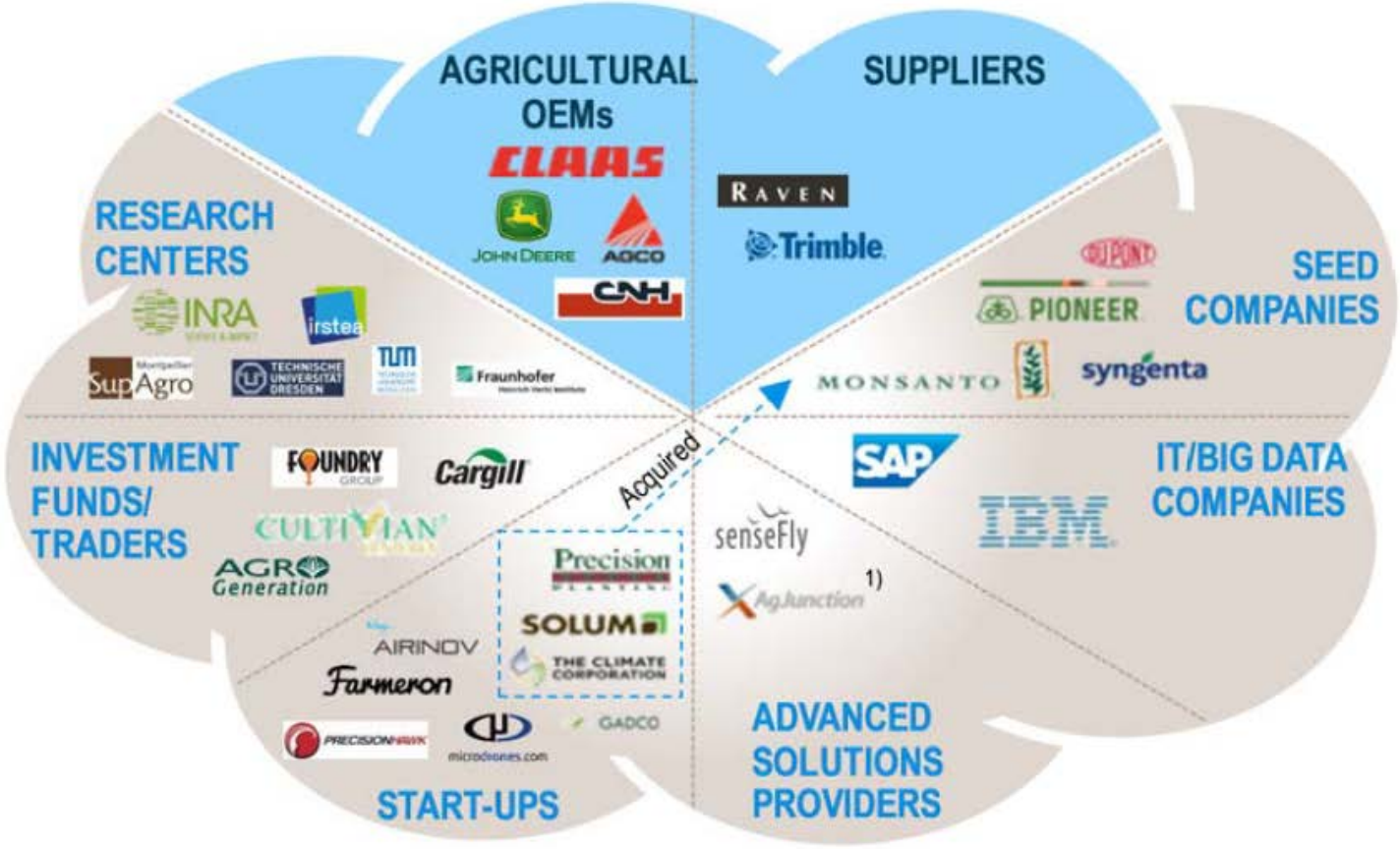
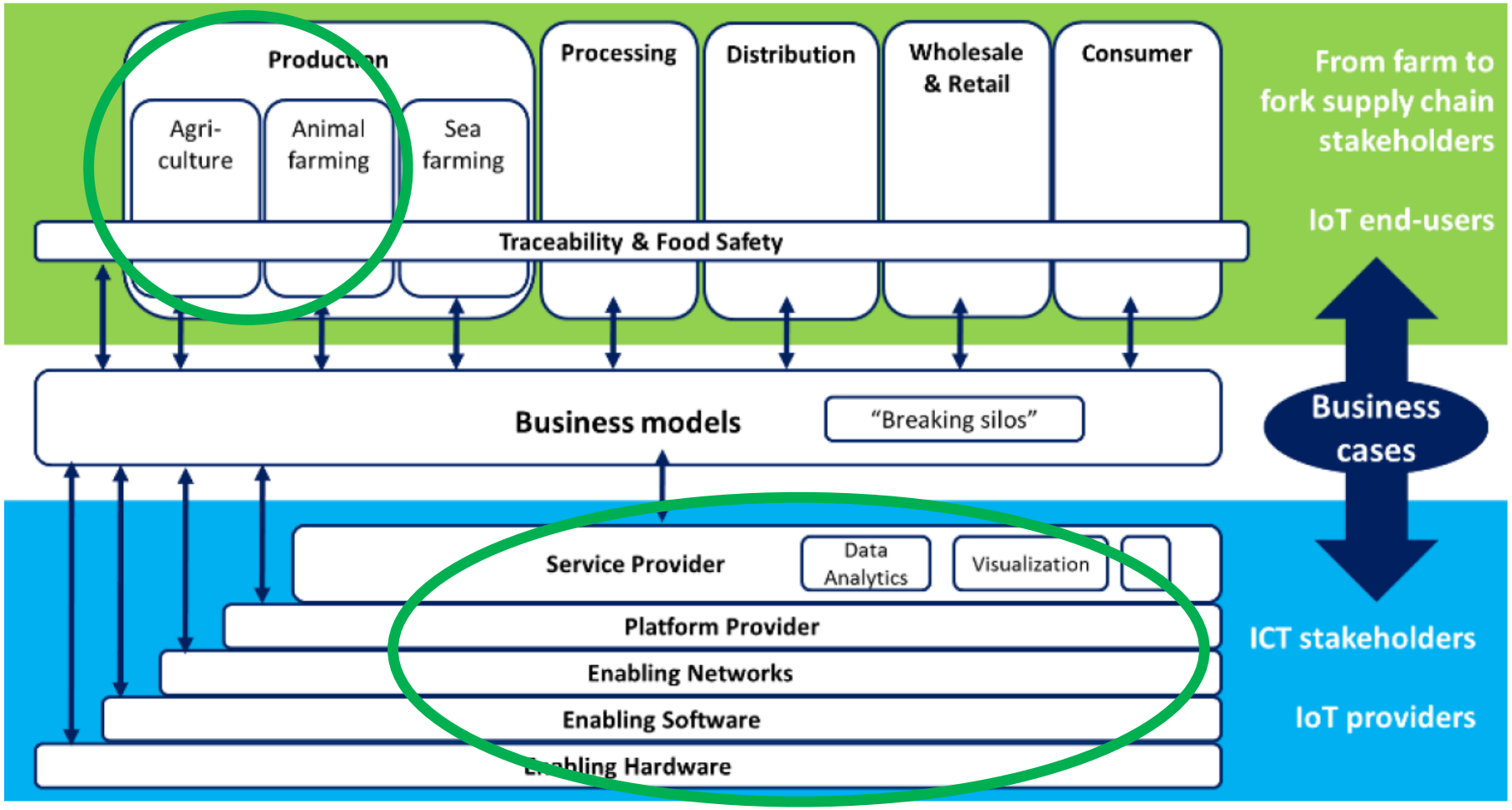
Agriculture 4.0: a new Mix of Players



1) Providing guidance system and cloud service at the same time

Source: Expert interviews; desk research; Roland Berger

Agriculture 4.0: a Changing Business Landscape … with Lots of (New) Players!



Source: AIOTI WG6

Agriculture 4.0: a Changing Business Landscape … with Lots of (New) Players!

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JOHN DEERE

Equipment Finance Parts & Service Contac

NEWS RELEASES SEPTEMBER 12, 2017

Deere & Company Completes Blue River Technology Acquisition

MOLINE, Illinois (September 12, 2017) — Deere & Company (NYSE: DE) announced today that it has completed its acquisition of Blue River Technology. Earlier in September, Deere said it signed a definitive agreement to purchase the Sunnyvale, California company to enhance John Deere's leadership position in precision agriculture.

Blue River has designed and integrated computer vision and machine learning technology that will enable growers to reduce the use of herbicides by spraying only where weeds are present, optimizing the use of inputs in farming –

DroneDeploy, CNH Industrial Collaborate on Farming Package

FEBRUARY 23, 2017 01:42 PM

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NEWS RELEASES

AGCO to Acquire Precision Planting from The Climate Corporation

July 26, 2017

AGCO, Your Agriculture Company, (NYSE:AGCO), a worldwide manufacturer and distributor of agricultural equipment and The Climate Corporation, a subsidiary of Monsanto Company (NYSE:MON), announced today that a definitive agreement has been signed for AGCO to acquire the Precision Planting LLC equipment business.

"Precision Planting is a strong business that plays an essential role in the growth and adoption of innovative precision ag practices that help farmers enhance their productivity," said Mike Stern, chief executive officer for The Climate Corporation. "As a leading global equipment manufacturer, AGCO is uniquely positioned to enable broader distribution of Precision Planting technology and will continue the development of innovative products that improve the efficiency and productivity for farmers around the world."

"The acquisition of Precision Planting will solidify AGCO as one of the global leaders in planting technology and strengthen our position as a full line partner for professional farmers across the globe," said Martin Richenhagen, AGCO's chairman, president and chief executive officer.

The Climate Corporation's Climate FieldView™ digital agriculture platform will retain connectivity with Precision Planting's 20/20 SeedSense monitor.

The terms of the agreement were not disclosed. The transaction is subject to regulatory approvals.

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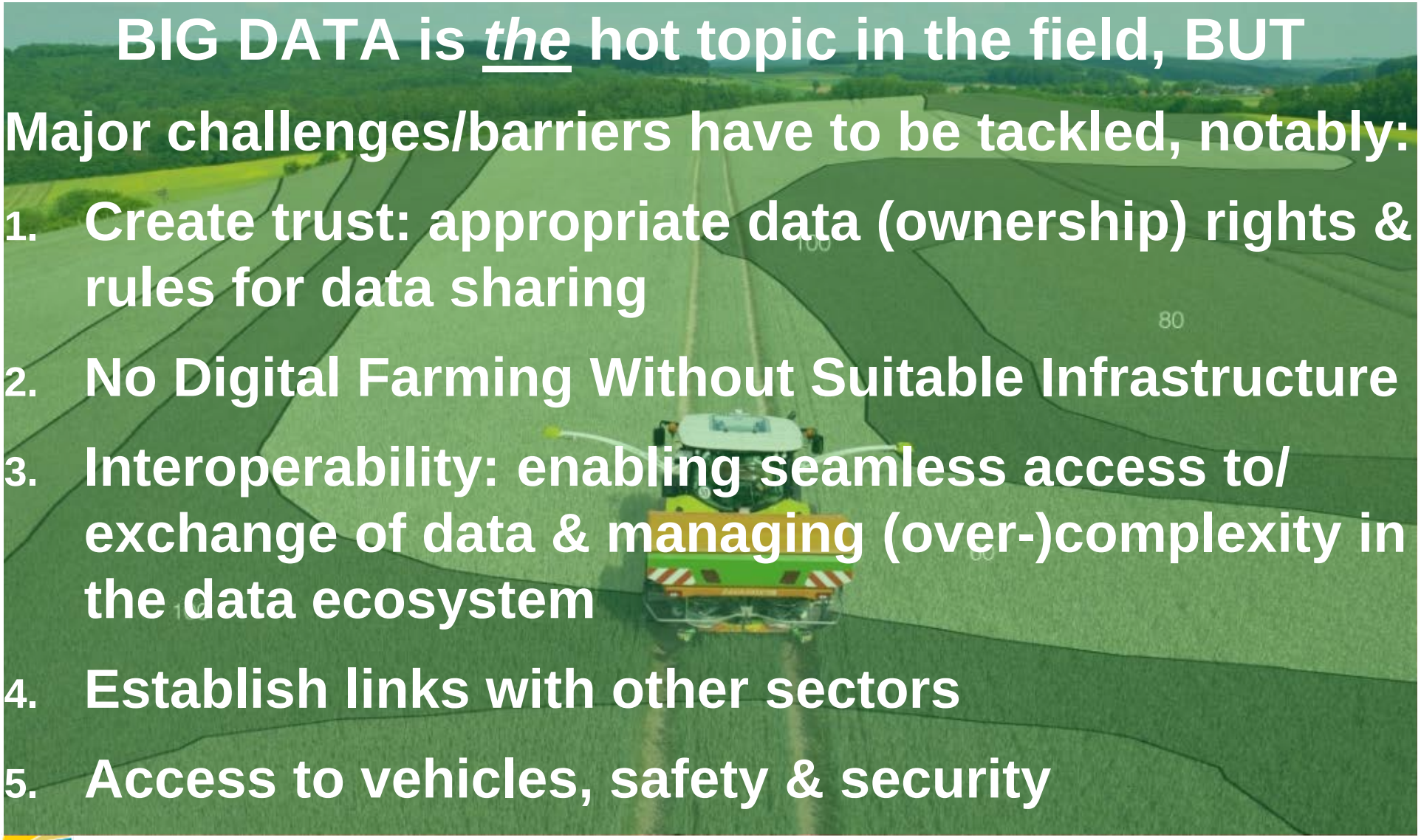
Using Data in Agricultural Primary Production



BIG DATA is *the* hot topic in the field, BUT

Major challenges/barriers have to be tackled, notably:

1. **Create trust: appropriate data (ownership) rights & rules for data sharing**
2. **No Digital Farming Without Suitable Infrastructure**
3. **Interoperability: enabling seamless access to/ exchange of data & managing (over-)complexity in the data ecosystem**
4. **Establish links with other sectors**
5. **Access to vehicles, safety & security**

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1. Create trust: appropriate data (ownership) rights & rules for data sharing

"In several surveys and other research efforts, growers repeatedly cite concerns over sharing data with 3rd parties as a main reason they are not comfortable using new products and services resulting in much of the data collected going unused. The issue of data ownership may seem pretty simple and straightforward, but there are many layers to dig through."

'The Dirt on Data Ownership', by Ben Craker (July 2017)

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-toilets-for-wifi-because-t-1796959482

22,000 People Agree to Clean Toilets for WiFi Because They Didn't Read the Terms

Rhett Jones
7/16/17 11:06am • Filed to: TERMS OF SERVICE

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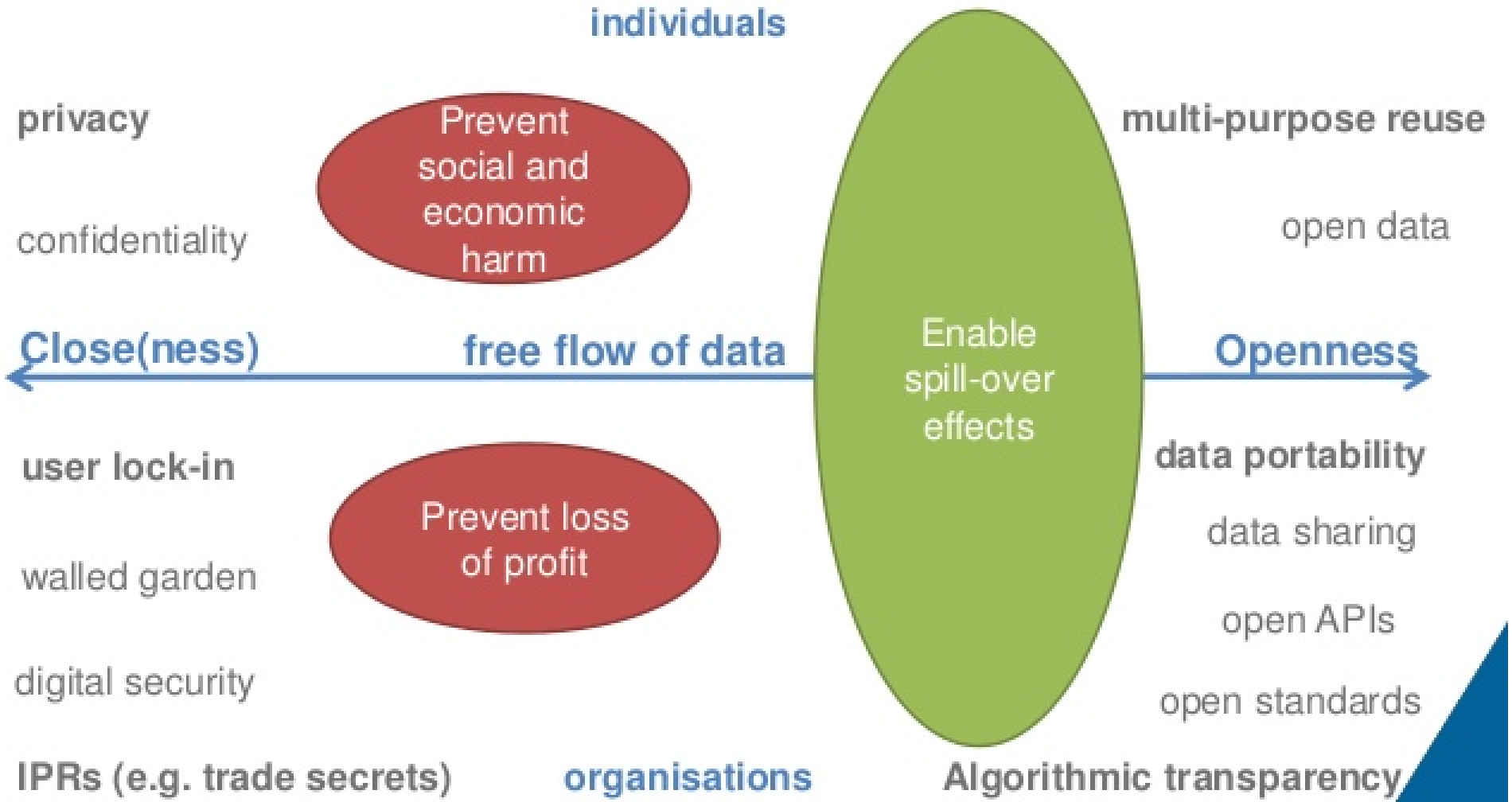
Striking the right balance between "openness" and "closeness"



Source: OECD

Needed: Trust in Data (Ownership) Rights, Clear (Contractual) Rules for Data Sharing

- **TRUST IS KEY TO ENCOURAGE DATA SHARING**

✓ Farmers are the **data originators** of the data gathered on the farm or during farm operations

✓ They are more than willing to share data if there is also a benefit for them and they understand the risks

✓ The solution to unlock the data is clear rules and transparency for contracts with farmers.

…and farmers have many contracts…

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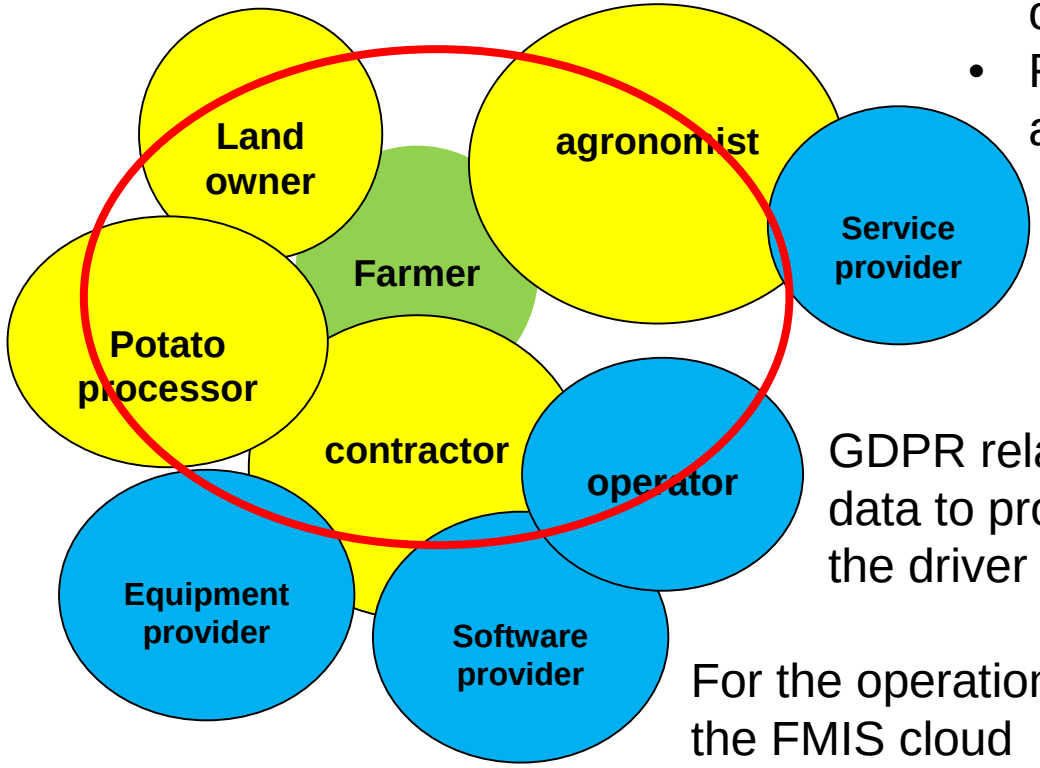
Needed: Trust in Data (Ownership) Rights, Clear (Contractual) Rules for Data Sharing

CASE EXAMPLE: *A farmer is renting land to grow contracted potatoes. A contractor does the work on the field. The farmer is using an external agronomist for data-related activities.* ***Contracts to put in place for data exchange****:*

- For the operation of the data systems
- For the usage of the data for machinery related purposes
- For sharing data with external parties (dealer, sub-contractors)



- For the nitrogen optimisation application
- For the chemical application optimisation

GDPR related data to protect the driver

For the operation of the FMIS cloud system

Codes of Conduct

USA:

Home / Issues / Technology / Data Privacy

Privacy and Security Principles for Farm Data

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The recent evolution of precision agriculture and farm data is providing farmers with tools, which can help to increase productivity and profitability.

As that technology continues to evolve, the undersigned organizations and companies believe the following data principles should be adopted by each Agriculture Technology Provider (ATP).

It is imperative that an ATP's principles, policies and practices be consistent with each

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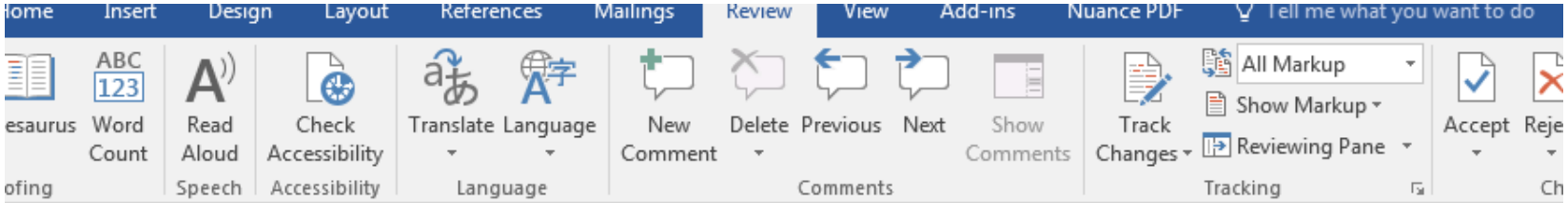
New Zealand:



AT(17)4188:1 – DA/mvs Last update: 27th October 2017

EU CODE OF CONDUCT ON AGRICULTURAL DATA SHARING

INDEX - ONE PAGE SUMMARY (POCKET GUIDE)

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EU Code of Conduct on Agricultural Data Sharing – Core Objectives

- Define common understanding of best practice rules & principles on access/re-usability rights for agricultural data (“ownership)
- Achieve broad sectorial consensus in agriculture on the issue: obtain support by as many relevant stakeholders as possible
- Raise awareness, sensitize & inform farmers and sectorial actors about the issue (translations)
- Work with the EU Institutions (European Commission) to inform and shape future EU initiatives (e.g. horizontal guidelines) etc.

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EU Code of Conduct on Agricultural Data Sharing – Structure & Underlying Principles

II. General Principles/Definitions

III. Code of Conduct

- Attribution of the underlying rights to derive data (Also referenced as data ownership)
- Portability
- Privacy/Security
- Liability & IP Rights

IV. Annexes

i) Model Cases/Case Studies (Examples)

ii) Regulatory Framework

iii) Contract check list for agricultural data

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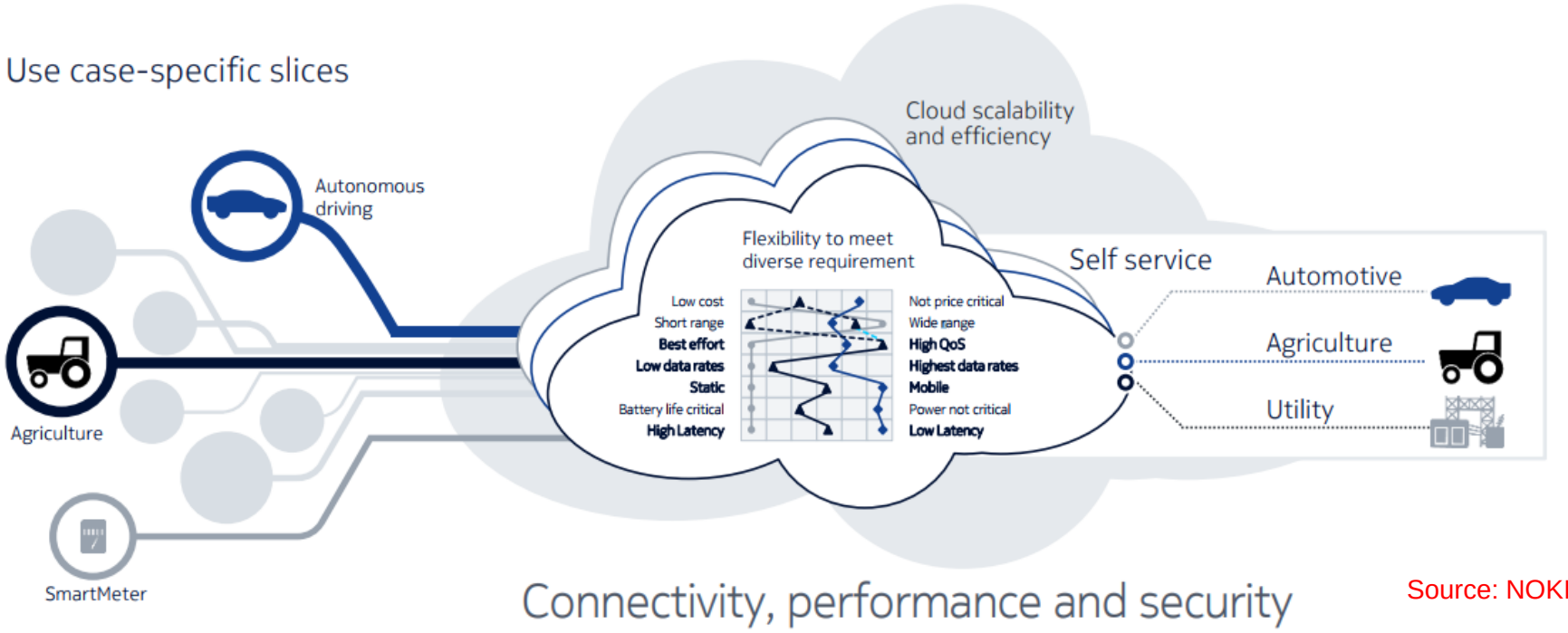
2. No Digital Farming without Suitable Infrastructure

- ✓ Follow-up on communication technologies suitable for agriculture (ITS-G5 / IEEE 802.11p 4G-V2X – 5G-V2X)
- ✓ CEMA cooperation with the European Broadband Competence Offices Network and Support Facility



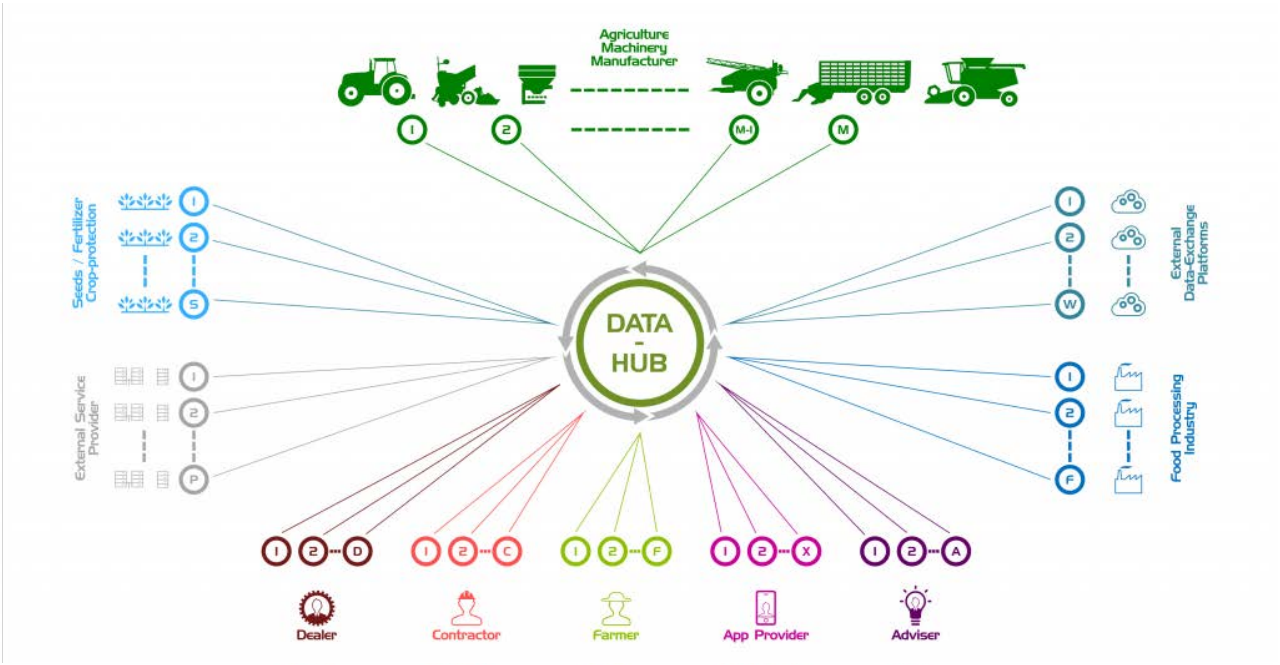
Source: NOKIA, Ulrich Rehfuess

3. Interoperability: enabling seamless access to/ exchange of data & managing (over-)complexity in the data ecosystem

- ✓ Same terminology/protocols for data exchange between machines, machine to cloud / Farm Management Information System /…
- ✓ Main actor is AEF

INTEROPERABILITY

+



Source: Johannes Sonnen, DKE-Data, Dresden 9/2016

4. Establish links with other sectors

KEY TO GET OFF THE AGRICULTURAL ISLAND IS COLLABORATION with OTHER PLATFORMS:

- ✓ First Use Case on interaction with e-Mobility via ETSI (European Telecom Standardisation Institute)

Source: silver medal agritechnica 2017 CLAAS

- ✓ Final goal: enhanced interaction/exchange of understandable data with other vertical sectors

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5. Access to Vehicles, Safety & Security

- ✓ **FACT:** Vehicle manufacturer is responsible for safety, security & vehicle integrity
  - ✓ At market launch
  - ✓ Over the vehicle lifetime
- ✓ **ISSUE:** This is a specific challenge for connected & automated vehicles that can be accessed remotely in the future

WAY FORWARD

- ✓ "Extended vehicle" (vehicle + off-board server) which ensures access by a 'remote' server – no direct remote access to vehicles shall be allowed.
- ✓ Under clear conditions including on the data to be exchanged, the safety & security, the return of investment, the interoperability, restrictions on access when the vehicle is moving, etc…

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Agriculture 4.0 – Working Together to Master the Challenges to Reap the Benefits: CEMA's Approach

- Strong need for multi-stakeholder action, particularly the cooperation with researchers and the farming community to promote information about and trust in digital technology.

copa cogeca
european farmers european agri-cooperatives

Ceettar

smart AKIS
Smart Farming Thematic Network

fertilizers europe

IOF 2020
INTERNET OF FOOD & FARM

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Long-term structural challenge: low customer pull! Slow uptake of innovation & slow fleet renewal

- Uptake of innovative farm machinery in the EU is slow
- Example of Germany:
  - 1.2 million tractors registered in Germany
  - Average tractor age: 27.5 years
  - Fleet replaced at rate of merely 33,000 new tractors per year
  - Average passenger car: less than 10 years old
- **NB:** investment cycles & amortisation rates in farm machinery much longer than in the automobile sector!

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AgriTech 2030 focuses on three key areas of work:

1. Maximizing the industry's contribution to highly productive, competitive, sustainable farming methods with high safety standards

2. Bringing European farming to the forefront of Digital and Precision Agriculture

3. Strengthening Europe's industrial & technological leadership in advanced farm equipment

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1. Maximizing the Industry's Contribution to Highly Productive, Competitive, Sustainable Farming Methods with High Safety Standards

- The EU must recognize the intrinsic link between the farm machinery industry & agriculture in all relevant policies and strategies.
- An ambitious, coherent, forward-looking EU regulatory agenda for the farm machinery industry is critical. EU industrial, digital, environmental and agricultural policies must be aligned to provide a coherent supportive framework.
- EU legislation must focus on actions appropriate to the machinery usage and operation, rather than the "copy-paste" from the automobile sector which has added significant costs in recent years for little or no added value.
- The EU should put a greater focus on self-regulatory mechanisms, including self-testing (to avoid burdensome authorisation procedures that are too complex and too costly for small product series and for the many SMEs active in the industry).

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2. Bringing European Farming to the Forefront of Digital & Precision Agriculture

- Providing via CAP after 2020 direct support measures for the investment in green digital and precision technology.
- Making available use-related EU research funding (such as large-scale pilots and digital testbed projects like IoF2020) in order to pave the way for a successful and rapid uptake of digital technology in farming.
- Strengthening investment in rural broadband across the entire EU to establish a robust digital infrastructure for this farming revolution.

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3. Strengthening Europe's Industrial and Technological Leadership in Advanced Farm Equipment

- Providing EU research funding in the most promising technology areas, notably automation, robotization, and digital connectivity.
- Supporting machine developments which promote process-efficiency, CO2 reductions in agriculture and high standards of safety, including the industry's pledge to cut on-road fatalities with farm machines in Europe by 50% by 2035.
- Promoting export of high-quality, high-technology, environmentally respectful European farm vehicles to increase share of third markets with high growth potential.

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Agriculture 4.0 – a Unique Opportunity: Working Together to Master the Challenges/Disruption to Reap the Benefits!

- **Industry:** promote ease of use, reduce complexity of the technology, ensure seamless compatibility of machines & systems
- **Farmers/operators/agricultural contractors:** more digital skills will be needed; farm operator education should focus more on e.g. farm management acumen, technical/IT know-how
- **Government/Policymakers:**
  - **Infrastructure investment:** financial support of the deployment of the communication technologies (rural broadband, 5G etc.) to allow system networking
  - **Unlock public data** like geodata by harmonising & facilitating access
  - **Active support for Agriculture 4.0 technologies:**
    - Support for adoption/uptake (investment support/subsidies, EU CAP post-2020)
    - Future development (research funding, appropriate regulation)

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Thank you!

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