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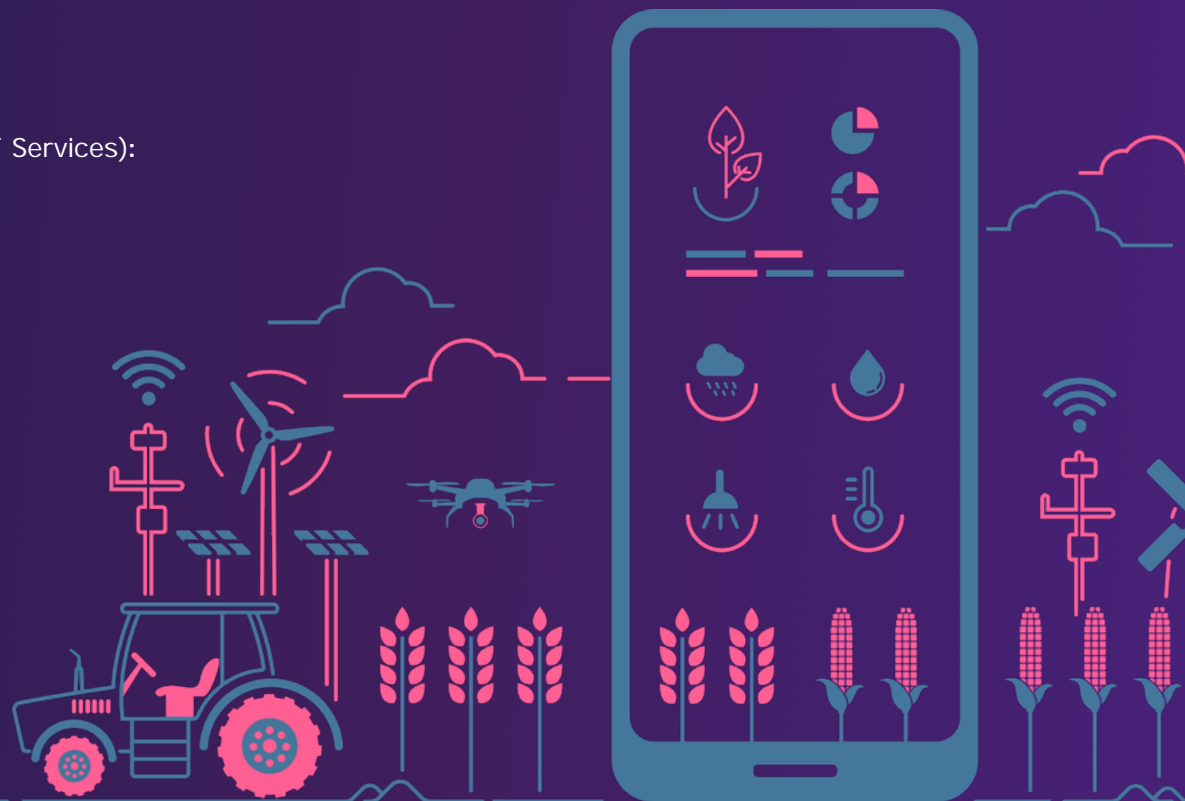
Cloud-Edge-IoT Innovations in Agriculture and Crisis Management: Exploring Data Spaces, Value Chains, and Practical Applications

Post-webinar Report

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1. Introduction

This report summarises discussions, presentations, and insights from the event organised by UNLOCK-CEI on 20th February 2024, as part of the EUCloudEdgeIoT initiative and focused on the integration of Cloud-Edge-IoT technologies in agriculture and crisis management. The event highlighted the need for technological transformation to meet increasing global food demands and address environmental issues. It brought together stakeholders from academia, industry, technology, and farming to discuss how cloud computing, edge analytics, and the Internet

of Things (IoT) can be applied to improve farming practices.

Participants aimed to understand the current state of technology in agriculture and crisis management, identify barriers to adoption, and outline steps toward a future where technology enhances sustainability and productivity. The discussions were grounded in practicality, aiming to bridge the gap between technological potential and on-the-ground agricultural needs, thereby charting a course for a more efficient, sustainable, and technologically integrated agricultural sector.

2. Event overview and agenda

The webinar attracted **120 registrants** and **83 live attendants**. It was part of the “Cloud-Edge-IoT industry innovations” webinar series that collectively aims to explore the latest industry trends, discuss sector-specific service requirements, showcase real-world use case presentations, and engage in panel discussions with industry experts to shed light on the challenges and opportunities faced by companies in adopting and harnessing the full potential of these technologies. The event showcased the following rich agenda:

Opening of the webinar

- 📌 Welcome and opening remarks, housekeeping – Maria Giuffrida, Trust-IT Services
- 📌 Introduction to policies framing IoT in agriculture – Doris Marquardt, Programme Officer EU Policies, EC
- 📌 Overview of UNLOCK-CEI & CEI trends in agriculture – Golboo Pourabdollahian, IDC
- 📌 Value chain dynamics in agriculture sector – Inessa Seifert, VDI/VDE IT
- 📌 AgriDataSpace project presentation – Sjaak Wolfert, Wageningen University

Use Case Presentations

- 📌 NebulOus – Precision Agriculture – Vasilis Zaridis, Raven
- 📌 NebulOus – Crisis Management – Amir Azimian, atFire
- 📌 ICOS – Agriculture Operational Robotic Platform – Artur Jaworski, PSNC
- 📌 NEMO – Smart farming and Precision Agriculture – Antonis Gonos, ENTERSOFT
- 📌 AerOS – Connected and Cooperative Mobile Machinery focused on agriculture – Anna Ryabokon, TTControl & TTEch
- 📌 FluidOS – Smart Viticulture – Andy Edmonds, Terraview
- 📌 Nephele – Disaster Recovery – Leonardo Militano, ZHAW
- 📌 Agridataspace – Roberto García González, Universitat de Lleida

Promotion of MetaOS open calls

- 📌 NebulOus – Ana Luísa Alves, F6S
- 📌 FluidOS – Costanza Pestarino, Digital SME

Panel Discussion with Industry Experts moderated by Maria Giuffrida, Trust-IT Services

🗣️ Leonardo Militano, ZHAW

🗣️ Alexander Wagner, John Deere

🗣️ Konstantinos Railis, Synelixis

🗣️ Andy Edmonds, Terraview

Q&A session with the audience

3. Main Topics and Challenges

3.1 Adoption of Cloud-Edge-IoT Technologies in Agriculture

The webinar revealed an increasing yet cautious interest among the agricultural community in embracing Cloud-Edge-IoT technologies. Significant hurdles remain while the potential for enhanced data-driven decision-making and operational efficiency is well-recognised. These range from infrastructural limitations, such as inconsistent internet access in rural areas, to cultural barriers stemming from a lack of familiarity with digital tools. Effective adoption is further complicated by diverse agricultural environments, varying from high-tech greenhouse operations to traditional open-field farming, each with unique technological needs and challenges. Bridging this gap requires tailored, context-sensitive approaches that accommodate different farming practices' specific circumstances and constraints.

3.2 Skepticism and Adoption Barriers

Panel discussions underscored the deep-seated scepticism among farmers towards new technologies, rooted in concerns over cost, complexity, and practical applicability. This resistance is compounded by apprehensions about data security and control, particularly given the increasing prevalence of data breaches and privacy violations in the digital age. Farmers are understandably wary of adopting systems that may expose sensitive operational or financial information. Overcoming these barriers necessitates clear, transparent communication regarding the benefits and safeguards associated with new technologies and robust support structures to facilitate their integration into existing agricultural workflows.

3.3 Technical and Infrastructural Challenges

The technical intricacies of implementing Cloud-Edge-IoT solutions in agriculture were a focal point of discussion. Key issues highlighted include the need for seamless data flow between a myriad of devices and platforms, ensuring real-time data processing capabilities at the edge to facilitate timely decision-making, and developing scalable cloud solutions to manage the deluge of data generated by modern agricultural practices. These challenges are magnified by farms' physical and operational diversity, necessitating flexible, adaptive solutions capable of accommodating a wide range of environmental conditions and farming techniques.

3.4 Regulatory and Social Challenges

The regulatory environment surrounding digital agriculture is in a state of flux, presenting a significant challenge for farmers and technology providers alike. Navigating the complex web of agricultural, environmental, and data protection regulations can be daunting, particularly for smaller operations with limited legal resources. Additionally, the event highlighted the crucial role of social factors in technology adoption, including the importance of community norms, generational divides in digital literacy, and varying levels of trust in new technologies. Addressing these challenges requires a collaborative, multi-stakeholder approach that respects the values and concerns of agricultural communities while promoting compliance and ethical technology use.

4. Main Learnings & Future Steps

4.1 Engaging with End-users

The dialogues emphasised the paramount importance of directly engaging with the farming community to promote technology adoption. This engagement should extend beyond mere consultation, involving farmers in designing and testing new tools to ensure they meet real-world needs and are user-friendly. Demonstrating technology in action through field trials and pilot projects can provide tangible evidence of its benefits, helping to dispel scepticism and build trust. Furthermore, these interactions offer valuable feedback for refining and improving technological solutions, ensuring they deliver practical value to end-users.

4.2 Simplification and Education

The complexity of modern agricultural technologies can be overwhelming for many farmers, underscoring the need for simplification and education. This entails streamlining user interfaces and workflows and providing comprehensive training programs that demystify technology and empower farmers to harness its full potential. Such programs should be accessible, hands-on, and tailored to different skill levels, enabling farmers to progressively build their digital competencies and confidence. Moreover, ongoing support and guidance are essential to help users navigate challenges and leverage technology effectively in their daily operations.

4.3 Multidisciplinary Approach

The conversations underscored the necessity of a multidisciplinary approach to developing and implementing agricultural technologies. This approach should integrate technical expertise with insights from agricultural science, social science, economics, and environmental studies to create well-rounded solutions that address the multifaceted challenges of modern agriculture. Collaborative efforts that bring together technologists, agronomists, social scientists, and farmers can foster innovation that is both cutting-edge and grounded in the realities of agricultural practice, leading to more sustainable, equitable, and effective outcomes.

4.4 Future Steps

The event outlined a clear path forward, emphasising the need for ongoing collaboration, standardisation, and innovation. Developing common protocols and standards can facilitate interoperability and ease of use, while clear data governance models are crucial for addressing privacy and security concerns. Additionally, fostering partnerships between the public and private sectors can accelerate innovation and provide the necessary resources for technological advancement. Continuous monitoring, evaluation, and adaptation of technological solutions based on real-world performance and farmer feedback will be key to ensuring that these innovations remain relevant and beneficial in the ever-evolving landscape of agriculture.

5. Conclusion

The use of Cloud-Edge-IoT technologies within the agricultural landscape offers significant prospects for transforming traditional farming into a more efficient, sustainable, and resilient enterprise. This potential shift, however, is not without its challenges. Success hinges on collective action to dismantle prevalent obstacles, stimulate widespread and inclusive innovation, and cultivate a foundation of trust among all parties involved in the agricultural process.

Achieving the promise of these technologies requires a multifaceted approach. It demands that stakeholders from various backgrounds – technology experts, farmers, policymakers, and researchers – work in unison. Together, they must tackle technical, social, and economic barriers that currently hinder the full-scale adoption of innovative practices. This includes addressing issues of digital literacy among farmers, ensuring the interoperability of different technologies, and creating economic models that make technological adoption viable for all scales of farming operations.

Moreover, fostering an environment of inclusive innovation is crucial. Solutions should not be developed in isolation but should result from collaborative efforts that consider the diverse needs and challenges of the global farming community. This collaborative spirit extends beyond just the development of technologies; it encompasses the creation of supportive policies, educational programs, and financial models that facilitate access and implementation of these advancements across the sector.

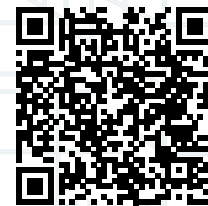
Building trust among stakeholders is another cornerstone for realising the potential of Cloud-Edge-IoT technologies in agriculture. Trust is

cultivated through transparency, consistent results, and the ethical use of data. It requires clear communication about how technologies work, how data is used, and how privacy is protected. It also involves demonstrating tangible benefits that can be achieved through technology adoption, such as increased crop yields, reduced environmental impact, and improved market access.

In conclusion, navigating the path towards a technologically empowered agricultural future is a complex journey that necessitates a user-centric, multidisciplinary, and collaborative approach. It calls for a concerted effort to ensure that technological advancements align with the needs and realities of farmers while contributing to food security and environmental sustainability. By addressing these challenges head-on and leveraging the collective expertise and resources of the global community, the agricultural sector can step confidently into a future where technology serves as a pillar for growth and resilience.

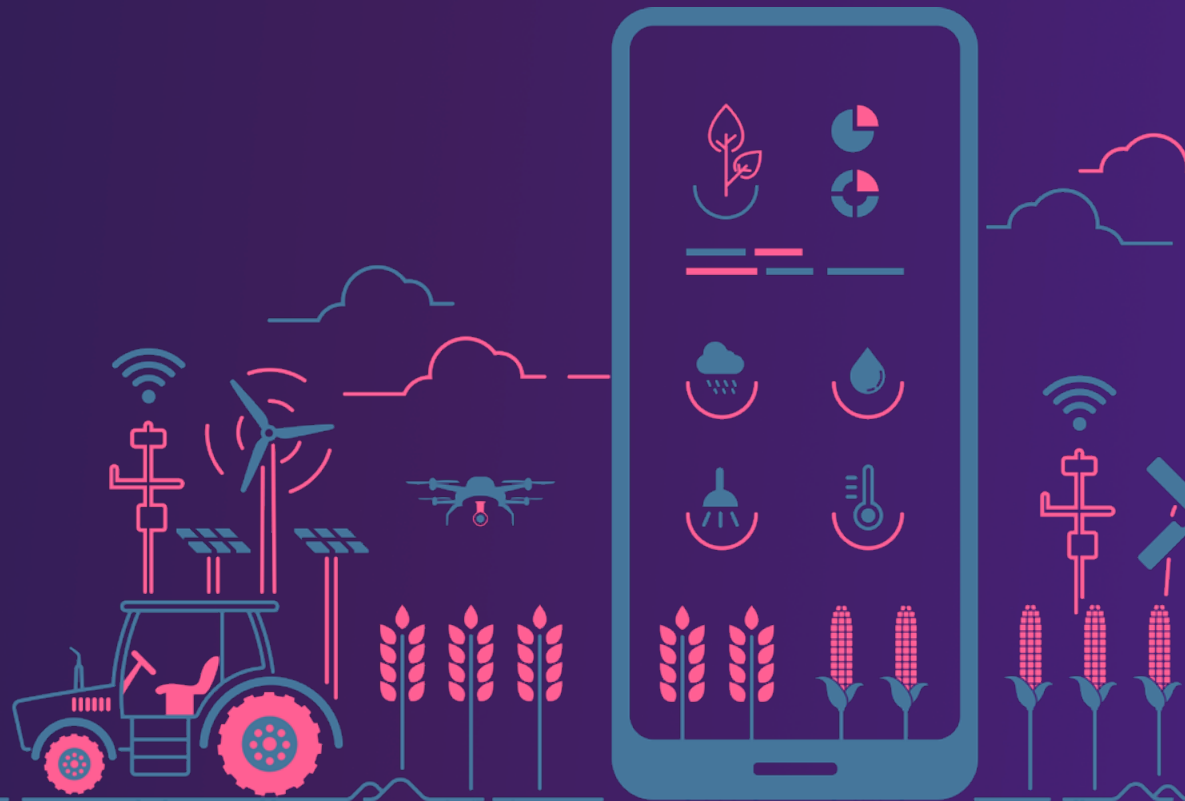
Rewatch the webinar and download the slides:

<https://eucloudedgeiot.eu/event/eucei-event-agriculture-crisis-management/>





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