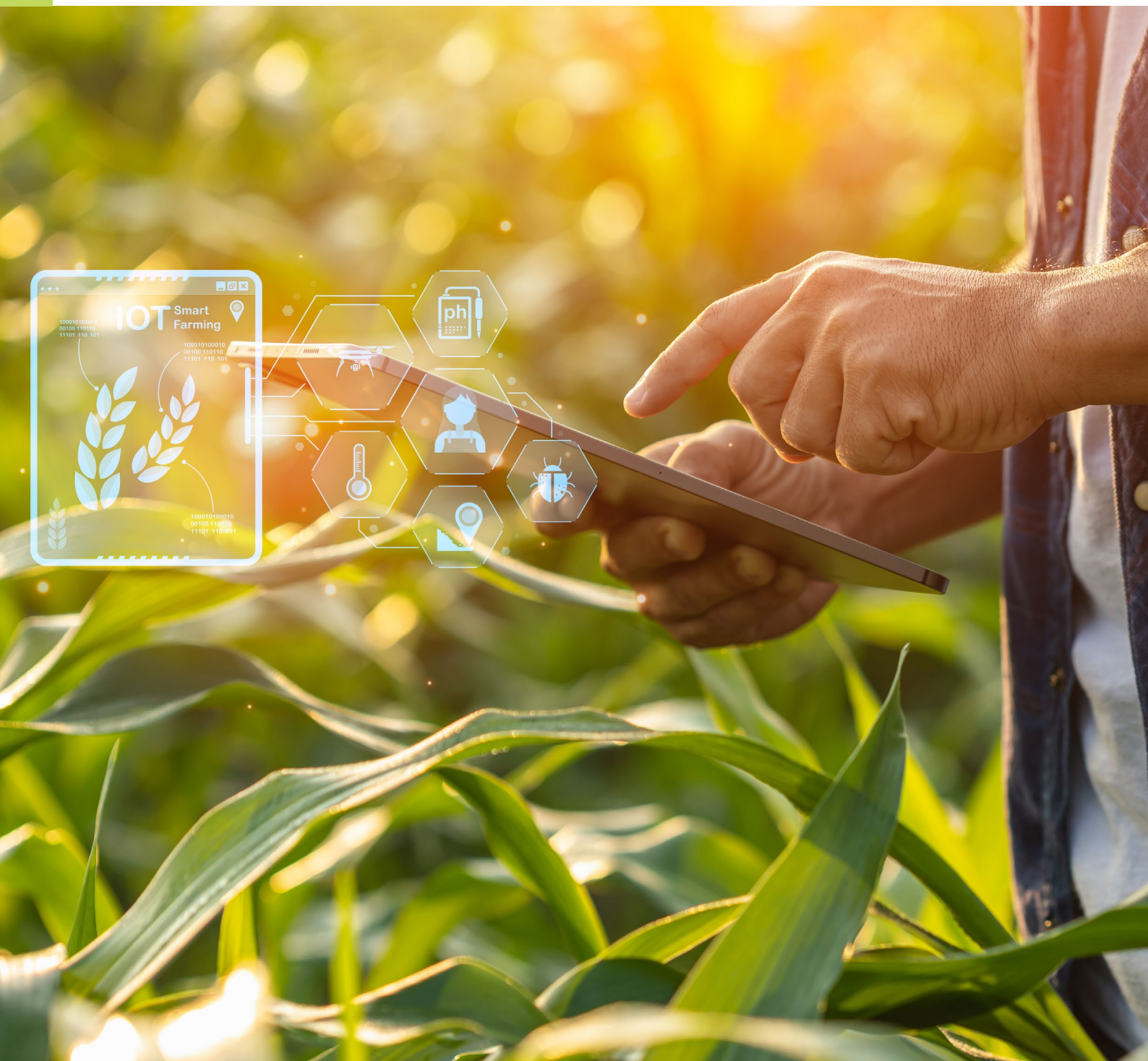
QuantiFarm

Funded by
the European Union

Strengthening Competitiveness for DATSs Adoption in EU Farming Systems

POLICY BRIEF



Highlights

Digital Agricultural Technology Solutions (DATSs) can strengthen competitiveness in EU farming systems, but their uptake depends on more than technology availability alone. QuantiFarm's competitiveness analysis shows that adoption is shaped by the broader market and policy environment, including data governance, interoperability, access to finance, advisory capacity, skills, and viable business-model conditions.

The analysis indicates that competitiveness depends on coherent policy measeures, rather than on isolated instruments. The most supportive combinations consistently bring together regulatory clarity, targeted incentives and risk-sharing finance, innovation support and standardisation/interoperability measures, and advisory and capacity-building mechanisms. At the same time, business model viability is a decisive adoption lever: models with unclear value propositions, opaque pricing, or weak support services tend to remain sub-optimal or critical, whereas models that build trust, provide reliable service delivery and reduce farmers' upfront risk are more likely to support sustained uptake.

QuantiFarm also identifies recurring cross-cutting barriers affecting most DATSs families: persistent shortcomings in data governance and interoperability, uneven access to finance and risk-sharing instruments, and a structural skills and advisory gap. These barriers affect both farm-level decisions and the wider market conditions needed for DATS deployment and scale-up.

We recommend

To improve self regulation & uptaking

1. Enabling business models that reduce entry barriers through leasing, pay-per-use, subscription-based solutions and lower-risk finance.
2. Maintaining proportionate and innovation-friendly compliance, while avoiding unnecessary administrative burdens and overly complex certification requirements.
3. Improving data governance, interoperability and connectivity through phased and practical implementation.

To improve regulation

4. Integrating DATSs into CAP and regional support frameworks, including support for the service layer required for sustained use.
5. Supporting collective uptake through cooperatives, producer organisations, public-private partnerships and long-term demo and benchmarking networks.
6. Strengthening AKIS, advisory capacity and continuous training, including micro-credentials and a 2030 digital skills roadmap for agriculture.

Background & Challenges faced

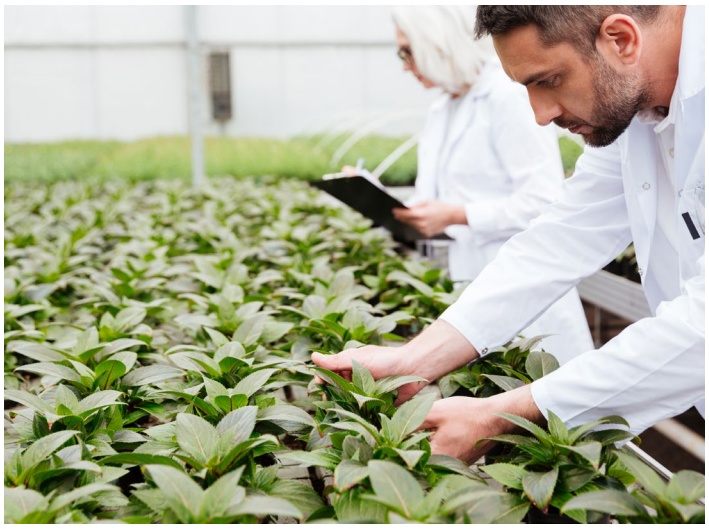
Within QuantiFarm, competitiveness was analysed under Task 5.3, led by Confagricoltura. The analysis examined competitiveness of farmers and technology providers, mapped the relevant policy and regulatory landscape, and assessed business model configurations across the nine DATS groups using evidence from real-life test cases. The methodology combined two dedicated lenses: policy criteria analysis and business model analysis, supported by shared steps on DATS categorisation, test-case evidence and policy landscape review.

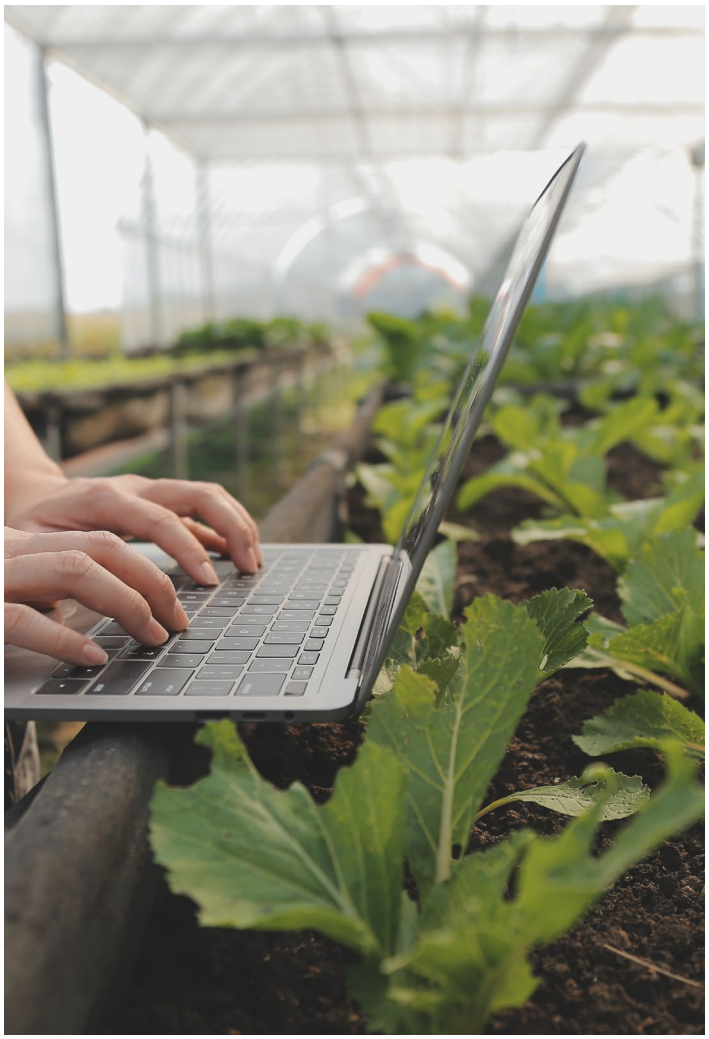
The broader policy context is one in which digitalisation is increasingly framed as a strategic enabler for modernising agriculture, reinforcing resilience and supporting competitiveness. At the same time, QuantiFarm notes that effective uptake requires more than a general policy ambition: it depends on shared data infrastructures, interoperable platforms, clear governance frameworks, and practical support mechanisms that make digital tools accessible, affordable and usable in everyday farm management.

At operational level, farmers and cooperatives face a set of recurring constraints. These include investment costs and financing pressures, uneven digital skills and advisory availability, connectivity gaps, interoperability and standardisation barriers, and uncertainty around data governance and fair value conditions. Cooperatives and producer organisations are particularly relevant in addressing these bottlenecks because they often manage data, provide technical support and act as intermediaries between innovation and implementation.

QuantiFarm's matrices and scoring exercises show that three constraints cut across most DATS groups: persistent weaknesses in data governance and interoperability, uneven access to finance and risk-sharing instruments, and a structural skills and advisory gap. The analysis also identifies sector-specific differences: crop-related DATSs show strong potential for input optimisation and climate- and soil-related services, while livestock-related DATSs are especially relevant for animal health, welfare and emissions monitoring.

QuantiFarm Insights





The competitiveness analysis used two complementary lenses. The first was a policy criteria analysis, where policy tools were mapped and assessed across multiple criteria, including regulatory, economic and fiscal, industrial and innovation, reputational, labour, rejuvenation, consumer and credit dimensions. The second was a business model analysis, where configurations were assessed across six thematic areas: demand, supply, revenues, timing, financials and regulatory frameworks, and then classified as optimal, sub-optimal or critical under real-life conditions.

This analytical approach allowed QuantiFarm to identify both supportive and hindering conditions for DATS adoption. A key result is that the most effective packages are not single measures, but coherent combinations of policy and market-design tools. Another major result is that business model viability matters directly for competitiveness: short-term uptake is supported by service-based models, subscription or pay-per-use approaches, bundled solutions and advisory-supported adoption, while longer-term market maturation requires interoperability, data portability, performance-based pricing, reliable service conditions and financing aligned with asset lifecycles.

The final prioritisation process further refined these insights. Two clusters emerged as the strongest quick wins: AKIS and advisory capacity and the 2030 digital skills roadmap for agriculture. A third strong near-term priority is collective uptake and demo/benchmark networks. Among the more structural measures, mission-driven R&I, testbeds and real-farm pilots is seen as highly important but harder to implement, while CAP and regional funding for DATS infrastructures is considered a practical enabling measure. Data governance, interoperability and connectivity is important and well accepted, but harder to deliver quickly and therefore suited to phased implementation.

Validation discussions also reinforced several transversal messages: adoption depends on enabling conditions such as skills, advisory, connectivity, data governance and access to finance; CAP support should not only finance equipment, but also the recurring service layer that makes DATS usable in practice; and regulatory approaches should remain proportionate, operational and stakeholder oriented.

Validation Insights

The final validation process coordinated within WP5 further strengthened the competitiveness recommendations by confirming that DATS uptake depends not only on the technologies themselves, but also on enabling conditions such as skills and training, advisory capacity, connectivity, data governance and interoperability, and access to finance. Validation discussions also reinforced the importance of collective uptake through cooperatives, producer organisations and public-private partnerships, as well as the need to treat digital tools as multi-use infrastructure within CAP and rural policy implementation. In addition, stakeholders stressed that support should address not only one-off equipment acquisition, but also the recurring service layer required for effective use in practice, including software, maintenance, technical support, connectivity, training and advisory. The same process confirmed that certification requirements linked to digital technologies should remain voluntary, accessible and proportionate, while also highlighting the need for greater clarity on young farmer eligibility in relation to digitalisation incentives.

Policy recommendations

1. Short-term measures to accelerate uptake

In the short term, QuantiFarm recommends measures that reduce entry barriers and make the value proposition of DATS clearer and more manageable for end users. This includes standardisation and interoperability between FMIS and CAP, a regulatory fitness check on data rights and obligations in agricultural data management, and opening CAP to eligible technological services linked to DATSs. Additional measures include removing bureaucracy in market entry and technology application, supporting accessibility through leasing and switching options, and reducing financial risks linked to new DAT investments.

The short-term package also includes economic and fiscal measures such as tax credits for agricultural robotics, automated guidance technologies and automated feeding systems; tax incentives for FMIS and digital support tools; and incentives for automatic milking systems and animal welfare technologies. Voluntary reputational tools can also play a role, including certification for farms with high animal welfare standards, quality certification for advanced monitoring systems and milk produced with AMS, and digital sustainability certification for companies using FMIS. Priority access to EU funds for young farmers adopting FMIS is also identified among the short-term options.

From the business-model perspective, short-term competitiveness is supported by service-based offers, subscription models, pay-per-use schemes, bundled solutions and advisory-supported adoption, provided that conditions improve accessibility, interoperability, contractual transparency and ease of switching.

2. Long-term measures for market maturation

For the longer term, QuantiFarm recommends measures that strengthen the structural enabling environment for competitiveness. These include regulations promoting efficient fertiliser use and environmental impact reduction, strengthened market positions for farmers in adopting DATSs, harmonised test methodologies on efficiency gains, and support for minimum standard quality and traceability digital tools in livestock systems.

Long-term competitiveness also depends on skills and human capital. The deliverable highlights support for alternative local working options in farming, more accessible new-skills training and micro-credentials, support to farms in building the additional human capital required by DATSs, and training for farmers on smart technologies. On the innovation side, the long-term agenda includes stronger support for start-ups and companies developing DATS solutions, and support for research on AI and sensors for animal health.

Long-term finance measures include micro-financing for small farms adopting DAT systems, dedicated funds for digitising agricultural data collection, financing lines for smart machinery and credit lines for modernising dairy farms. The long-term agenda also includes consumer-facing information campaigns on food quality and safety improvements from automation. More broadly, QuantiFarm associates long-term market maturation with interoperable data standards, data portability, performance-based pricing, enforceable service-level agreements, and multi-year renewal options aligned with asset lifecycles.

3. Prioritised clusters for implementation

- QuantiFarm's prioritisation exercise identifies the following clusters as particularly relevant for implementation sequencing:
- Quick wins: AKIS and advisory capacity; 2030 digital skills roadmap for agriculture.
- Strong near-term option: collective uptake and demo/benchmark networks.
- Long-term structural measure: mission-driven R&I, testbeds and real-farm pilots.
- Practical enabling measure: CAP and regional funding for DATS infrastructures.
- Important but harder to deliver quickly: data governance, interoperability and connectivity.
- Promising but more contested: de-risking scale-up, technology neutrality and sandboxes.

4. Feasibility conditions emerging from validation

The validation process adds several practical implementation conditions. First, support schemes should address the total cost of ownership, not only one-off equipment purchase, by allowing support for software subscriptions, maintenance, technical support, connectivity, data integration, training and advisory. Second, certification linked to digital technologies should remain voluntary, accessible and not excessively burdensome. Third, implementation should remain technology-neutral, proportionate and aligned with existing conformity and certification frameworks.

6 Feasibility & impact potential

The competitiveness recommendations can largely be operationalised through existing instruments, especially CAP Strategic Plans, AKIS-related implementation choices, regional innovation and advisory programmes, cohesion policy, guarantees and credit schemes, and EU data and AI governance frameworks relevant to agriculture. QuantiFarm presents these recommendations not as isolated interventions, but as a practical policy package to reduce adoption frictions, improve market conditions and strengthen the enabling environment for sustained DATS uptake.

The evidence also suggests that successful digitalisation depends on a balanced allocation of responsibilities among policymakers, farmers, advisors, cooperatives and technology providers. In both the short and long term, the objective is not only to stimulate adoption, but to do so under conditions that remain fair, investable, interoperable and proportionate.

Contact details

Daniele Rossi d.rossi@confagricoltura.it

Alessandro Lachetti alessandro.iachetti@confagricoltura.it

Elisabetta Pierantoni ext.elisabetta.pierantoni@confagricoltura.it

Confagricoltura - QuantiFarm WP5 Leader

Strengthening Competitiveness for DATSs Adoption in EU Farming Systems

POLICY BRIEF

QuantiFarm

Funded by the European Union