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STARTUPS REVOLUTIONAISE AGRICULTURE – THE CASE OF HUNGARY

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ABSTRACT – The digitalisation of the agricultural sector, which the subsequent proliferation of artificial intelligence has accompanied, has also been accompanied by the introduction of numerous innovations in various areas. These innovations are typically associated with businesses and startups driven by innovation. The present study examines the phenomenon of agricultural startups, focusing on global unicorn companies, and considers the case of Hungary in Europe. Several startup databases were consulted to gain insight into the subject, including the American Crunchbase database, the Dealroom database and the European startup database. The research findings indicate that most agriculture-related unicorns are located in North America, with a notable absence in Europe. Nevertheless, numerous agriculture startups provide innovative solutions to the region's challenges. The study culminates with a case study of Hungary, which introduces the distinctive Hungarian National Chamber of Agriculture (NAK) Techlab program launched in 2019. Since then, several funding opportunities have been made available for agriculture-related startups in Hungary, indicating a gradual increase in the number of agricultural startups and their success rate.

Keywords: entrepreneurship, startups, unicorn, agriculture, agritech, sustainability, Hungary

INTRODUCTION

The growing global population and the unsustainable use of natural resources are devastatingly affecting our planet, causing climate change, destroying nature and raising pollution levels; therefore, developing strategies to build sustainable and resilient economies and societies is necessary. Regional competition has also been intensified in the past decades (Bodnár, 2020).

In this sense, agriculture has recently become an essential target of technology startups worldwide (Szalavetz, 2023). Startups will shape the future of agriculture (Borda & Balogh, 2023). As demonstrated by Fenyvesi and Kesmarki-Gally (2012), the integration of advanced information technology solutions can enhance Hungary's utilization of its distinctive agricultural potential, thereby conferring a competitive advantage to its agricultural sector and food industry. This, in turn, is expected to positively impact domestic input production. Furthermore, research focused on production processes fosters the development of novel technologies and machinery.

In the past decade, due to their favourable economic impact and role in stimulating modern growth (Eisenbeis, 2018), there has been considerable scientific interest in startups. Giuliani et al. (2024) argue that the study of innovation-driven enterprises, in particular startups, is crucial. Just as Bednarikova et al. (2020) argued, it is essential to examine the factors that influence the young generation's intention to startup businesses.

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The term "startup" is a neologism that has gained considerable currency in recent years. Startups are considered new forms of innovative and fast-growing enterprises in traditional industries, creating intense competition and displacing former leaders (Kézai & Skala, 2024). They represent a new entrepreneurial path in the changing economic environment. They also The global environment requires rapid change, and startups drive correct dynamic change in the digital environment. They are venture capital investments where entrepreneurs can be short-lived but do not represent a greater risk than starting a company. It focuses on testing the market availability of existing ideas and displaying which ideas are viable in a given market. This is a catalyst for the dynamic development of startups, which can implement innovative ideas but can be changed quickly with little investment and flexibility (Skala, 2019). Businesses are less flexible and make significant changes in market segmentation, market, supply and demand. The life curve of startups is very variable. Startup characteristics expected are young entrepreneurs, innovations, technological development and high risks (Csákné et al., 2020).

The primary purpose of this study, similar to Borda & Balogh (2023), is to analyse the agriculture-related startups in Hungary. This paper seeks to answer the research question: What are Hungary's latest trends in agriculture startups?

This study aims to present the latest trends in agricultural startups. The methodology employed is based on secondary research, which includes a literature review, database analysis, and a case study of the HNCA (the Hungarian National Chamber of Agriculture) Tech Lab Program. Given Hungary's longstanding history as an agricultural nation, the agricultural sector offers a significant opportunity for economic competition, with innovative directions emerging as a potential source of growth.

The remainder of the paper is structured as follows. The literature review section provides an overview of the principal research findings about startups, innovation-driven enterprises, and agricultural startups. The subsequent section, "Methodology," describes the research method employed, the study area, and the database on which the research is based. The findings section includes the key results and a case study, and the article will conclude with a discussion of the conclusions drawn and suggestions for future research.

LITERATURE REVIEW

The literature review is comprised of two distinct sections. The initial section identifies the term startup, while the subsequent section presents the agriculture startups.

STARTUP THE INNOVATION-DRIVEN ENTERPRISES

There is no consensus in the scientific literature regarding the definition of a startup. However, several characteristics can be observed (Díaz-Santamaría & Bulchand, 2021). As Szalavetz (2022) notes, new companies utilising digital technologies, that is to say, competitors from outside the industry, are emerging in traditional industries. These startups are creating significant competition and, in some cases, even displacing the former leaders of traditional industries by disrupting the established parameters and characteristics of competition. It should be noted that startups can be defined as a subset of SMEs, namely young, innovative companies that address global markets based on technological, process, or business model innovation (Surana et al., 2020). Startups differ from large companies in their organisational structure, leadership style, reactions to the environment, available resources and the internal context in which they operate. This is mainly because startups lack expertise, resources, funding and technology (Budden et al., 2023).

Startup enterprises have become a focus of public policy due to their potential for short-term growth and innovation. They are a significant catalyst for open innovation processes (Spender et al., 2017). Policymakers view science, technology, and innovation as crucial in achieving sustainable development goals by establishing scientific, technological, and innovation-based startups (Ács et al., 2007; Audretsch et al., 2007). Startups offer novel, superior, and more effective solutions, technologies, and business models for urban challenges that are not yet available (Cooper et al., 2018).

According to Ács et al. (2017), the success of the startup ecosystem can be gauged by the number of unicorns it has produced. The term 'unicorn' describes companies with a capitalisation of

more than USD 1 billion (Pride, 2018; Kenney & Zysman, 2019). The most prominent examples include Airbnb, Facebook, and Google, though several prominent agricultural cases exist. There are multiple categories of unicorns, including decacorns, valued at over $10 billion, and hectocorns, valued at over $100 billion.

RESEARCH BACKGROUND ON AGRICULTURE STARTUPS

An enterprise engaged in the field of agriculture is designated as an "agtech," "agritech," or "agrotech" entity. As Marvin (2018) notes, these companies are designed to facilitate the application of technology in the agricultural sector. The success of these technologies is contingent upon the rate at which producers can assimilate them.

As Dutia (2014) and Pham and Martin (2018) have observed, agrotech's principal objective is to modify the agricultural sector through increased productivity and reduced socioenvironmental costs. Baladraf et al. (2024) highlight that agritech startups have emerged as an innovative and forward-thinking solution for enhancing efficiency within the agricultural supply chain. However, despite their contributions, the supply chain operations of these startups exhibit significant sustainability challenges and inherent limitations. The specific objectives of agrotech can be enumerated as follows in Table 1.

Table 1. *Agrotech startups*

Minimising food waste
Reducing CO2 emissions
Optimising the quantity of chemical waste produced
Managing the quantity of water used in agricultural production
Mitigating the scarcity of a qualified workforce
Optimising agricultural distribution and logistics

Source Authors' own compilation based on Blanco (2019)

Examining the research papers related to the topic, we have found that agricultural startups contribute to sustainable agriculture and food security in four aspects: technological innovations (e.g., precision farming, biotech), economic impacts (e.g., job creation, investment trends), Environmental practices (e.g., resource management, biodiversity), and policy and regulation (e.g., subsidies, compliance).

As for technological innovation, agrotech startups are at the forefront of transforming agriculture through innovative technologies that enhance efficiency, sustainability, and productivity. One of the key areas of focus is precision farming, which utilises advanced tools such as drones, sensors, and GPS to optimise crop yields while minimising waste and environmental impact (Sahoo et al., 2007). Moreover, integrating the Internet of Things (IoT) in agriculture allows for real-time data collection and analysis, further enhancing precision farming practices (Chin & Audah, 2017).

As for economic impact transformation of agriculture through sustainable practices has also had profound socio-economic implications. It promotes inclusive growth by promoting practices accessible to small farmers and improving food security at the community level. In addition, sustainable agricultural models can create new employment opportunities for the green economy, from the installation of renewable energies to the management of sustainable agricultural operations (Rushchitskaya et al., 2024).

Sustainable agriculture is another critical focus for Agrotech startups as they develop practices prioritising environmental stewardship and social equity (De Wolf et al., 2004; White, 2020). Vertical farming, for instance, presents a space-efficient method of growing crops in urban settings, significantly reducing land use and environmental impact (Birss, 2024). Farm management software also plays a crucial role in streamlining operations, allowing farmers to manage crop planning, monitoring, and harvesting more effectively (Preininger & Hafner, 2021).

As for policy and recommendations in the era of agriculture4.0, agricultural startups have emerged outside the core countries of agricultural innovation and have the potential not only to grow rapidly but also to have a beneficial impact on upgrading local agriculture. However, achieving rapid change is limited. Diverse programmes that address the most important barriers hindering a large-scale adoption of innovative agricultural solutions would take decades to bear tangible results (for example, a meaningful improvement of farmers' digital capabilities). Agricultural advisory organisations and programmes helping farmers implement all the complementary innovations that are indispensable for the integration of innovative solutions in their practices is crucial (Szalavetz, 2024).

To sum up, agrotech startups are leveraging a combination of precision farming, advanced technologies, and sustainable practices to revolutionise the agricultural landscape, ensuring a more efficient and environmentally friendly future for food production; therefore, exploring them is crucial.

METHODOLOGY

Research area

The research area is Hungary, situated in Central and Eastern Europe. According to the Hungarian Statistical Office (HSO, 2023), the share of agriculture, forestry and fishing of gross value added was 2023 3.2%. The Hungarian startup ecosystem is still in its infancy (Jáki et al. 2020), and there is a paucity of long-term time series data, which presents a significant obstacle to studying startup businesses (Radácsi & Csákné Filep, 2018). National country reports examining the startup ecosystem in the country have only been available since 2020 (https://www.startuphungary.io/reports). The Startup Hungary Report (2023) was based on the responses of 147 startups. However, the Startup Genome Report, one of the most comprehensive reports about global startup ecosystems, indicates that Budapest represented Hungary, which is the centre of the startup ecosystem. In 2024, Budapest was ranked 123rd on the global ranking list. (Startup Genome, 2024).

Data and methods

The data were obtained from the American Crunchbase, the Dealroom, and the European Startup databases. The American Crunchbase database is a commercial database on innovative companies maintained by Crunchbase Inc., an innovative startup based in San Francisco, California. The database was established in 2007, but its scope and coverage have increased significantly recently. Crunchbase is one of the most comprehensive and well-known databases of startup companies. It is the leading platform for professionals to identify innovative companies, establish connections with the individuals behind them, and pursue new opportunities. Crunchbase is relied upon by over 55 million professionals, including entrepreneurs, investors, market researchers, and salespeople, as a source of information for business decisions. In addition to Hungary, the database includes startup companies from approximately 198 countries worldwide. Crunchbase is the most comprehensive database of its kind, offering information on high-tech companies and investors across the globe. It is a paid database, with researchers granted free access (Kézai et al., 2020; Kézai & Kurucz, 2023). The data on 30 September 2024 was used based on the Crunchbase database (2024) to identify the unicorn startups. The empirical research presents an analysis of the Hungarian data in the database on 23 August 2023. The total number of registered Hungarian startups was 3,741. Following the exclusion of closed, IPO and acquired companies from the database, the remaining startups were 3,548. According to Skala (2019), startups are defined as young enterprises, and thus, only companies founded within the last ten years were considered, leaving 723 startups.

In order to gain a comprehensive overview, the Dealroom database was also incorporated into the study. The Dealroom is the most comprehensive data source on venture capital funding for Central and Eastern European companies. However, the data's veracity depends on the reports' sponsorship. However, the investments in named companies in the Dealroom database provide a more tangible representation of the venture capital industry (Karsai, 2023). Finally, as the paper focuses on Hungary, located in Central and Eastern Europe, we implemented the European startup database, Eu-startups.com.

RESULTS AND DISCUSSION

The result section is comprised of three parts. The first provides an overview of global agriculture-related unicorn startups in 2024. The second presents the leading European startups. The third section focuses on Hungarian agriculture startups with funding opportunities for startups. Finally, the study introduces a novel program the Hungarian National Chamber of Commerce implemented to support innovation-driven enterprises.

AGRICULTURE UNICORN STARTUPS IN 2024

According to the Crunchbase database, the largest global database of startups, there were 1,277 unicorn companies in September 2024, exhibiting a geographic and sectoral distribution of unequal density. Examining the geographical distribution of the unicorn startups, we found that the majority of unicorn startups are situated in North America (55.20%), with 26.39% located in Asia, 13.70% in Europe, 1.8% in South America, and 0.39% in Africa. Additionally, approximately 2.4% of startups have no available information. Of the 175 unicorn startups in Europe, the majority are located in Western Europe (75%), with 10% in Northern Europe and 8% in Central Europe. Switzerland has five unicorns, while Austria, Croatia, Lithuania, the Czech Republic, Liechtenstein, and Luxembourg have one. In the Visegrad countries, the Rohlik Group, one of Europe's leading online grocery delivery services, was founded in Prague, Czech Republic, in 2014 (Crunchbase database, 2024).

Analysing the list of unicorn companies based on sectoral differences, we found that the top four industries are the Enterprise Tech industry (31.25%), Financial Services (17.70%), and Consumer & Retail (16.37%). Notably, agricultural unicorns do not represent a significant proportion of the overall unicorn industry. Instead, they are categorised separately, accounting for 2.8% of all unicorns in 2024 (Crunchbase database, 2024).

According to Dealroom (2024), Agritech startups raised a record $8 billion in 2021 and $3.9 billion more in 2022. There are currently 19 agriculture technology unicorns globally (Dealroom, 2024). Table 2 summarises the top 10 global agricultural unicorns by foundation date in 2024.

Table 2. *Agriculture Unicorns by foundation date in 2024*

	Startup	**Location**	**Date of foundation**	**Characteristics**
1	Ynsect	France	2011	Alternative food industry
2	Apeel Sciences	USA	2012	Preservation of fresh produce with plant-derived shelf-life extension technology
3	Nature’s Fynd	USA	2012	Nutritional vegan protein from a microbe
4	InFarm	Germany	2013	Vertical farming
5	Farmers Business Network	USA	2014	Business network
6	Medicaid	China	2014	E-commerce platform
7	Bowery Farming	USA	2015	Vertical farming, farm monitoring
8	Nixing	China	2015	Training for farmers
9	Tridge	South Korea	2015	Online trade platform
10	Inari	USA	2016	Seeding change

Source: Crunchbase database (2024)

AGRICULTURE STARTUPS IN EUROPE

In addition to the global startup unicorns, the Startup Europe database (2024) identifies several promising agriculture startups on the European continent. Table 3 provides a summary of the most promising agriculture startups and their characteristics that were founded in Europe.

Table 3. *Most promising agriculture startups in Europe (2024)*

	Startup	Location	Date of foundation	Characteristics
1	Agricarbon	United Kingdom	2020	Measures and validates soil carbon capture and storage for farms and carbon markets.
2	Agrobiomics	Denmark	2022	Natural biostimulants., that make the agriculture more resilient
3	Biocentis	United Kingdom	2022	Revolutionise insect control through advanced genome engineering and a unique technological platform.
4	Carbonmaps	France	2022	Offers a comprehensive, science-based, data-driven environmental accounting platform for the food industry
5	Garden	United Kingdom	2020	Optical phenotyping technology and analytics to optimise food production.
6	Klim	Germany	2020	Supports the transformation to regenerative agriculture at scale by providing financial support, knowledge, documentation tools, and a community via their digital companion for farmers
7	Proteas	Belgium	2021	Germplasm provider for sustainable plant proteins.
8	Several technologies	France	2020	Manufactures innovative agricultural tractors,
9	Source Ag	Netherland	2020	Empowering growers through AI
10	Undo	United Kingdom	2020	World-leading carbon dioxide removal project developer specialising in enhanced rock weathering

Source: own compilation based on eu-startups.com

The role of agtech, or agricultural technology, in the evolution of farming practices is of significant consequence. It offers solutions that enhance crop yields, reduce resource usage, and minimise environmental impact. These innovations transform how we grow and produce food, making farming more efficient, sustainable, and resilient to climate change and food security challenges. In Europe, agtech and agriculture companies are at the forefront of this transformation, developing innovative solutions tailored to the region's unique challenges.

HUNGARIAN AGRICULTURE STARTUPS AND THE FUNDING OPPORTUNITIES

In the case of Hungary, which has a long history of agricultural production, even in 2024, agriculture remains a significant contributor to the country's industrial output, as evidenced by the findings of the EIT Food report (2022). In 2019, the Hungarian government launched the Digital Agenda for Prosperity (2019-2022), aiming to increase agricultural production's profitability through collecting and processing sectoral information, automation and robotisation of technological

operations while efficiently using available environmental resources. Domestic agribusinesses are making a significant contribution to this, some of which have already started to exploit the opportunities offered by digitalisation in response to the benefits of technology and market pressures. The programme, therefore, aims to support the development of a digital agri-innovation environment and startup "ecosystem" that can contribute to the realisation of Smart Farming 4.0 in the long term, which is a term for the digital agricultural economy, or in a narrower sense, precision agriculture, information and communication technologies (ICT), decision support based on the collection and processing of large-scale data, and technological and management reform leading to the ever closer integration of automation and robotisation, and to changes in production, farm management and business models for product trajectories. Innovation-driven startups can be crucial in achieving these challenges, so developing a digital agri-innovation environment and startup ecosystem is essential (Hungary's Digital Agricultural Strategy, 2019).

Based on our analysis the Hungarian agriculture-related startups were founded in the last ten years, and are mainly in the fields of Agtech, Animal Feed, Artificial Intelligence, CleanTech, Consulting, Delivery, Drones, E-commerce, Energy, Environmental Engineering, Farming, Food Processing, Forestry, Information Technology, Hardware, Health Care, Hydroponics, Livestock, Machinery Manufacturing, Natural Resources, Recycling, Renewable Energy, Software and Water Purification, Table 4 summarises some great examples. The technology related companies are located in the capital and its surrounding, while other in the upcountry.

Table 4. *Agriculture startups in Hungary*

	Startups	**Location**	**Date of foundation**	**Characteristics**
1	AgroPilot	Baja	2018	AgroPilot specialises in imports, installation, and operation of TOPCON's agricultural products.
2	ALZAGRO	Szolnok	2018	ALZAGRO manufactures a smart and reliable grain sampling drone.
3	MOOW	Budapest	2018	Agriculture Sensor for Optimising Cow Milking Process
4	Growberry	Szarvasgede	2018	We are digitalising all knowledge related to plant cultivation to improve productivity and risk control of farms and the processing industry.
5	Inventori Solutions	Kecskemét	2019	Inventori Solutions is a digital production tracking and inventory management platform for agricultural producers or trading companies.
6	Grinsect	Hódmezővásárhely	2019	Grinsect breeds and processes black soldier flies in an intensive vertical farming system.
7	Green Drops Farm Ltd.	Debrecen	2019	Develop, research, and sell innovative, vertical hydroponic systems.
8	Proofminder	Budapest	2021	Proofminder puts an “agronomist” next to each plant, as our leaf-level farming platform sees invisible things for other solutions.
9	SpaceCrop Technologies	Budapest	2022	SpaceCrop is an agritech that helps farms manage irrigation and increase crop resiliency using satellite data and artificial intelligence.
10	3R-BioPhosphate Ltd.	Budapest	2022	Agricultural spraying technology

Source: own compilation based on the Crunchbase, Eu-startups and Dealroom database

NAK TECHLAB PROGRAM AND OTHER FUNDING OPPORTUNITIES FOR AGRICULTURE STARTUPS IN HUNGARY

The Hungarian National Chamber of Agriculture (HNCA) initiated the NAK TechLab incubation programme in 2019 to support innovative enterprises operating within the agricultural sector. This programme represents a collaboration between the HNCA and the Design Terminal, convening all stakeholders in the sector to facilitate the development of innovative solutions for the Hungarian agrifood industry. The objective is to enhance competitiveness, sustainability, and environmental consciousness.

The programme's objective is to support startup companies engaged in developing niche agricultural solutions, offering them the opportunity to further refine their products with the assistance of large Hungarian corporations, including Auchan, Bonafarm, SIÓ, and Syngenta.

Those accepted into the three-month incubation program can develop their business through business training, intensive workshops, and working with agribusiness, business development, and corporate mentors. The incubation process will conclude with a Demo Day as part of the Agtech Summit Conference, where the projects will be presented to a professional jury of agribusiness decision-makers and will have the opportunity to interact with other companies and investors.

Over the past five years, the NAK TechLab has supported more than 100 innovative ideas from over 1,000 young startup founders. Robotics and energy management are the most popular fields in the NAK Techlab programme. In 2023, the winning ideas were dFARM (https://dfarm.hu/), SMAPP LAB (https://smapplab.com/), Water minilab (https://www.waterminilab.com/), and Proofminder (https://proofminder.com/) (HNCA, 2024).

In addition to the NAK TechLab programme, there are several funding opportunities for agriculture startups in Hungary (Table 5).

Table 5. *Funding opportunities for (agriculture) startups in Hungary*

Investor/ Venture capital/ Accelerator	Characteristics
Hiventures	Hiventures is an investment fund management company that provides seed, pre-seed and growth investments through its venture capital programmes.
Impact Ventures	Impact Ventures oversees two social impact funds, mainly focusing on social innovation. Their objective is to generate a quantifiable positive social impact in conjunction with a financial return. To this end, they invest in and provide business development support for social enterprises with sustainable, scalable business models, including those in the agrifood sector.
Vespucci Partners	Vespucci Partners is a venture capital fund based in Budapest that seeks to identify and support startup teams with innovative products capable of achieving success in the global market. The fund invests in seed and series A startups with global potential, aiming to identify and support exceptional startups in their international growth. The investment process is characterised by clarity and transparency.
OXO Labs	OXO Labs offers financial support of up to EUR200,000 for early-stage projects and further incubation services. These include access to expert and mentoring activities, financial advice, and office infrastructure. For those projects that perform successfully, the next stage of funding is made available via later-stage investor group members. The agricultural technologies sector is also a target area for investment.

Design Terminal	The Innovation Agency cultivates "innovation champions" through corporate partnerships and talent acceleration. It provides corporate leaders and startup founders the requisite knowledge and access to catalyse innovation across any organisation. Incubation programmes are operational in 12 countries, including Hungary. Since 2014, the organisation has collaborated with over 1,000 startups and several leading corporations.
Startup Campus	Startup Campus represents a global programme designed to support innovative businesses at all stages of their development, from the initial conceptualisation phase to the point of market entry. The programme is active in global events to enhance the visibility of Hungary and Central and Eastern Europe, foster entrepreneurship, and establish connections between the regional startup ecosystems.
Climate Launchpad	Climate Launchpad is seeking agrifood startups with Greentech components. The programme is primarily designed for early-stage startups or even concept owners. It facilitates the rapid transition of an idea into a business with the guidance of experienced business coaches.

Source: own compilation based on EIT Food report (2022:18-19.)

However, this is a very divisive issue, as many studies have confirmed. Many studies have discussed venture capital funding in Hungary, where public venture capital funds account for the largest share of total venture capital funding (Karsai, 2018; 2023). This is an overly generous government support, but it is not a panacea (Szalavetz, 2023).

Given the growing workforce shortage in the service industry, faster adoption of new technologies could be crucial (Vitezić & Perić, 2024). Nevertheless, even though new technologies can make many high-skilled jobs more intrinsically motivating (Gibbs, 2017), this study highlights some points to consider. The attitudes of experienced and digitally skilled users are valuable and reveal essential strategic tracks. This applies to both AI device designers and service providers, particularly to future efforts related to social influence.

CONCLUSIONS

The study examined agricultural startups, which are increasingly vital for addressing the unique challenges of urban population change, climate change, food security, resource scarcity, and many other factors. The research highlights that this sector's most successful startup companies are concentrated mainly in North America. Europe – particularly Hungary – is witnessing a gradual rise in innovative agritech ventures. In Hungary, initiatives like the NAK TechLab programme underscore the country's commitment to supporting agriculture-focused startups. Launched in 2019, NAK TechLab offers financial backing, partnerships, and professional guidance, facilitating rapid growth and industry integration for early-stage agritech companies. Domestic startups are capitalising on opportunities in precision agriculture, crop management, and sustainability, aided by funding from both national and European sources. This research constitutes a significant theoretical contribution, as it is among the first studies in Hungary and the broader Central and Eastern European region to examine agrotechnology startups.

An explicit acknowledgement of the inherent limitations of any research project necessitates ongoing scientific inquiry and serves as a critical foundation for the rigorous design of future investigations. Using Crunchbase data, Dealroom, and Eu-startups is not without significant limitations. These databases are primarily reliant on self-reporting by the startups themselves. Consequently, when startups do not consider the value of providing up-to-date data, the information may become outdated or even absent from the database. This latter scenario may be the case, considering the markedly smaller number of Hungarian startups. Nevertheless, knowing all three limitations, this field has no better data source.

Given the novelty of agricultural startups and the limited availability of scientific literature, further research is warranted. Future studies could focus on agricultural startups in Hungary, which represents a relatively young startup ecosystem. One promising direction would be the investigation of the operational dynamics of agricultural startups, with comparative analyses against enterprises in other sectors. Another avenue involves a detailed evaluation of agrotechnology startups established through initiatives such as the NAK Tech Lab program and comparable national and international programs. In addition, research on the application of Artificial Intelligence in agriculture constitutes a crucial area, given the rapid expansion of AI across multiple sectors. Finally, extending the geographical scope of inquiry to include other Central and Eastern European countries would further enrich the understanding of this emerging field.

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