

# *Agricultural cooperatives and digital technology*

What are the impacts? What are the challenges?

2016



# Introduction

## 01 The agricultural industry recognises that digital technology is a key issue, offering significant value-creation opportunities

- For all the cooperatives surveyed, the development of digital technology was considered to be a key issue among the five major trends that are shaping tomorrow's world (demographics, emerging countries, urbanisation, the environment and technology). The agricultural industry is generally more connected than average and has historically led the way in embracing new technologies such as GPS. The industry has launched numerous digital development initiatives to explore new practices and services.
- Using mobility, data analysis and connected device technologies is seen as a way to optimise processes and harness added value, particularly for members.
- The cooperatives surveyed highlighted how complicated it is to fully understand the impacts of digital technology as it reaches across all activities and affects all operations. Although digital technology is seen as potentially ground breaking in certain fields such as precision agriculture, it is more generally perceived as a catalyst for process optimisation and the development of agricultural cooperatives.

## 02 Although they have already deployed practical initiatives based on digital technologies, cooperatives see today as a turning point

- Precision agriculture's promise to "consume less while producing the same, or even more" has won over all the cooperatives, which have developed different services to assist their members. Data-capture and site-specific management technologies are becoming more established and are developing rapidly. The main concern regards the ability to use the data to identify the best solution, given the open and complex environment, as well as the "long" data-production cycle.
- The extensive business ecosystem of agricultural cooperatives (members, customers, suppliers, other cooperatives, etc.) has encouraged them to be among the first to adopt the digitisation of information exchanges with their different partners, particularly members. More than half of the cooperatives have also introduced, or are considering, collaborative working initiatives.
- Cooperatives also use digital technology to optimise production, supply-chain, maintenance and traceability processes, mainly through the effective use of data.
- French cooperatives have an understanding of the issues and a degree of maturity comparable to cooperatives in other countries.

## 03 Aside from the issues related to target value chains and technologies, the main challenges encountered revolve around the human factor

- Technologies have progressed significantly but the key issue for the majority of the cooperatives lies in their choice, implementation and effective use. The IT architecture needs to evolve to combine robust core processes with flexibility in the peripheral functions. The ability to effectively use data has been enhanced along with the collection of data, which must also be safeguarded. However, data transmission between the various tools remains a limiting factor.
- Although digital technology is often addressed at senior management level, various models exist in terms of governance, with varying degrees of decentralisation. Cooperatives have strengthened their teams to acquire the skills necessary for this transformation and have rolled out cross-functional and collaborative working methods that increase agility. Numerous partnerships with suppliers, universities and other cooperatives have been put in place to pool resources and reduce costs.
- Data ownership laws and regulations are a source of concern but not a barrier to continued progress and the challenge for cooperatives is still to demonstrate the value added through data sharing so that it is accepted by everyone.



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Dear readers,

We are proud to share with you our seventh annual report on agricultural cooperatives, prepared on the basis of interviews carried out with leading French and international cooperatives.

As we have pointed out in our previous reports, the value chain of agricultural cooperatives is being transformed by five major global trends, and certain activities have been significantly impacted by the development of technologies that have agricultural applications. Cooperatives have identified digital technology as a key driver in responding to their main challenges of creating value for their members, satisfying rising food demand, keeping in step with changing consumer behaviour and strengthening competitiveness.

Cooperatives are beginning to implement digital initiatives. Precision agriculture technologies are booming, data generated by agricultural activities are collected and analysed to provide valuable information, links between the cooperatives and their different stakeholders, particularly members, are now electronic, and digital technologies have given new momentum to food traceability that is becoming increasingly farm to fork.

As part of the transformation, cooperatives are facing four major challenges and must change their model to meet them. Their strategy should incorporate the opportunities that new tools have to offer, before they are seized by newcomers to the industry. The technologies are still in their early stages and applying them to the cooperatives' business ecosystem remains complex. People play a central role in digital technology and must adapt to the new working methods and skills required, particularly through the implementation of appropriate governance.

As a final point, French law applicable to data from the agricultural industry is a source of concern as it is insufficient and inconsistent.

With this in mind, we think that digital transformation represents a significant challenge for cooperatives, but also a real opportunity to create value, particularly for members.

This report presents a review of the digital transformation underway in the cooperatives and identifies the challenges it raises.

We hope you enjoy reading it.

## Acknowledgements



*Special thanks go to the cooperatives that contributed to the review via interviews, which are quoted extensively throughout this report.*

# Introduction



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# Five major trends will transform the cooperatives' environment over the next 30 years

*Population growth*



*The emergence of new economic powerhouses*



*The increasing pace of urbanisation*



*Climate change and the scarcity of resources*



*Technological breakthroughs*



## *Of all the technological breakthroughs, digital technology is a key issue for farmers and cooperatives; they have already embraced*

Farmers have **led the way** in embracing new technologies such as GPS, which they have used on their tractors since the 1990s.

Today, they are **better equipped than the average** member of the general public in terms of computers and laptops, and the number of farmers with tablets and smartphones has been increasing since 2013.

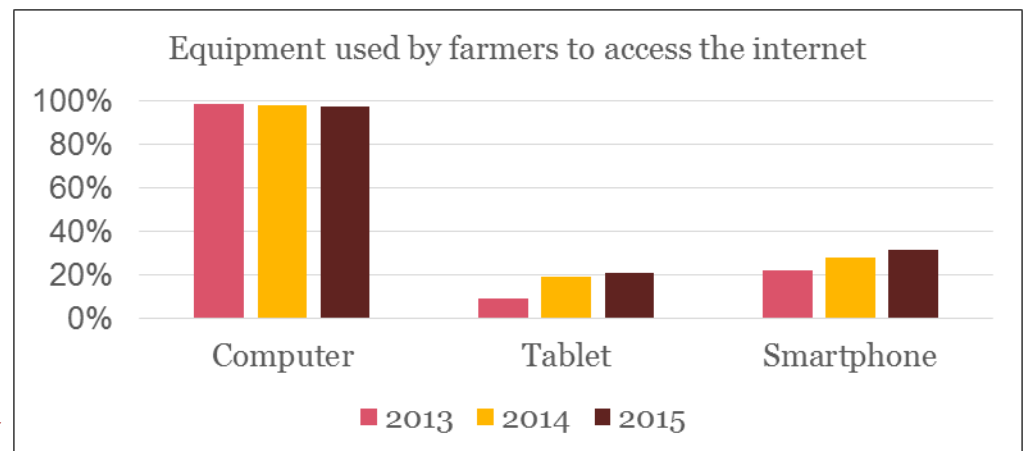
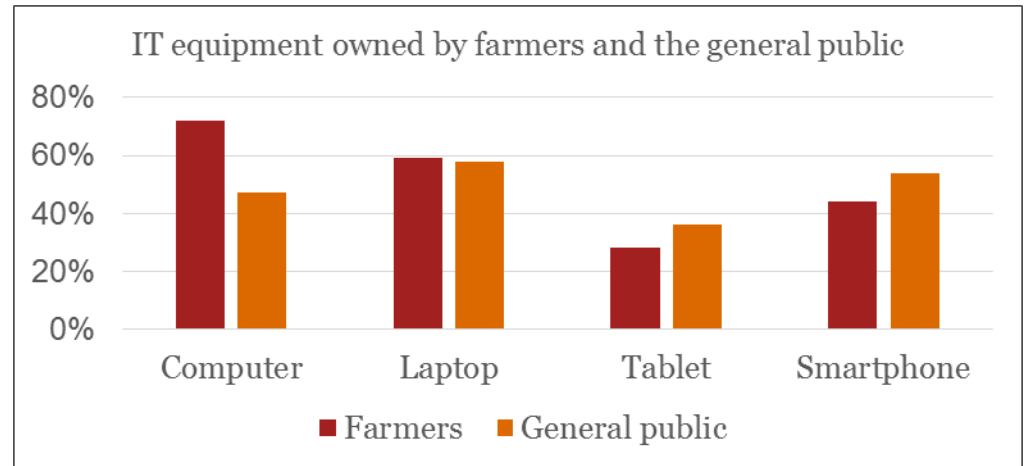
Cooperatives are also embracing digital technology, recognising it as a **key issue** for the agricultural industry:



*100% of the cooperatives surveyed identified digital technology as a key issue*



*50% of the cooperatives describe it as a revolution and 50% as a means of optimisation*



Source: the 2015 "Agrinautes Agrisurfteurs" report on farmers and their use of computers and the internet prepared by BVA and Tic-agri

# *Digital technology*



# 1



# *What is digital technology?*



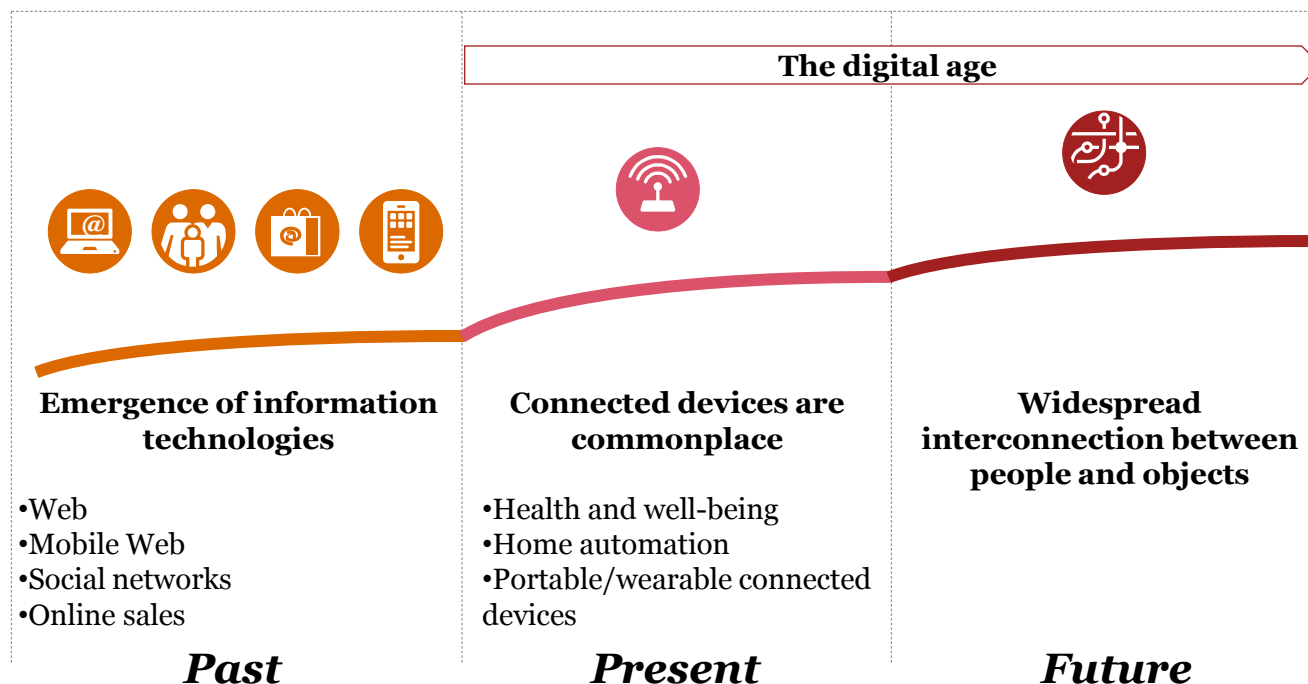
# *1.1*

## ***Digital development has accelerated rapidly and places the user at the centre of the technology***

Digital transformation refers to the way in which society has changed since the emergence of IT technologies:

- **1960:** the first computer
- **1992:** creation of the Web
- **1994:** beginning of online sales
- **1995:** emergence of social networks
- **1999:** development of the mobile Web

In 2008, we entered a new digital phase, with transformation accelerating due to developments in digital technology and directly impacting society.



As a result, new **connected devices** are becoming commonplace and in the future, with the optimisation of the **interconnection** between people and objects, consumers will be ever-more connected, between each other and with their devices.

In addition to the devices, digital technology is underpinned by advances that allow these tools to function, such as the Internet of Things, the cloud and data storage platforms.

Source: "La nouvelle grammaire du succès, La transformation numérique de l'économie française", a French government report on changes to the economy in the digital age

## *Four giants ("GAFA") dominate the digital market and have set in motion the creation of new models*

These four giants introduced **new digital practices**, that have now been adopted by most Internet users:

### Google

- Google search engine created in 1998
- Revenue of \$74 billion in 2015
- Numerous offers and products including:



- Project to market the Google self-driving car



- Created in 1976, marketing a range of connected products
- Revenue of \$234 billion in 2015
- A highly developed range of products and operating systems:



### facebook

- A social network created in 2004
- Revenue of \$18 billion in 2015
- Facebook's mission is to help users connect and communicate using a variety of platforms:



### amazon

- Site created in 1995, initially for online book sales
- Revenue of \$107 billion in 2015
- Online sales, marketing of own products, new distribution methods and cloud computing services:



Sources: 2015 Annual Reports

## *New digital operators have followed in GAFAs wake, making breakthroughs in a variety of fields; new user habits are influencing all sectors*



*And in the future?*

Source: PwC Report– Agribusiness in the digital age

# *How will it affect businesses?*



*"Digital technology isn't optional: it's a necessity for survival."*



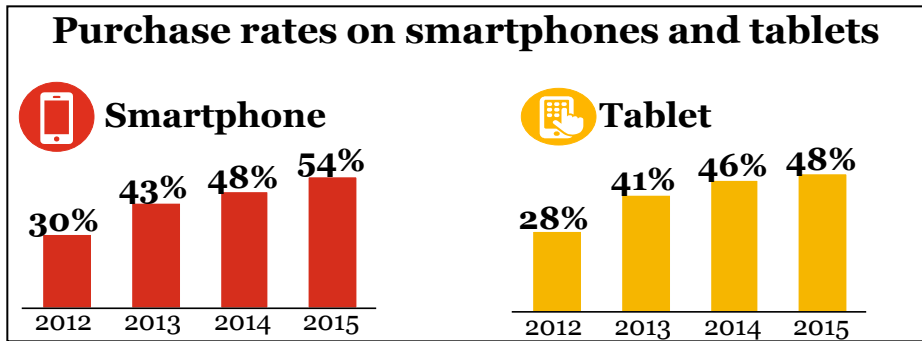
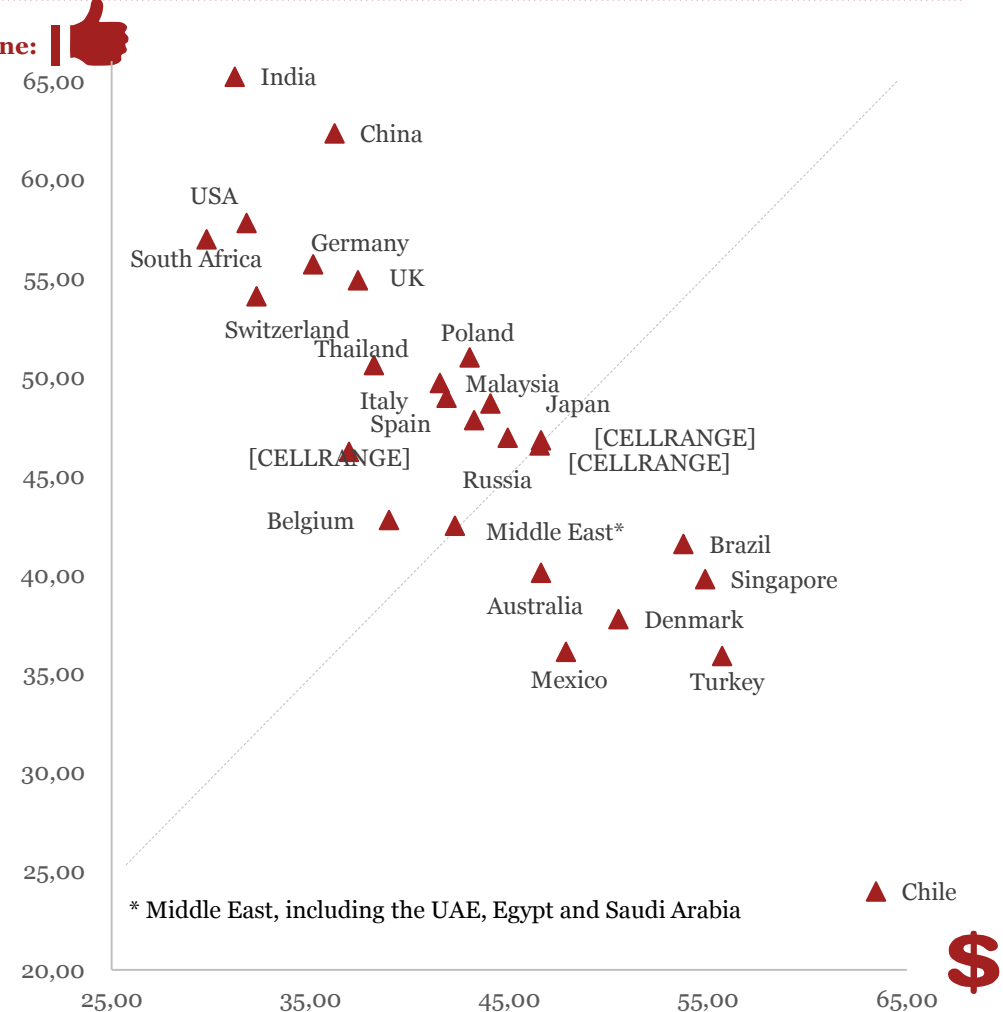
*"Digital technology is a driver of transformation."*

# 1.2

# Consumers are becoming digital nomads who want to be able to do everything, anywhere, instantly; an expectation reflected within businesses

- The majority of households make regular online purchases.
- Purchases using mobile phones and tablets are becoming commonplace and new purchasing behaviours are emerging, particularly via next-generation wearables, such as connected clothing or watches.
- Practicality is one of the main reasons given for making online purchases.
- Nevertheless, food items remain one of the least purchased products online.
- Employees in businesses follow the same pattern of behaviour and demand practicality and mobility.

Reason for purchasing online:  Practicality (%)



Based on web purchasers (2015: 22,618 respondents; 2014: 19,068; 2013: 15,080; and 2012: 11,067)

Source: 2016 Total Retail, based on 22,618 respondents

Reason for purchasing online:  Price (%)

## ***New distribution methods are emerging to meet digital-consumer expectations***



### **Drive-throughs**

There are 4,025 drive-throughs in France, including 2,903 "click and drives" (the remaining 1,122 are to pick up purchases made in the store). Drive-through services are offered by mass retailers, particularly hypermarkets (of which more than 80% offer a drive-through option).

The number of drive-throughs in France is constantly increasing (by 1,400 from 2015 to 2016).



### **Home delivery**

Online distributors such as Amazon prefer home delivery. The Amazon Prime Now service offers express delivery in one hour, for example. Home delivery is also available from the majority of hypermarkets and supermarkets.

New operators are replicating the service in new sectors, offering home delivery of meals prepared in local restaurants, for example.



### **Short distribution channels**

Short channels allow consumers to consume locally and almost without intermediaries. Various short-channel options are available to consumers, such as AMAPs (associations to support local farmers in France), farmers' markets, food assemblies, pick-your-own farms, etc. In return for the opportunity to purchase directly from producers, 58% of internet users say they are willing to eat only in-season vegetables and 34% don't mind having to pick them up on specific days.



### **Subscriptions**

Subscriptions boxes give consumers the chance to discover new products with each new box, and offer different types of products such as make-up or tights, but also food items.

Subscriptions can also include box services with ingredients for the week's meals.



### **And also in the future...**

Robot delivery concepts are being developed by Starship Technologies, for example. Delivery bots will be able to make home deliveries of packages and meals.

Source: LSA magazine, CCM Benchmark, September 2015

# Connectivity and the effective use of data are revolutionising business processes

**Industry 4.0** is regarded as the fourth **industrial revolution** after mechanisation (steam power), mass production (assembly lines) and automation (electronics and robotics).

It establishes **data** as the central value in the **value chain** and encourages the use of smart, connected, data-generating systems.

## Examples

### SIEMENS

Using robots in industry, such as the Siemens plant in Amberg, Germany, where 75% of the production chain is automated

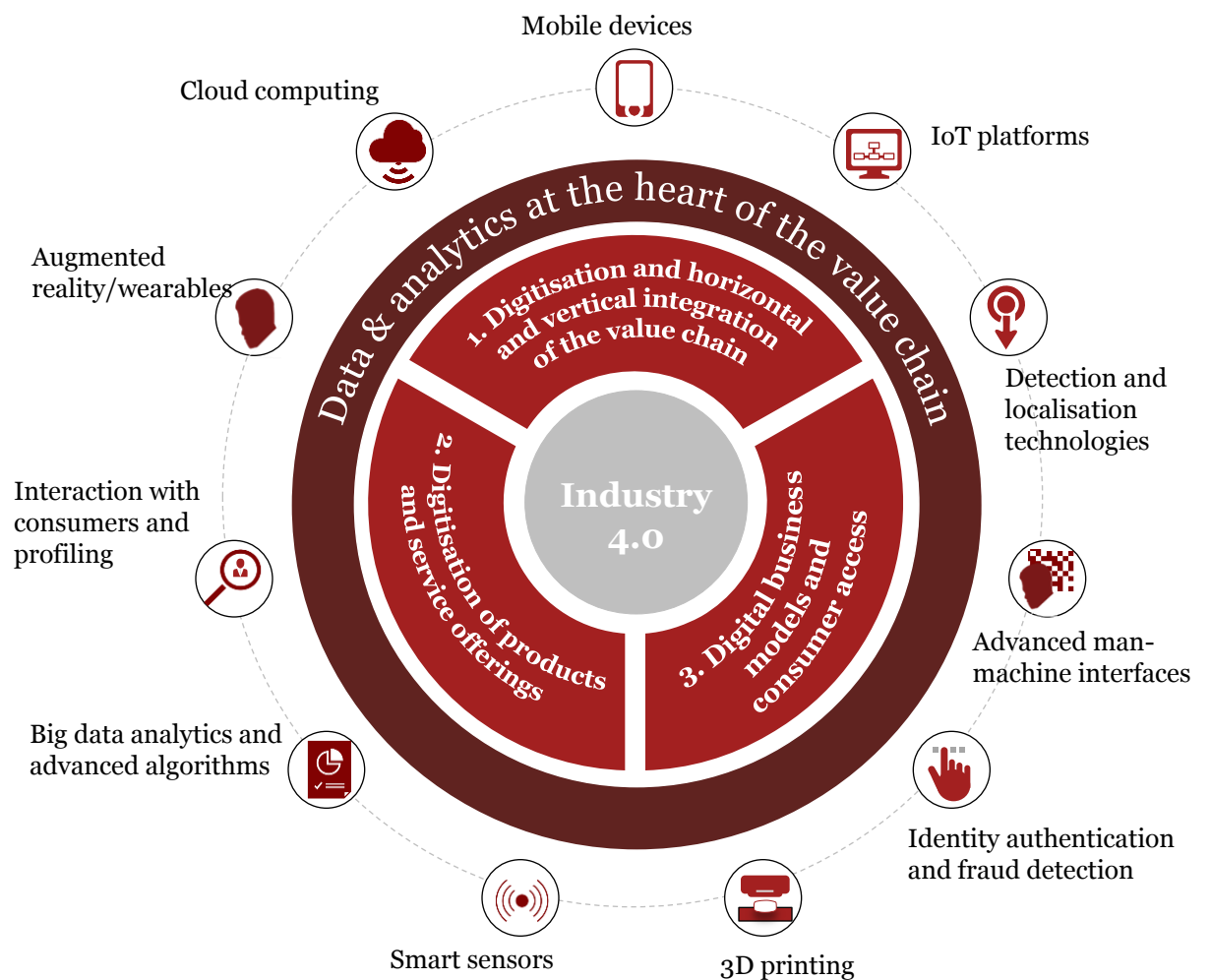
Fab labs driving the industrial innovation

- Protospace for  AIRBUS
- i-Lab for  AIR LIQUIDE
- Innovation Community for  RENAULT

3D printing dramatically reducing production cycles



Source: PwC Report– Agribusiness in the digital age



Source: PwC Report Industry 4.0 – Building the digital enterprise



## ***Digitisation and collaboration strengthen businesses' capacity to interact with their ecosystem, community and other members of the value chain***

### ***Digitisation***

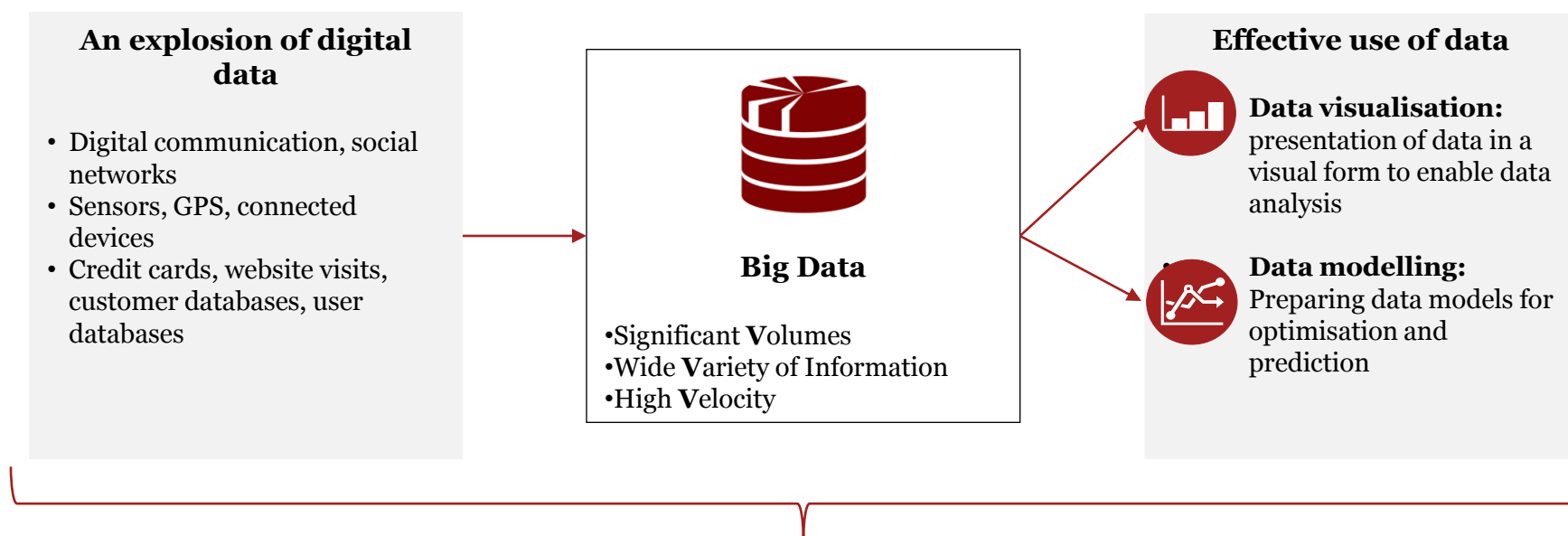
Digitisation includes all techniques that eliminate physical flows in favour of digital formats to speed up and simplify communication:

- Digitising paper documents (bank statements, orders, bills, pay-slips, etc.)
- Introducing new distribution or communication channels
- Computerising business processes (accounting, purchases, human resources, etc.)
- Making training available online, mainly through e-learning and Massive Open Online Courses (MOOCs)

### ***Collaboration***

- Collaborative working thanks to a variety of tools   
- Collaborative economy: sharing and exchanging goods, services or skills among individuals 
- Collaborative project financing ("crowdfunding")   

***Digital technologies generate 2.5 trillion bytes of data every day; using them enables businesses to better understand the present and prepare for the future***



***Effectively using data not only enables businesses to analyse the past, monitor activities in real-time and optimise business flows, but also to predict the future.***

# *What impact will it have on cooperatives?*



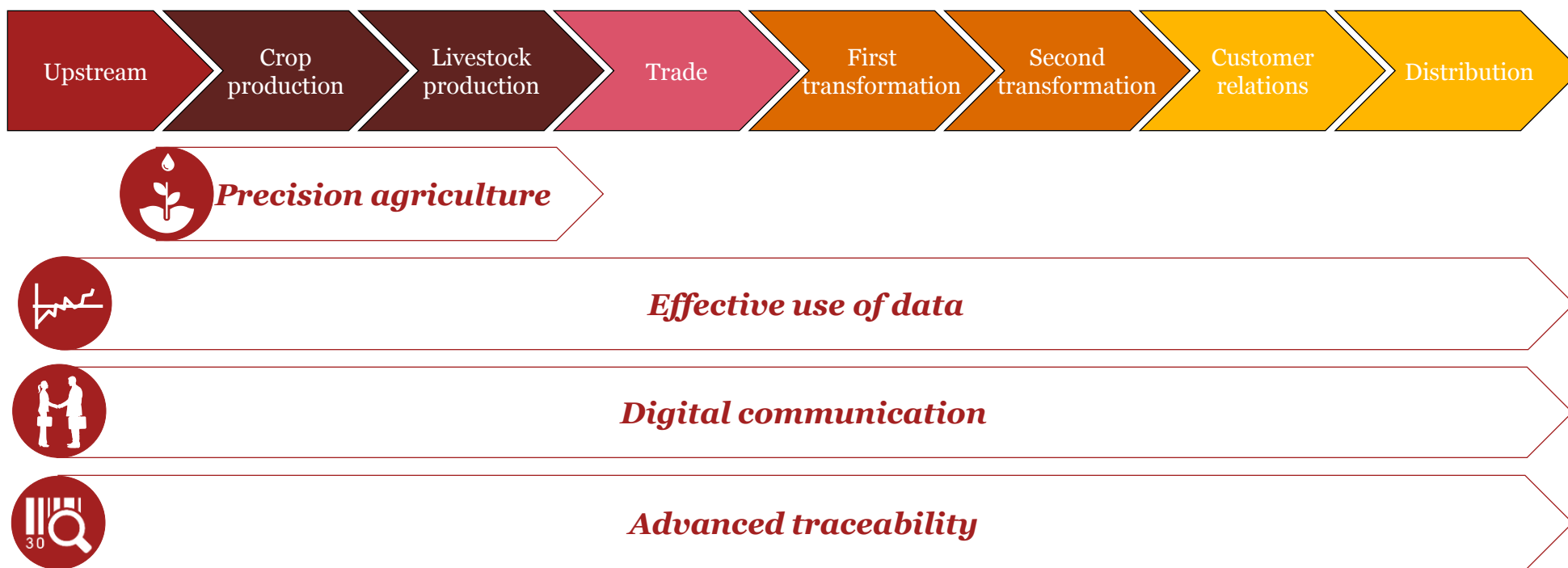
*"New practices are going to shake up all of our processes."*

# 2

## ***This transformation affects the value chain of cooperatives, optimising certain activities and revolutionising others***

In addition to opportunities for optimisation, new technologies offer agricultural cooperatives the chance to implement other specific practices, such as precision agriculture.

With a generally rich and complex business ecosystem (members, employees, customers, suppliers, partners, etc.), the cooperatives' environment facilitates the establishment of value chains or the creation of communities, making practices such as collaborative working and digitisation, more beneficial.



# New models are being created, mainly by a generation of innovative startups

Ever-increasing number of direct sales via local market places and new distribution methods

Excess capacity made available online, such as peer-to-peer rental of farming equipment

Development of new data-based business models



Expansion of "do-it-yourself" and "at-home" consumption

Financing of innovative startups



Acquisition of innovative startups

Collaborative financing of agricultural projects



Source: PwC Analysis

## ***Cooperatives highlight the complexity of defining this transformation: it is both technological and human, and a source of both optimisation and revolution***



"Digital transformation consists of four pillars: **technology**, data analytics, the Internet of Things and data hubs."



"Going digital is a technological revolution in terms of **agriculture, transformation** and also **consumer relations**."



"Trends in agriculture are changing dramatically with the **data** revolution. I believe that data will revolutionise farming as much as mechanisation did in the 1950s and 1960s."



"Digital technology provides new methods and media to **communicate** with a public that we want to target more and more closely."



"We began to talk about digital technology within our cooperative two and a half years ago without really knowing what it meant. We knew we had to do something, but the scope of digital was deceptive and everything that was related to digital technology was thought of as IT. We therefore wondered what aspects of digital technology were relevant to our cooperative."



"Digital transformation is all about looking at how we can **automate** processes and avoid transactions."



"For us, digital technology brings together a variety of things: it is the combination of our **business intelligence** strategy and our application and **solution** initiatives for farmers."



"Digital technology is important to two types of **relationships**: with the members and, in terms of management, with the teams."

# Precision agriculture



*"Precision agriculture largely lies in front of us; we're only at the very beginning. But it's so promising to know it's the right direction to take."*

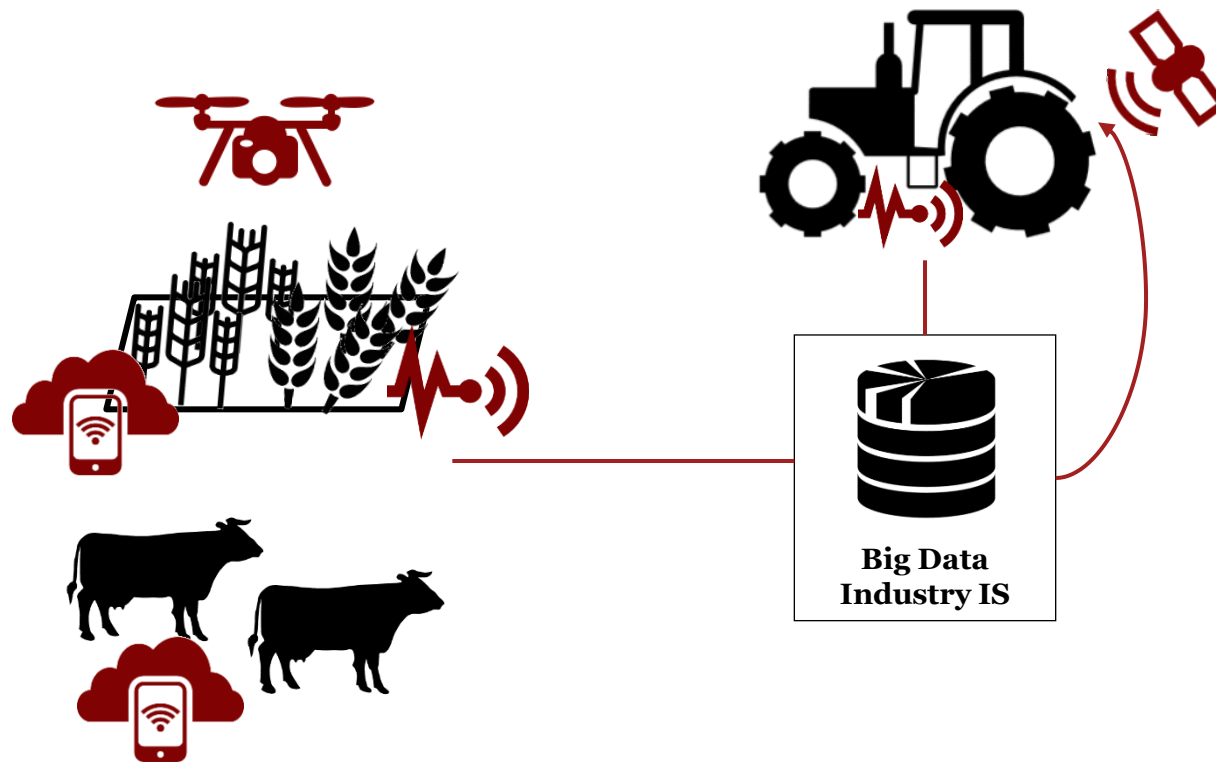


*"The agricultural industry is particularly attracted to precision techniques because they reduce costs. It is a logical step for the industry and the cooperative needs to help its members find their way. If it doesn't, others will."*

## 2.1



## *Precision agriculture aims to optimise production while using fewer resources*



*The concept of precision agriculture includes all approaches that aim to optimise returns while taking into account intra-field variability: using the right inputs, at the right time, in the right place, and in the right quantities to optimise production while using fewer resources*

- Precisely measuring the needs of crops or livestock
- Optimising input requirements
- Saving time and energy



## ***GPS and drones help farmers to improve productivity and reduce their environmental impact***



### ***Improved farmer productivity thanks to onboard GPS equipment***

- **Optimising trajectories** thanks to automatic tractor guidance in fields
- **Dividing fields into rows** for crop sprayers to limit inputs and their environmental impact
- **Intra-field site-specific treatment** based on soil mapping



JOHN DEERE

**OmniSTAR**<sup>®</sup>  
The Global Positioning System



### ***Improved knowledge of agricultural parcels thanks to drones***

- **Soil and parcel analysis** (3D mapping) to develop sowing models or evaluate soil requirements
- **Sowing** through the use of capsules containing seeds and nutrients dropped in the soil
- **Spraying** (quantity, distance, precision)
- **Crop monitoring** to identify anomalies
- **Analysing irrigation requirements** through the use of sensors
- **Evaluating crop health** using light reflection techniques
- **Monitoring silos**

*Note that satellite imaging technology is still widespread and is sufficiently precise for some of today's practices.*



**Parrot**



**mavrx**



Source: PwC global report on the commercial application of drone technology

## *Sensors provide farmers with important farm-related data and connected devices simplify daily activities*



### *Sensors provide farmers with important farm-related data*

- **Ground sensors** to monitor soil indicators (rainfall, humidity, etc.)
- **Onboard sensors** on tractors or drones to monitor crop health, detect plants or measure requirements
- **Sensors on livestock** for geolocalisation and monitoring



### *Farmers also use a variety of connected devices to simplify daily activities*

- **Connected and autonomous agricultural robots** for hoeing and weeding
- **Milking and feeding robots** that also facilitate livestock monitoring
- **Connected devices** that allow several hybrid seeds to be sown in the same row depending on the characteristics of the soil
- **Intelligent agriculture**, with autonomous solutions for greenhouse lighting that adapt to the needs of the plants, for example



## ***Precision agriculture is already established in the cooperatives, which are developing new offerings to help their members***

Precision agriculture technologies (GPS, drones, sensors and connected devices) are **already quite widespread** and have been adopted by many cooperatives and their members. Two of the cooperatives even specified that they had been adopted by all their members. However, their adoption is primarily in the form of a "catalogue of services" and for the moment the possibilities of global integration remain limited. Cooperatives add to the catalogue as technologies advance.

- Cooperatives provide their members with **drone** mapping and monitoring services. One cooperative offers to combine these services with biological control techniques and to drop trichogramma by drone to attack European corn borers.
- **Cooperatives use data from milking machines** and automation systems to remotely help and advise farmers on farm management.
- Cooperatives are also starting to use **3D printers** to custom make replacement parts on demand and thereby reduce inventory levels. However, this technique is dependent on obtaining the dimensions of the part, raising issues in regard to intellectual property rights.

Both upstream and downstream technologies are available, and numerous applications are possible. Connectivity continues to be an issue and the cooperatives are following developments closely. The LoRa (Low Range) network, for example, could allow connected devices to exchange information at low data rates.

On the other hand, for cooperatives to be able to use these technologies effectively and offer precise solutions, data analytics must be perfected and adapted to each segment.



*"Farms are becoming increasingly computerised. We help producers to manage their automated milking systems, which constantly generate data. We are therefore able to remotely manage farms, monitor changes in milk temperature, the health of livestock, the quantities of feed consumed, production volumes, milk flows, etc. With smartphones, farmers are now able to manage many aspects of farming from the comfort of their home."*



*"The equipment already exists and is the responsibility of the manufacturers. The data, which form the link between the techniques, are less developed. Data must be collected, processed and analysed so that they can be fed back to the connected devices."*

## ***Cooperatives have already been won over by precision agriculture, but they believe that the most important developments are yet to come***

### ***Benefits***

- Improved knowledge of parcels of land and crop needs
- Reduced consumption of inputs due to more precise use of seed and crop treatments; reduced environmental impacts as a result
- Increased productivity due to optimisation tools
- Simplified daily farming activities thanks to process automation

### ***Limitations***

- Technologies are constantly evolving and need to be closely monitored
- Technologies are quite cumbersome and can be difficult to adapt to small parcels of land
- Interoperability may be a problem given the number of tools available

### ***Challenges***

- Network coverage is sometimes inadequate to allow the different tools to communicate and transmit their data
- Ownership of the generated data and value model
- Link with data management and use (storage, quality, etc.)
- Innovative technologies that require big data that can be difficult to collect and organise

### ***Maturity among cooperatives***

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# Effective use of data



*"We perform predictive approach tests on the basis of the data, but we're not good enough yet. We obviously help farmers to plan for the next few years, but we need another level of data to be able to predict how the business is going to evolve in the future. We still lack data."*



*"I don't believe in predictions. I think Mother Nature will always have the last word."*

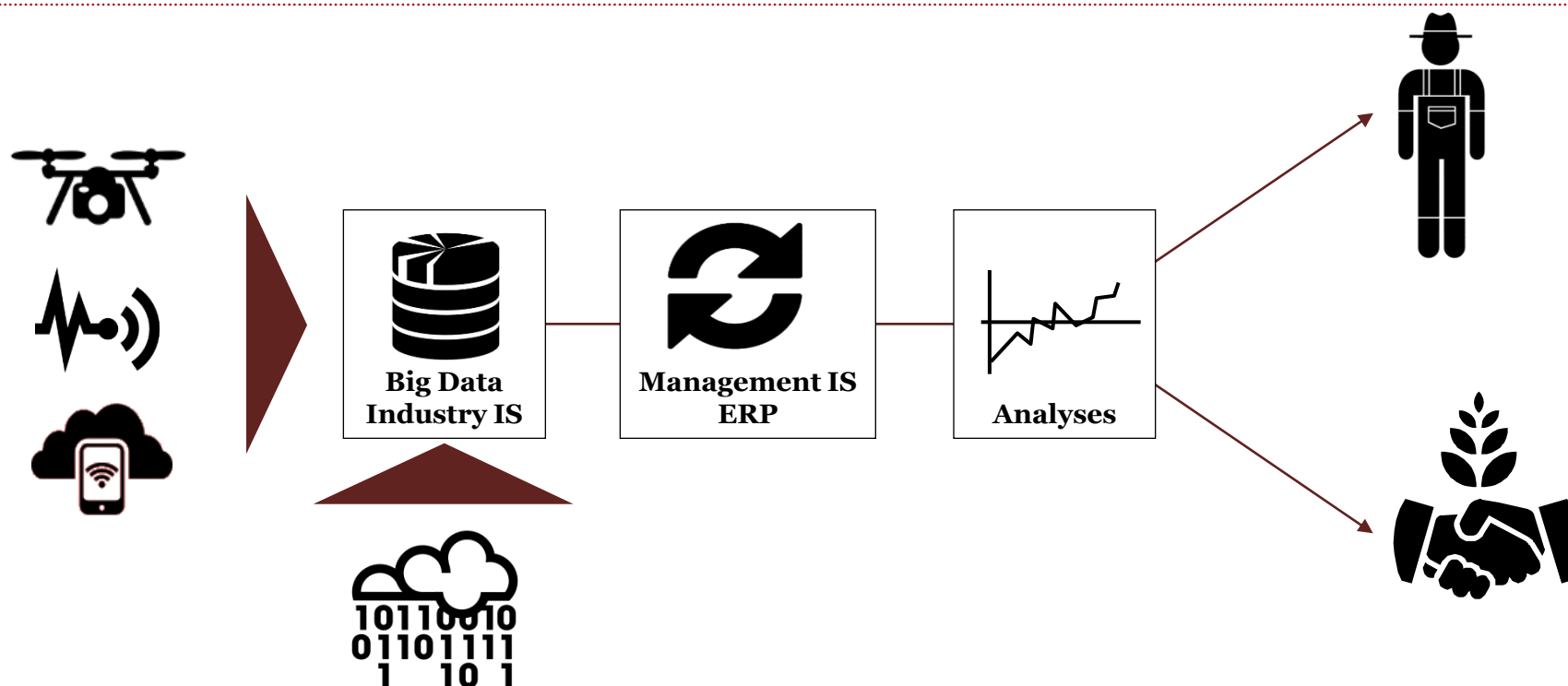


*"Today, our investments in Big Data are focused on understanding the challenges, the constraints and the technologies."*



## 2.2

## ***Agricultural data enables close monitoring of farms, while data analysis can help farmers stay one step ahead***



***Effective use of sensor-generated information combined with external data means farms can be monitored in real time. By analysing the data, farmers can be prepared for a range of scenarios and optimise production, helping them stay a step ahead to make the right decisions.***

- Agronomic practices: real-time monitoring of farm data, decision-making (such as the selection of crops or treatments), estimating harvests, etc.
- Practices non-specific to agronomics: requirement planning, sales optimisation, predictive maintenance, etc.

## ***Data analysis tools are available to farmers to help them make decisions and anticipate input requirements***



***There are a number of IT solutions available to help farmers use their data to anticipate their farms' future requirements and make the best decisions***

- **Advice on the choice of seeds to be sown** (and the best conditions) thanks to analyses of meteorological databases and digital parcel maps. This solution can also be used with a benchmarking monitoring tool to compare crop yields with neighbouring farms
- **Advice on fertiliser use**
- **Anticipating irrigation requirements** using predictive analyses of meteorological conditions and sensor networks
- **Crop forecasting**
- **Software to manage agronomic data** generated by the farm in order to optimise production monitoring and traceability

## *Farmers can anticipate crop diseases and machine malfunctions thanks to agricultural data processing*



### *Anticipating diseases and malfunctions*



- **Early detection of mastitis** using thermal imagery
- **Prediction of the evolution of diseases and yields** with "smart agro" artificial intelligence
- **Predictive maintenance** thanks to sensors fitted to agricultural machinery collecting information on the performance of parts to improve operational efficiency and predict breakdowns

### *Several organisations support predictive agriculture by making additional data freely available ("open data") to the agricultural industry*



- **Agronomic data** (phytosanitary product guidelines, reference doses for crop types, lists of ruminant breeds, etc.)
- **Meteorological information** broken down to each square kilometre
- **Data on soil properties**



## *Cooperatives have launched several data-related initiatives, working together or with third parties on this complex issue*

**90% of cooperatives** collect, store and use data generated by farms, but mainly for analytical purposes at this stage.

- Solutions for capturing and storing data are currently being implemented:
  - **Data capture** to create "Big Data" data sets. As part of this initiative, one of the cooperatives surveyed has created a network of reference farms.
  - **Creating data hub storage solutions** to manage greater quantities of data and help farmers safeguard them.
  - **Creating open data platforms** used to share data and applications between businesses.
- Agricultural cooperatives are beginning to deploy industry-specific practices:
  - **Creating decision-support and decision-making tools**, which help farmers make their own decisions or provide them with a model that offers the best solution for their needs.
  - **Creating applications** to assist members in their data use (help, support, etc.) One cooperative is considering marketing its applications to non-members.
- Other practices, already well-developed and established in some businesses, also affect cooperatives, such as **data analysis** for predictive maintenance purposes, or transformation or supply-chain **optimisation**.

Half of the cooperatives believe that the effective use of data is still **complex and problematic**, particularly when it is analysed for predictive purposes (an approach deemed irrelevant by two of the cooperatives surveyed). The data are difficult to understand and to communicate and will be necessary for the use of certain precision tools, such as those that rely on information on soil characteristics.

Faced with the complexity involved, **60% of the cooperatives surveyed are working together** or with suppliers or universities to step up progress on this challenging issue.



*"Numerous suppliers propose their services to members, to help them collect their data with a view to providing advice. It would be to our advantage to try to work with these businesses."*



*"Farmers don't crave information. What they want is to make sure their farms are profitable, get a good price, improve the marketing of their produce, work less, employ fewer people, and have less red tape to deal with each day."*



*"Sensors are important because the industry is data rich but the probability that the same conditions will be repeated is practically zero. We must work towards precision agriculture and being able to store our agricultural observations in the form of data."*

## ***Cooperatives collect enormous quantities of data, considering them as an asset, and although they are put to use, they are not yet used for predictive purposes***

### ***Benefits***

- Greater understanding of farms and their operations through the effective use of data
- Enhancing the relevance of farmers' decision-support tools
- Anticipating requirements (irrigation, nutrients, etc.), harvests, diseases, and even malfunctions with predictive analysis

### ***Limitations***

- Development of data analytics tools and practices is limited
- Difficulty and complexity of data processing
- The length of the agricultural cycle (the harvest, i.e., one year), which means that several years of historical data are needed to perform useful analyses
- Cooperatives remain sceptical about the possibility of using information to develop models that can be applied at ever-greater levels of detail

### ***Challenges***

- Identifying/choosing the data to be collected and putting the required sources in place (i.e., sensors)
- Implementing data collection and storage tools and managing data governance and quality
- Modelling a complex environment, difficulties communicating data and long data-recurrence intervals
- Ownership of the generated data and data sharing: open data
- Working with third parties (cooperatives, suppliers, universities, etc.) on innovation

### ***Maturity among cooperatives***

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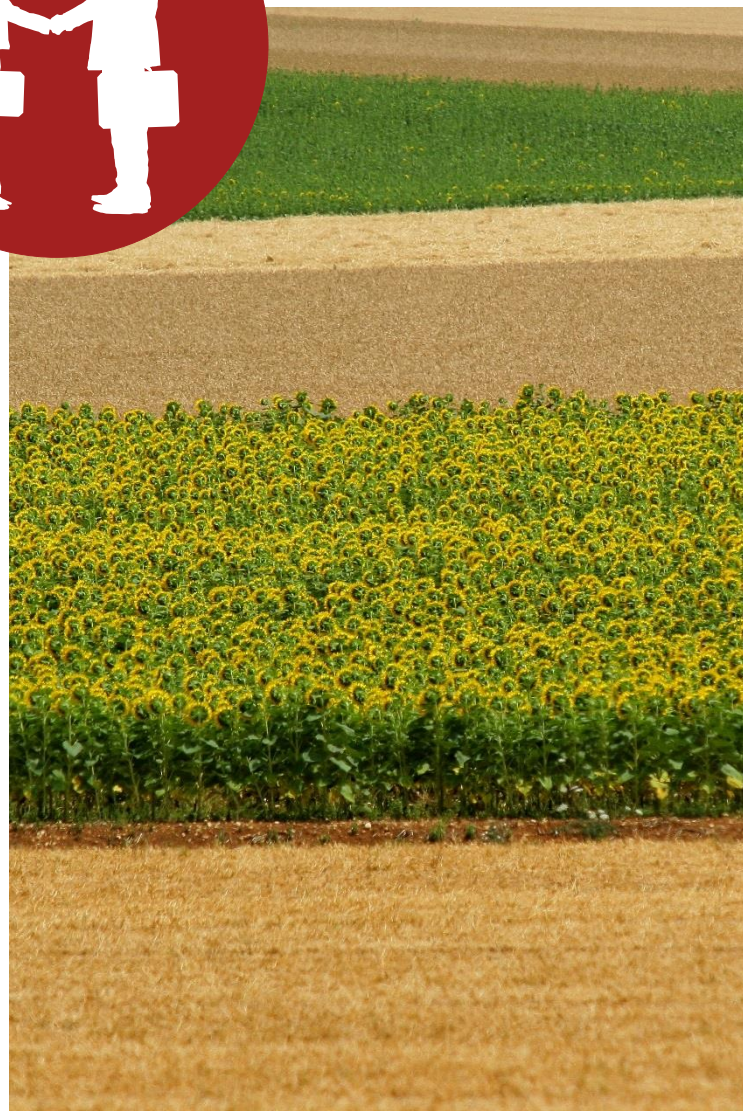
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# *Digitisation of communication*

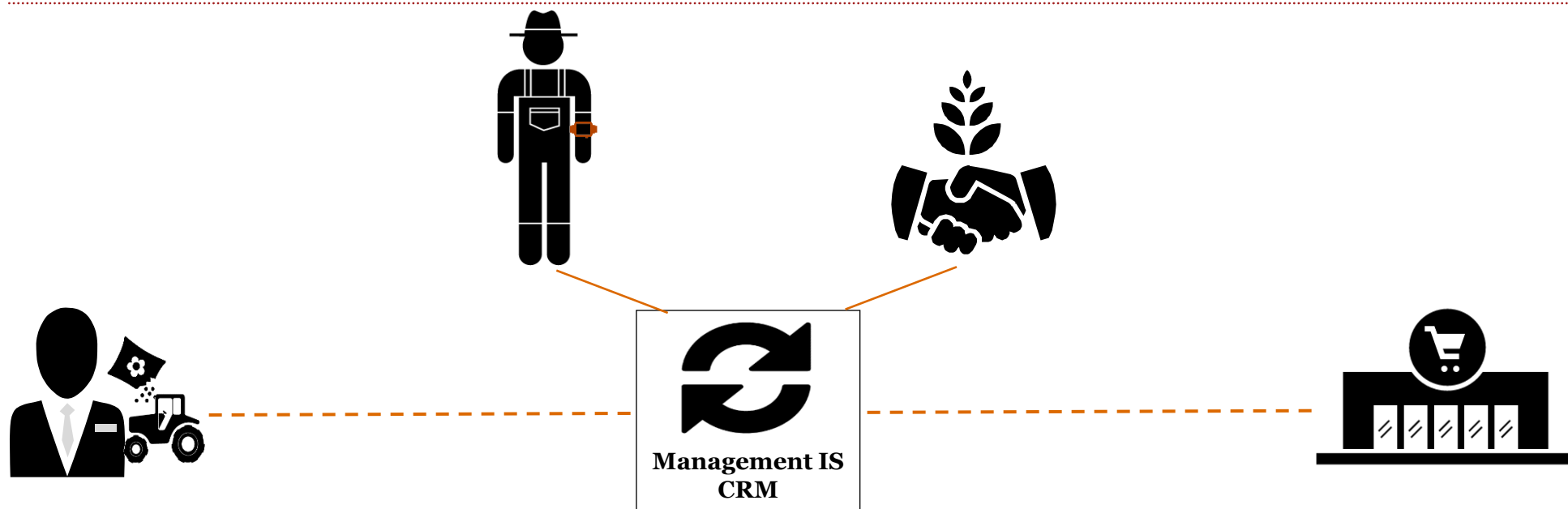


*"Digital technology allows us to do things we couldn't do before."*

# 2.3



## ***Digital communication automates and accelerates the exchange of information, meaning work can become more collective***



***Digital technology not only facilitates relationships between the various stakeholders in the cooperatives' value chain – members, suppliers, customers and even end-consumers – but also relationships within the cooperative.***

- Automation and digitisation of communication with suppliers and customers
- Collaborative economy (financing, innovation, etc.)
- New supply chains that are closer to the consumer
- Digital marketing

## *Communication between the cooperatives and their members, as well as internal communication among employees, is becoming increasingly digital*



### *Ever-increasing number of platforms made available to farmers by cooperatives and third parties*

- **Member-specific sites and applications proposed by cooperatives to simplify communication**

A significant number of newcomers are also offering their services to farmers:

- **Specialised websites for farmers** where a full range of farming products can be purchased
- **Platforms for the sale of new and used agricultural equipment**
- **Collaborative platforms for the rental of unused equipment**, connecting individuals or businesses



### *Cooperatives' working methods are evolving towards collaborative digital workplaces*

- **Sharing** documents, data and calendars thanks to digital processes
- **Collaborative** intranets, blogs and internal social networks
- **Digital** meetings
- **Collaborative working** on the same documents or on ideation platforms
- Tools for **mobile working**
- **Digitising** and storing documents in the cloud



## ***Digital flows and collaborative approaches effectively meet the needs of cooperatives, which generally form part of a complex business ecosystem***

- **In terms of digitisation of communication, for 70% of cooperatives, members are the top priority:**
  - **Member websites** to replace or add to the services provided by local stores
  - **Creating applications** for members to place orders, or give details of the livestock to be sent to the abattoir. Support and advisory service applications
  - **Text messaging** to provide price quotations, for example
  - **Digitising invoices and bank statements**
  - **Using data to create dashboards** (monitoring consumption or production, etc.)
  - Developing **e-learning** systems (MOOC)

Note that cooperatives cater to a relatively diverse membership with very different habits. Depending on the member or the topic, the required format could be email, text message or letter. Consequently, in the short term it is important to maintain an **omnichannel** strategy, which complicates implementation.

Cooperatives still consider meeting people in person (requiring the existence of a **local** network of sales engineers) to be essential.

- **More than half of the cooperatives also pointed out that they were working on implementing collaborative approaches internally** (collaborative intranet, digital meetings, etc.)
- Automated exchanges with suppliers and customers (EDI, marketplaces, etc.) have already been widely implemented and are becoming increasingly commonplace.



*"We've worked really hard to digitise our communications with suppliers, farmers, distributors and consumers. The quantity of information and its exchange is a huge job and we're still working to improve our efficiency."*



*"We market a certain number of products and we deliberately refuse to allow farmers to complete their order forms online because we want to maintain personal relationships and discussions. We don't think that the tool creates added value."*

## ***With digital technology, cooperatives can create new relationships with customers and communicate more easily with end-consumers***

 ***New operators are placing themselves between the brands and the distributors to digitise relationships and better inform consumers***

Positioned at the interface between producers and distributors to facilitate data exchange when listing a new product for example, or choosing the information to be posted on online sales sites.

**ALKEMICS**

 ***New operators are exploiting the opportunities offered by digital technology and are penetrating the local produce and "consume differently" niche markets***

- **Short distribution channels and direct selling**
- **Subscriptions**



 ***Communication between businesses and consumers increasingly takes place on social networks and marketing is going digital***

- **Targeted digital advertising** via social networks to offer consumer-specific advertising
- **Digital marketing**
- **Better customer awareness** (databases, CRM, etc.)
- **New consumer services** via social networks

**facebook**



## ***Cooperatives are taking advantage of the possibilities available to connect more closely with their end-consumers***

**70% of cooperatives** are trying to get closer to end-consumers in order to improve communication and better understand their demands

- **New forms of communication with consumers**
  - **Social networks** for two-way communication with consumers, digital advertising and the creation of brand communities
  - **Targeted and monitored communication**, with impacts measured using dedicated indicators
  - **Working collaboratively with consumers**, by asking for their opinion on marketing choices
- **Better customer awareness**
  - **Creating consumer databases** to better understand their needs
  - **Developing CRM tools** to monitor prospects, business levels, etc.
  - **Data analysis** to provide services to consumers who are poorly served or overlooked
- **Creating new sales channels**
  - **E-commerce channels** offering direct selling to consumers
  - **New e-commerce strategies** in partnership with e-commerce pure players such as Amazon or Alibaba



*"Two years ago, we associated digital marketing with advertisements on Facebook. Now, we talk about consumer analytics, programmatic ad buying, etc. We've decided to focus on digital marketing. If we move quickly, the digital image that we're creating can become a real advantage and open up new opportunities."*



*"We're really happy with our sites. The only challenge is that e-commerce is the most rapidly developing distribution channel and all our competitors are doing the same. It's going to get more and more competitive."*



## ***Digital technology has revolutionised communication methods, bringing cooperatives closer to members and consumers***

### ***Benefits***

- Closer contact with end-consumers to have a fuller understanding of their expectations and to improve communication
- Easier information exchange with members
- Collaborative working within cooperatives
- Easier communication within a production chain or community

### ***Limitations***

- Impact of social networks where positive opinions, but also negative opinions, can spread rapidly – image management is essential
- Regulations on the sale of phytosanitary products restrict newcomers with a 100% digital approach

### ***Challenges***

- Implementing a digital policy
- Managing the expectations of various generations internally and externally
- The return on investment from digital communication campaigns is still very difficult to quantify

### ***Maturity among cooperatives***

5

4

3

2

1

0

# Advanced traceability



*"Traceability is an important and long-standing issue, but its implementation has changed with the arrival of digital technology."*



*"We're working more and more with producers on traceability. Today, we have traceability measures in place, but we can't guarantee complete traceability of a product. These days, consumers almost want to know the name of the cow or where the carton for the milk came from. We have to be increasingly innovative if we want to win back consumers' stomachs."*



## 2.4

***The amount of information generated along the length of the supply chain raises the possibility of far more detailed traceability in the future***



***All the data captured during the production and transformation processes can be fed into a traceability system, facilitating increasingly detailed tracking.***

- Consumers are increasingly concerned about where products come from
- Health scandals have undermined the confidence of consumers who now pay closer attention to traceability, creating opportunities to promote a transparent supply chain
- Digital technology enables far more detailed "farm to fork" product tracking

## Numerous digital solutions are available to collect data from farm to fork

*Collecting data along the length of the production chain means traceability can become increasingly detailed*



- **End-to-end geotraceability solutions**
- **Various tracking (logistical traceability) and tracing (product traceability) systems are available in France**, such as RFID, NFC, QR code, Data Matrix and Flashcode. The three latter systems use codes that can be scanned to obtain further information.

*Regulations are changing and impose greater traceability requirements on different types of products.*



*The cold chain is also checked and monitored*



- **RFID chips**
- **Thermochromic ink indicators**
- **Microbiological indicators, electronic temperature gauges**



*Consumers want to know more about what's on their plates*



- **Various food safety and transparency scandals** have pushed consumers to know more about where their food comes from
- **Increase in food designations** (AOP, AOC, organic, etc.)
- **Total, transparent traceability** is becoming a marketing advantage, contributing specific value added

## ***Traceability is not new to cooperatives but digital technology has given it fresh momentum***

The issue of traceability is nothing new to cooperatives. Irrespective of the increasingly strict **regulatory constraints**, cooperatives recognise the **value**, for some production chains, of implementing a system of traceability that goes in to greater detail or covers a larger part of the global value chain, and then using it as a marketing advantage:

- Product certification (with standards such as "Agri Confiance" in France that impose compliance with specific requirements)
- CSR-type approaches
- Enhanced batch tracking along the length of the logistics chain
- QR codes on packaging that can be scanned by consumers to have more information or to watch product-related videos

**50% of cooperatives** would like to see **farm to fork** traceability in future and to offer consumers precise product information, such as the farm of origin. This is complicated to introduce, except for cooperatives with a high level of vertical integration or that belong to a well-organised production chain. Traceability could go so far as the carbon footprint calculation of the product's farm of origin.

The benefits of the approach vary from one production chain to another, depending on whether the product is fungible or not. Fungible products can only be traced back to the silo.

Traceability would help to promote products of French origin, particularly for export. Nevertheless, it could only be marketed to a specific audience willing to pay more in return for the additional product information.



*"The challenge that we face, with all the tools we have, is to be able to establish a link between the advice that we've given to farmers, the produce in their farms and to take it one step further by extending the information to the marketing of the product. We sell our products worldwide and if we were able to do that, we could promote French products internationally. Some cooperatives do it already and can give you the entire history of the pigs slaughtered in their region and sold on the other side of the world. They're a little ahead of us."*



*"Many countries, particularly in Asia, insist on being able to trace a product back to the cow. For the moment, we can't go back to the cow, but it's an extremely detailed issue and we're working on it."*

## ***Detailed traceability will in time be a necessity, but until then it is a marketing advantage for the promotion of products***

### ***Benefits***

- Management of reputational risk
- Creation of added value related to traceability
- Generally goes hand in hand with improved supply chain management and optimisation

### ***Limitations***

- Feasibility and benefits vary significantly between one production chain and another (less relevant for fungible products – commodities – where traceability can only go back to the silo)
- Implementation is complicated for production chains that are long (with several transformation phases, for example) or international

### ***Challenges***

- Choice of the level of detail and deployment of the necessary tools
- Effective use of the data already available
- Promotion of traceability and communication with the customer

### ***Maturity among cooperatives***

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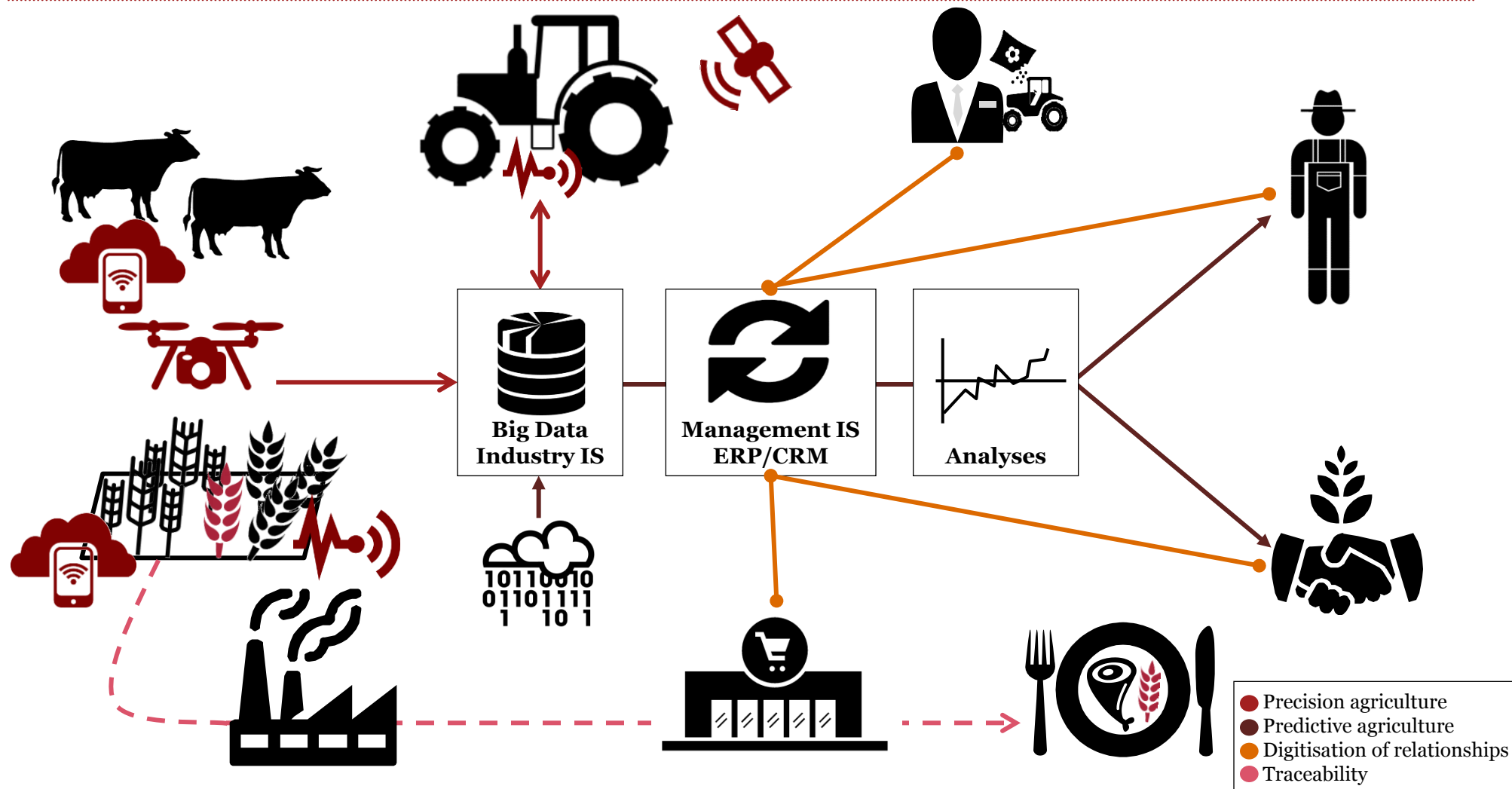
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# *Implementing practices with different levels of maturity*



# 2.5

***Cooperatives are a key link in the value chain for the digitisation of agriculture, but their position means they have to manage a complicated integration process***





## ***The cooperatives surveyed believe that digital technology will transform their processes and they have already deployed a number of initiatives to create value for their members***

Almost all of the cooperatives surveyed are convinced that digital technology will revolutionise the agricultural industry or significantly transform its processes. They have already deployed initiatives that take advantage of digital technologies, mainly in a bid to create value for their members:

- **All** cooperatives assist their members in the use of **precision agriculture** and have been won over by the benefits of precision techniques.
- ~**90%** collect, store and use agricultural **data** to improve the quality of their advisory services to members. However, they do not yet use the data for predictive purposes.
- ~**70%** use digital services and applications to strengthen their **relationships** with members and consumers. ~**60%** promote and implement **collaborative** working tools and methods.
- ~**50%** are looking into more advanced **traceability** management, from farm to fork.

In addition to developing and optimising existing processes through the use of digital technology, cooperatives are also identifying opportunities to create added value for their members.

Furthermore, the cooperatives surveyed believe that, despite the rapid changes in technology and practices already seen, the main changes are still to come. There are still opportunities for innovation.



***50% of cooperatives believe that digital technology represents a revolution***



*"In the coming months and years, we are going to put a lot of effort into artificial intelligence."*

# *What are the challenges?*



3

## ***Cooperatives want to integrate digital technologies into their model as quickly as possible to meet stakeholder expectations – not going digital at the earliest opportunity is considered risky***

Cooperatives have to meet the expectations of the various stakeholders in their business ecosystem, and those stakeholders are pushing the cooperatives to go digital:

- **Members** want to use digital technologies to manage their dealings with cooperatives in near real-time and to have access to innovative services. They want guidance and support on introducing precision agriculture.
- **Internally**, Generations Y and Z are questioning the current model. They want more accessible and agile tools, mainly to drive business innovation.
- **Third-party** suppliers and customers are heading in the same direction towards greater digitisation of data flows.
- Some cooperatives fall within the scope of **production chains**, whose activities are facilitated by the implementation of digital tools that allow more rapid data sharing.

The **reassessment of the value chain** has opened the door to newcomers to compete with the cooperatives in regard to:

- Established activities (advisory services, sales platforms, etc.), in which digital technology offers new methods and practices
- New services (data use, etc.), with the risk that the newcomer will then penetrate the rest of the value chain

Nevertheless, cooperatives consider digital transformation to be complicated. In order to successfully go digital, they are trying to set clear objectives and are adopting a flexible approach, advancing step by step.



*"The digital revolution is not ahead of us, but is happening right now. It is essential that we make it a major driver of our business. There's no point asking whether we should or we shouldn't."*

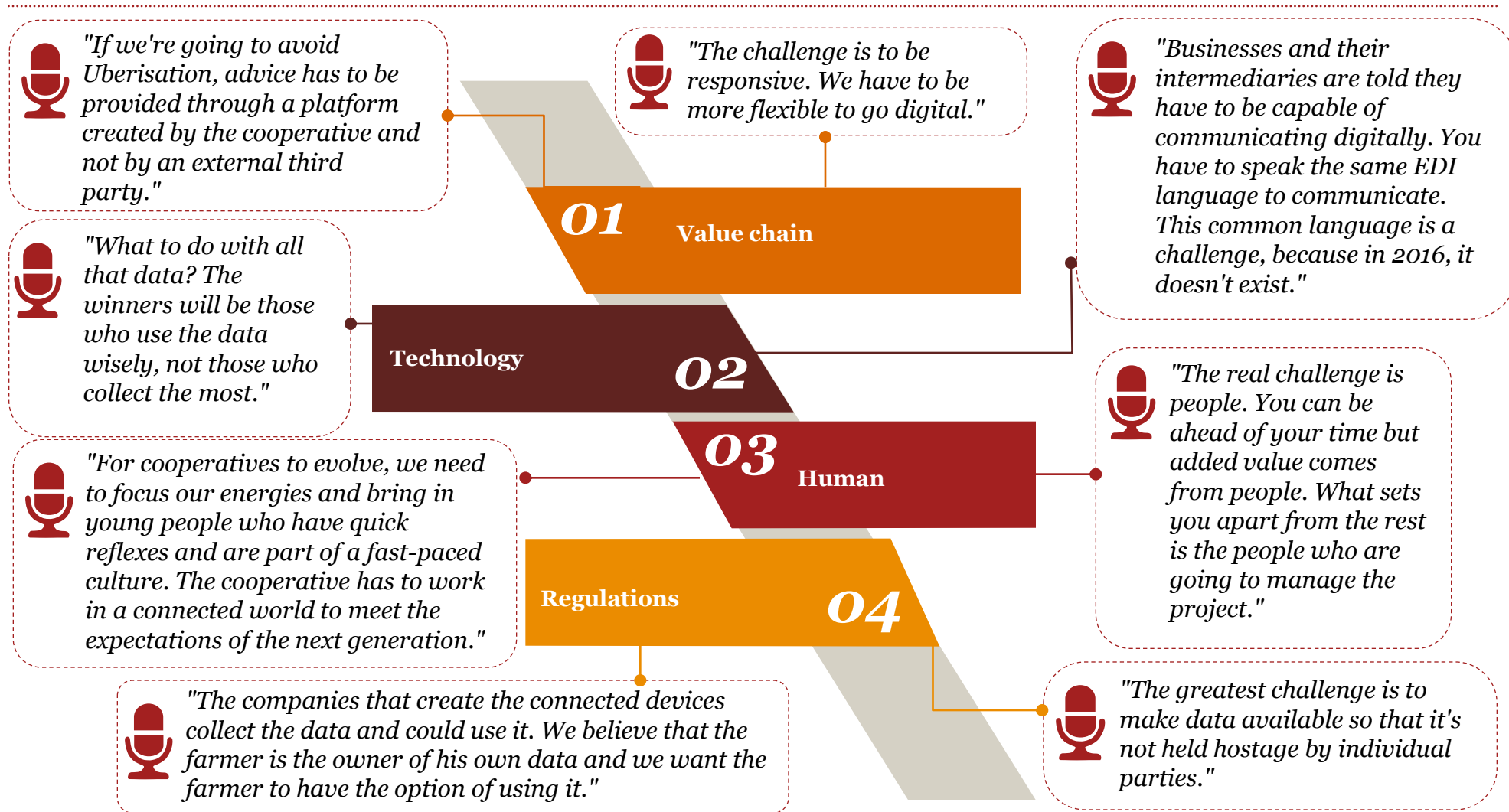


*"Digital technologies are indispensable and we're in an experimental phase. We're learning to use the tools, we're trying to understand the changes and everything's moving so quickly. The rules keep changing."*



*"Digital technology isn't just something that will make us better if we use it: if we don't want to be obsolete in 5 years time, it's an absolute must. It's a challenge and a necessity."*

# Seizing the opportunities offered by digital technology is only possible if the business, technological, human and regulatory challenges are well managed



## *In time, new models could change cooperatives' value chains*

- **Newcomers are penetrating the value chain, particularly through disintermediation and intermediation:**
  - New operators selling inputs to farmers on their websites
  - Disintermediation via suppliers' online sales platforms directly targeting farmers
  - Startup intermediation offering digitised services such as advisory or information-exchange platforms based on farmers' data. The proliferation of applications and websites already allows more digitally aware members to look for information outside of the cooperative.
- **Consequently, cooperatives must continue to develop the value they offer to their members, exploiting these new possibilities themselves and modifying their strategy accordingly:**
  - Creating new services for members, such as drone mapping
  - Developing decision-support and decision-making tools, using farmer-generated data
  - Digitising certain functions to simplify farmers' daily routines, such as local store websites or online training courses
  - Developing collaborative platforms to give members easier access to information and advice



*"There are going to be players who operate like Airbnbs of farming, who have no capacity of their own but will create sharing platforms for farmers. We're lucky to have regulations that provide us with a certain framework."*



*"If businesses like our cooperative don't go digital, manufacturers are going to deal directly with producers. The service will no longer be personalised or incorporate agricultural advice to farmers. Cooperatives have to be key players in terms of digital tools and help farmers to process their information."*

## ***Although technology has progressed, the key challenge for the majority of cooperatives lies in their implementation and effective use***

**The IT architecture needs to evolve** to adapt to and support businesses' digital transformation:

- Transformation of IT architectures into integration platforms for data captured from all channels (resources, processes, mobile devices, etc.) – urbanisation of information systems
- Implementation of Big Data platforms and shared Big Data platforms where necessary, to deal with the demands of large data volumes and near real-time processing
- Combination of a transaction processing system to support core processes (purchases, sales, finance, etc.) with more agile peripheral functions
- Implementation of service-oriented architecture (SOA) for closer interfaces between the business information system and API platforms, facilitating interaction with third parties

While some of the available technologies are mature, their **effective use is held back** by the ability to analyse data (particularly agricultural data), which needs to be perfected:

- Historical data spanning several harvests (and therefore several years) are needed
- The business environment is difficult to understand
- Each segment/production chain has its specific characteristics

**Data transmission** between the various tools also remains a limiting factor:

- Offline service provision (in the absence of a network)
- Management of the interconnection between different devices/bases

**Partnerships** and collaborative working are key to the success of the initiatives:

- Partnerships with startups and universities to develop innovation
- Creation of internal business incubators and reaching out to the public at large through open innovation



*"We need to create an incubator with the different initiatives available on the market. At the moment, all the startups that have good innovative ideas for farming go to financial innovation funds for financing but their project is abandoned before it can be put into operation. Thanks to our relationship with farmers, we think we could play a role as a catalyst for innovation."*

Source: PwC Report–DSI Digital Ready

## ***In addition to the technology, one of the main difficulties identified is the need for appropriate governance, teams and working methods to manage the human challenges***

### **Governance needs to be adapted to effectively address the multi-disciplinary challenges that require a high level of responsiveness**

- Incorporating digital considerations in the business' strategy by appointing a dedicated manager to assist senior management by coordinating data initiatives
- Strengthening partnerships between the IT department and other business departments: shifting from a compartmentalised model to multi-disciplinary teams with a mix of technical and operational skills
- Decentralising performance to autonomous and empowered teams
- Questioning the role of the IT department in regard to digital technology: transformation is essential to integrate new operating methods in the business

### **Skills are evolving and new roles are emerging**

- Developing new positions specific to digital technology (scrum masters, cloud managers, data scientists, community managers, etc.)
- Integrating the digital generations

### **Working methods are new, flexible, collaborative and multi-disciplinary**

- Using flexible methods to incrementally deliver sprint-based solutions. The approach is iterative and versatile and encourages rapid responses to demands for change
- Instilling a spirit of cooperation between teams by using new collaborative tools



*"We need to put the right people in the right place with the right skills if we're going to get things moving. Change will come quickly with the new generation."*



*"The digital strategy hasn't been implemented at cooperative level. Each BU manages its own digital transformation. There is no centralised governance."*

Source: PwC Report—DSI Digital Ready

## ***Data ownership laws and regulations are a source of concern but not a barrier to continued progress, and the challenge is to demonstrate the value added through data sharing***

**Laws and regulations** relating to agricultural data **are not consistent** between countries:

- A new European regulation on data protection and security entered into force in April 2016 to strengthen the rights of citizens and give them greater control over their personal data. However, it applies to personal data and primarily protects consumers.
- Data generated by livestock or fields do not fall within the scope of the regulation. Currently, the owner of the data is still in most cases the party that collects it (manufacturers of tractors, milking robots, etc.)

**A legal framework must therefore be put in place**, particularly in France, to protect data, which generate significant added value once processed. Europe must take a stance because certain manufacturers collect the data in their devices and have the opportunity to exploit them.

Farmers are fully aware of the issue and are reluctant to share their data without receiving something in return. That said, effective use of the data necessitates a degree of massification, and therefore sharing.

Cooperatives are carrying out an information campaign among their members to show them how they will recover the value produced by their data over time.



*"I'm seeing businesses becoming members of our agricultural association that are not farms but little technology startups trying to collect data and launch a product."*



*"The members are the owners of the cooperative so it's easier to ask them to supply data to the cooperative. It's also a question of transparency: as long as they understand that the goal is to create value for the cooperative partners, we will be able to invest the data in tools that will help us to improve productivity."*

Source: CNIL



# *Appendices*



## About this report



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The information presented in this report is based on interviews conducted with cooperatives.

The objective of the interviews was to perform qualitative research. The ratings allocated to the maturity of cooperatives presented on pages 28, 34, 41 and 46 reflect PwC's assessment based on the interviews and our perception of the integration of digital technologies and practices within the cooperatives.



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