EUROPEAN STRATEGIC CLUSTER PARTNERSHIP FOR EXCELLENCE
AgriFoodX5.0

D8.4 Policy Brief of AgrifoodX5.0 project

LITHUANIAN INNOVATION CENTRE (LIC)

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1 CONTENTS

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2 INTRODUCTION

AgriFoodX5.0 is a project aimed at strengthening the collaboration between clusters and improving their management capacity and the services provided to their members by facilitating the cooperation, networking and exchange of best practices and knowledge between the partners and their members. Ultimately, it aims to improve the capacity of the participants to support their members in their transition towards the Industry 5.0 concept in the food sector.

The project involves five cluster organisations from different countries:

- Lithuanian Innovation Center (LIC) - Lithuania
- Smart Food Cluster (LITMEA/SFC) - Lithuania
- Food Products Quality Clusters (FPQC) - Latvia
- The Galician Food Cluster (Clusaga) - Spain
- Associação do Cluster Agroindustrial do Centro (InovCluster) - Portugal

This deliverable presents the results of Tasks 8.4 “Learning activities”, which aim at learning from each other, and giving constructive feed-back to develop services that we provide to our SMEs, and how we collaborate nationally and globally. Also, summarize learning from other projects operating in similar fields to learn from successful and unsuccessful experiences. This policy brief aim to enhance cross-fertilization between AgriFoodX5.0 partners and policy makers, especially on the opportunities and barriers for clusters internationalization, the impact of various trends on SMEs competitiveness and the potential to respond to economic challenges, as well as the enhancement of new relationships.

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3 EXECUTIVE SUMMARY

The Agrifood industry is experiencing a swift advancement in digital transformation, with global discussions extending beyond Industry 4.0 to anticipate the fifth and sixth industrial revolutions. The process of digitalization is reshaping the entire product lifecycle, from design and manufacturing to usage and maintenance. Furthermore, it is revolutionizing supply chain operations, enabling companies to minimize their environmental footprint. Ultimately, these changes are intricately connected to heightened business competitiveness, increased productivity, innovation, and elevated wages.

Digitalization in the agrifood industry is not merely a technological advancement; it is a transformative force that can significantly enhance safety and human-centricity. This policy brief advocates for the development in public policy areas that can increase the speed of digital transformation in various EU countries and regions, emphasizing its pivotal role in addressing safety concerns and promoting human-centric practices. Recommendations include skills development, strategic investments, collaborative initiatives to leverage digital technologies effectively.

4 CONTEXT AND IMPORTANCE

The impact of technological advancements is being felt in all industry sectors, thus, there is no doubt that digital transformation will significantly affect the Agrifood industry sector as well. The contemporary agrifood industry operates in a complex environment, given the deteriorating economic landscape, escalating geopolitical risks, and the increased volatility witnessed in energy and commodities markets, all of which are exerting substantial pressure on the performance of whole industry. While certain countries and regions both globally and at the European Union level, as well as specific sectors within the AgriFood industry, are anticipated to increase their economic activities, certainly there are instances where some of them struggle to maintain their production volumes.

However, amid these challenges, digitalization presents a unique opportunity by offering innovative solutions. From smart sensors ensuring crop health to blockchain technology providing supply chain transparency, the importance of digitalization lies in its potential to make the agrifood industry safer, more efficient, and aligned with human-centric values. The ongoing digital revolution in agriculture and food systems opens up fresh avenues for the sector to generate added value, streamline trade, and meet consumer needs. Acting as a catalyst for innovation, digital technology spans from basic, mobile phone-based solutions to cutting-edge "digital farms" incorporating data from drones. This transformative digital shift empowers farmers to boost productivity, foster sustainability, and fortify

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resilience. Additionally, it contributes to the simplification of international trade by optimizing customs processes, risk evaluation, and logistics.

Acknowledging the paramount significance of digitalization within the AgriFood industry, it becomes particularly important to observe the evolving trends and the broad spectrum of this transformative journey. In this pursuit, this Policy-brief stands as a valuable document, poised to provide significant assistance to different innovation ecosystems that has particular focus in Agrifood industry, how they can completely adopt the principles of Industry 4.0 in the installation of digital solutions within all segments of value-chain creation and start preparing for the Industry 5.0 evolution. Research on the digital tools and technologies that have already been applied in the companies was performed during the phase of AgriFoodX5.0 project. Based on the above-mentioned research recommendations have been formulated to encourage the process of digitalization in these companies, ensuring they stay at the forefront of innovation in the dynamic Agrifood landscape.

5 POLICY AREAS

The development and use of digital technologies in industry is thriving in these countries or regions, where the conditions are favourable. One of the main factors enabling innovation development and industrial transformation are the human resources that support the processes of creation, diffusion and use of technology. Two other important elements that contribute to a more competitive and technological based industry are business investment and innovation activities. Finally, a business environment that is strongly influenced by the quality and availability of infrastructure, the provision of business development services, the creativity and opportunities for cooperation, together with the qualitative parameters of this process, constitute another key element of the business pillar of the enabling conditions for digitisation.

The sub-categories of Enabling environments for digital business transformation are presented below:

5.1 Skills

Human capital with the right competences and the ability to continuously develop them is essential to ensure the continuous digitalisation of industry. The right human capital not only uses and maintains the various digital technologies, but also promotes the introduction of new technologies and the optimisation or updating of processes to ensure the competitiveness of the company and to adapt to the latest market developments.

In the agrifood sector, digital literacy takes on an increasingly crucial role. The agriculture and food industries have been incorporating digital technologies to enhance productivity, efficiency, and sustainability. This includes the implementation of precision agriculture, data analytics, Internet of

Things (IoT) devices, and other technological advancements. However, only one in ten of farm managers in EU had full agricultural training, and there remains a scarcity of young farmers, with 55% of agriculture employees in the EU being over the age of 55.

5.2 Communications infrastructure and services

The cornerstone of digital transformation lies in having a communications infrastructure and services that are both easily accessible and of high-level quality. A reliable and efficient communications infrastructure enables a wide range of activities related to the digitalisation of industry integration into company processes. For instance, efficient connectivity ensures the smooth exchange of data among Internet of Things devices; businesses have seamless access to cloud computing; suppliers, manufacturers, distributors and customers can collaborate more quickly and efficiently.

However, the fundamental infrastructure, such as broadband or access to other high-speed internet connections, remains a partially unmet need in numerous rural areas, which means that some rural communities are not able to reap the full benefits of the social and economic integration that digitalisation brings. Bridging this digital divide becomes not just a matter of connectivity but a pathway to unlocking opportunities for these communities, ensuring they can participate actively and enjoy the complete spectrum of advantages that come with the digital era. In essence, investing in and expanding the reach of communications infrastructure is not just about technology; it is a commitment to inclusivity and ensuring that the benefits of digitalization reach every corner, fostering a more connected and prosperous future for all.

5.3 Collaboration

Collaboration between different actors in the context of the digitalisation of industry plays a key role in tackling the complex issues involved in this process, which are often beyond the capacity of companies alone to tackle. Potential cooperation partners in the context of digitisation can be actors in value chains, institutions that create, preserve and transfer knowledge, public institutions.

One of the untapped collaboration areas are the data sharing, which in the agrifood sector is important to guarantee a steady supply of food and biomaterials in the EU. Digital farming technologies promise to help agrifood industry make well-informed decisions that improve the quality and quantity of their production, with less labour and less impact on the environment. This future, however, can only become a reality if industry players are willing to share their data with other entities and organisations that develop digital technologies.

Embracing a culture of openness and collaboration in data sharing not only fosters innovation but also forms the bedrock for a sustainable and interconnected digital ecosystem. It is a shared commitment

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among industry participants to collectively advance towards a future where the benefits of digitalization are maximized, ultimately contributing to a more efficient, resilient, and environmentally conscious agrifood sector.

5.4 Investment

According to experts, any utilization of resources aimed at reducing current consumption to enhance future capabilities should be considered an investment. Business investment can include expenditure by companies to acquire both tangible assets (e.g. machinery, equipment, and buildings) and intangible assets (e.g. software, databases, intellectual property, company-specific human capital and organisational or marketing capital, such as brand and reputation).

In the year 2022, farmers and agrifood SMEs in the EU faced with a significant financial shortfall, reported an unmet demand of €62 billion. Thios disparity notably impacted small farms and young farmers. The financial gap for SMEs in processing agrifood products was €5.5 billion, exhibiting notable variations among Member States. Furthermore, the sector encountered an unmet investment need of €18.9 billion for associated with the green transition, such as organic production, digital solutions, advanced machinery, and measures to enhance sustainability and resilience against environmental challenges. Addressing these financial gaps not only supports the immediate needs of the agrifood sector but also paves the way for a more sustainable and resilient future.

5.5 Deployment of innovations

Innovation is defined as a new or improved product or process (or combination thereof) that is significantly different from the entity's previous products or processes and that is available to potential users (in the case of a product) or is used by the entity (in the case of a process). In the context of innovation, companies often use digital innovations to achieve a variety of objectives in terms of corporate governance, production processes, etc.

It is essential to establish a supportive framework that enables SMEs and small-scale producers to access and leverage science and innovation, serving as pivotal catalysts for fostering positive changes in the agrifood system. Innovation in this content, emerges as the driving force that can guarantee profitability for agrifood companies and farmers, simultaneously ensuring the provision of safe, nutritious, and affordable food for all, while promoting sustainable utilization of natural resources, renewable energies, and circular practices.

In essence, fostering an environment that encourages and supports innovation is not merely a strategic choice; it is a commitment to the holistic advancement of the agrifood sector. By embracing innovative solutions, companies and farmers can navigate challenges, maximize efficiency, and

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contribute to a future where the agrifood system is not only economically viable but also socially responsible and environmentally sustainable.

6 RECOMMENDATIONS

Taking into account the evolution of digitisation-related processes in agrifood industry and global trends, the following recommendations outline key areas for public interventions aimed at enhancing the scope and effectiveness of digital transformation:

Developing human capital:

1.1. Encourage companies to invest in digital competences:

- develop and improve the effectiveness of financial support instruments to promote the training, up-skilling or retraining of employees in the context of the application, deployment and use of digital technologies;
- create a system of tax incentives to encourage industry to invest in training and retraining programmes for workers in the application, deployment and use of digital technologies;
- develop and improve the effectiveness of advisory services related to digital competences and to improve the efficiency of digital skills development in enterprises.

1.2. Promote the supply and quality of training programmes to build digital competences:

- Review the content of policies for training, up-skilling and re-skilling of staff, prioritising initiatives that build competences for the application, deployment and use of digital technologies;
- developing new curricula/adapting existing curricula to better respond to industry, adapting existing curricula to the needs of industry in the context of the digitalisation of processes;
- review career guidance policies to expose students to STEM disciplines and attract them to study programmes related to the digitisation of processes;
- upgrading the competences of lecturers and teachers and updating the infrastructure required for the teaching process in higher education institutions in the light of ongoing digital technological progress.

1.3. Encourage the attraction of digital competences from abroad.

- Develop and implement programmes, Encourage the return of local citizens or attract foreigners with digital competences to regions in the development, deployment and application of digital technologies in the digitalisation of industry and to attract foreign students to study in programmes related to industrial digitisation, with the possibility to remain working in industrial companies.

1. **Digital infrastructure:**

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- Open up the public data needed to make digital technologies work;
- Develop public digital infrastructure and public digital services (ESIC, SIC, R&D, etc.);
- Develop a network of test infrastructure (test before invest) and pilot production available to industry;
- Expanding the 5G communication network;
- Establish a "Demo Digital Factory" to demonstrate the application of digital technologies in priority industrial sectors, allowing other companies in the relevant sectors to visualize the benefits of digital technologies.

2. **Public support for digitalizing business processes:**

3.1. Promote the supply of digital technologies:

- Support R&D by enterprises and/or research and education institutions projects involving the development of digital technologies.

3.2. Stimulating demand for digital technologies by increasing financial support instruments accessibility and efficiency:

- Reducing the administrative burden of utilizing public support instruments for digitalization e.g. the formalities of submitting documents or paying for a project, the evaluation of applications procedures, etc., prioritising the achievement of impact indicators;
- to include in the descriptions of public support measures their objectives, supported activities, requirements for applicants, evaluation criteria, etc., to better reflect the realities and needs of industry, taking into account the challenges of the digital transformation of industry to increase business efficiency (productivity and value added);
- develop a public service framework to enable industry to carry out the digital audits needed to make decisions on the deployment of relevant digital technologies to assess the feasibility of digital solutions.

3.3. Increase integration into international value chains based on digital technologies development and/or application:

- developing and improving the efficiency of advisory services on finding digitisation partners and technologies;
- Promote the involvement of industry in clusters whose performance is based on technological symbiosis (including the use of broad digital technologies);

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- to promote the involvement of Agrifood industry in international initiatives, clusters, R&D&I programmes promoting the development, deployment and application of digital technologies.

3.4. Increase the multiplier effect of digitalistaion, prioritising:

- digitalisation technologies, which in parallel contribute to negative environmental impacts reducing environmental impacts;
- the development and implementation of deep-tech technologies and innovations.

3.5. To strengthen the readiness of agrifood industry companies in the field of cyber security, by introducing companies to the challenges of cyber security and promoting the implementation of cyber security measures in business.

3. **Collaboration and Information Sharing:**

4.1. Facilitate Inter-Cluster Collaboration:

- Establish targeted initiatives or platforms that encourage collaboration among different agrifood clusters within the European Union. These platforms could serve as hubs for sharing best practices, knowledge, and resources.
- Create funding mechanisms to support joint projects and initiatives involving multiple agrifood clusters. This financial support could incentivize collaborative efforts aimed at addressing common challenges and exploring new opportunities.

4.2. Promote Cross-Sectoral Collaboration:

- Develop programs that facilitate collaboration between agrifood clusters and clusters from other industries and technology sectors. This cross-sectoral approach can lead to innovative solutions by integrating technologies and expertise from diverse fields.
- Foster partnerships with technology-focused clusters, such as those specializing in data analytics, artificial intelligence, or robotics, to explore how advancements in these areas can be applied to enhance efficiency and sustainability in the agrifood sector.

4.3. Establish a Knowledge Exchange Network:

- Create a centralized knowledge exchange network that connects agrifood clusters with clusters from various industries. This network could facilitate the exchange of information, research findings, and technological insights, fostering a collaborative ecosystem.
- Encourage participation in international initiatives that promote collaboration between agrifood clusters and counterparts in other regions, allowing for the sharing of global best practices and the identification of common challenges.

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7 CONCLUSION

In conclusion, the dynamic landscape of the agrifood industry, influenced by factors such as technological advances, economic complexities, and geopolitical risks, underscores the critical need for digital transformation. The digitalization of the agrifood sector not only presents a unique opportunity to address these challenges, but also promises to elevate efficiency, sustainability, and resilience to unprecedented level. Nevertheless, barriers including limited access to finance and a lack of digital literacy, particularly among small farms and young farmers, pose significant hurdles.

Recognizing the transformative potential of digital technologies, this policy brief serves as a valuable resource for innovation ecosystems within the agrifood industry. It extends recommendations to embrace the principles of Industry 4.0 and strategically prepare for the subsequent evolution into Industry 5.0.

Moreover, the successful deployment of digitalization in the agrifood industry relies on key enabling conditions. These encompass developing human capital with the right digital competences, improving digital infrastructure and communications services, fostering collaboration among stakeholders, and ensuring adequate investments in digital technologies. By addressing these aspects will not only empower the industry to navigate current challenges but also open up new avenues for innovation, sustainability, and international competitiveness. The recommendations outlined in this policy brief provide a comprehensive framework for policymakers, industry players, and other stakeholders to collaboratively propel the agrifood sector into a digitally transformative and resilient future.

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ANNEX – RESOURCES USED

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