The Digitalisation of the European Agricultural Sector

The digitalisation of the European agricultural sector has the potential to revolutionise the industry, promoting efficiency, sustainability, and competitiveness.

An example of a Digital Twin used to assess livestock.

From artificial intelligence (AI) and robotics to the Internet of Things (IoT) and 5G, the latest technologies can offer invaluable support for farmers and agribusinesses.

Through digitalisation, stakeholders can benefit from a more streamlined value chain, with closer collaboration and improved communication between producers, processors, distributors, and retailers. Meanwhile, innovative SMEs can emerge and thrive, bolstering the industry with new ideas and fresh perspectives.

Despite the many benefits of digitalisation, it can also create a digital divide between those with access to cutting-edge technologies and those without. This divide could manifest itself in several ways, such as between connected and disconnected farms, and between small and large agricultural operations.

To ensure that digitalisation is inclusive and accessible for all, it is important for policymakers,
industry leaders, and technology providers to work together in promoting the benefits of digitalisation and supporting farmers with training, resources, and incentives to adopt new technologies. By doing so, the European agricultural sector can make the most of the digital age, improving the sustainability and profitability of farming operations while also addressing pressing issues such as food security and climate change.

**How IoT is used in agriculture, and how does it benefit farmers and the industry as a whole?**

The Internet of Things (IoT) technology has been transforming the agricultural sector by providing farmers with access to real-time data on environmental and machine conditions. These data help farmers make better decisions and improve every aspect of their work, including crop farming and livestock monitoring. By combining IoT real-time data with accurate geo-spatial data, farmers can practice precision farming, resulting in higher yields, reduced waste, and more sustainable practices.

Additionally, IoT technology enables farmers to remotely monitor crops and livestock, reducing labour costs and ensuring the health and safety of their animals.

**Benefits and challenges ahead**

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Increased economic and environmental performance: Digitalisation can help farmers make better decisions, optimise their operations, and increase productivity, leading to higher profits and a more sustainable agricultural sector.

Environmental sustainability: The use of digital technologies can help farmers reduce their environmental footprint, by optimising resource use, reducing waste, and using precision farming techniques.

Competitiveness of the EU digital supply industry: Digitalisation can help the European agricultural sector stay competitive in the global market, by providing innovative solutions and creating new business opportunities.

Improved working conditions for farmers: By automating tasks and optimising operations, digital technologies can help reduce the physical and mental workload of farmers, leading to better working conditions.

Increased transparency along the supply chain: Digitalisation can help improve traceability and transparency of agricultural products, enabling consumers to make more informed choices.

Connectivity issues: Many rural areas still lack reliable and affordable internet access, hindering the adoption of digital technologies.

Limited benefits awareness: Many farmers may not be aware of the potential benefits of digitalisation and may lack the necessary skills and resources to implement new technologies.

System interoperability: Different digital platforms may not be compatible with each other, making it difficult to share data and integrate different applications.

Farmers' skills: Many farmers may lack the necessary digital skills to fully benefit from digitalisation.

Benefit-cost ratio: The cost of implementing new digital technologies may outweigh the potential benefits, especially for small-scale farmers.

Reluctance to share data: There may be concerns over data privacy and ownership, hindering the sharing of data between different actors in the agricultural sector.

The landscape of data-sharing platforms and ecosystems needed for a common European agricultural data space: there is a need to develop common data-sharing platforms and ecosystems that can enable data sharing and interoperability between different applications and stakeholders in the agricultural sector.
Farm Management Systems & App Providers
Provided by machinery suppliers, input providers (seeds, fertilisers, pesticides...)

B2B Ecosystem Platforms
Collaboration between several vendors enabling data sharing.

National / Regional Data Hubs
Data space resulting from Public-Private Partnerships supporting eco-systems.

High-value data sets from public sector
Examples: Geo-spatial data, soil and environmental data...
Looking ahead

The use of digital twins has the potential to enable an interoperable and sustainable transformation in agriculture. By creating virtual representations of physical assets such as fields, animals, or machinery, digital twins can be enhanced with data from sensors and cameras on the land, utilising **Cloud, Edge, AI, and IoT** technologies to optimise water usage, accurately spread seeds and fertilisers, and reduce the need for harmful pesticides.

The benefits of using digital twins in farming are numerous, including improved efficiency and productivity, reduced waste and environmental impact, and better decision-making capabilities for farmers. Additionally, digital twins can provide a platform for testing new farming techniques and technologies, reducing the risk of costly and time-consuming trial-and-error processes.

However, challenges remain in implementing digital twins in agriculture, including the need for reliable and secure connectivity, data privacy and ownership concerns, and the cost of implementing such technologies. As such, there is a need for further research and development, as well as collaborative efforts among farmers, industry leaders, and policymakers, to fully realise the potential of digital twins in agriculture.

Digitalisation of Agriculture: Horizon 2020
The future of farming
Follow the latest progress and learn more about getting involved.
Follow the Commission's work on tech and digital @DigitalEU (https://twitter.com/DigitalEU)

Latest News

PRESS RELEASE | 11 January 2024

The new rules define the rights to access and use data generated in the EU across all economic sectors and will make it easier to share data, in particular industrial data.

PRESS RELEASE | 14 December 2023
The Commission has adopted this week the amendment of the Digital Europe work programmes for 2024, assigning €762.7 million in funding for digital solutions to benefit citizens, public administrations, and businesses.

DIGIBYTE | 14 December 2023
Over €760 million investment from the Digital Europe Programme for Europe’s digital transition and cybersecurity

The European Commission has adopted the amendment of the Digital Europe Programme Work Programmes 2023-2024

PRESS RELEASE | 07 December 2023
EU and the United States hold Cyber Dialogue in Brussels

The 9th EU-U.S. Cyber Dialogue took place in Brussels over the past two days. The EU and the U.S. discussed their shared commitment to a resilient cybersecurity partnership; an open, interoperable, secure, and reliable Internet; and stability in cyberspace.

Browse Internet of Things
The EU actively cooperates with industry, organisations and academia to unleash the potential of the Internet of Things across Europe and beyond.
Dig deeper


The future of farming relies on research, innovation and capacity building in the agri-food sector funded through multi-financial framework initiatives.


Through Horizon 2020, more than €200 million for Research and Innovation (R&I) were allocated to the deployment of digital technologies for the agricultural sector.

See Also


The European Union’s Digital Decade policy programme sets our goals for the digital transformation, with 10,000 climate-neutral edge nodes as one target. This means cloud, edge and the Internet of Things have a big role to play.


The future Internet of Things and Edge Computing can revolutionise the way production and processes are organised and monitored across strategic value chains.


A study carried out on Internet of Things (IoT) clusters in Europe provides a deeper understanding of dynamics, drivers and success factors in this area.


The Commission is working to ensure more robust and resilient security frameworks for IoT devices and the networks of which they are a part.

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