

AHFES

A QUADRUPLE HELIX ATLANTIC AREA HEALTHY FOOD ECOSYSTEM FOR GROWTH OF SMES

D4.1 Analysis of current trends and best practices on H4 cooperation for innovation and growth in the AA

Project acronym: AHFES

Project title: A quadruple helix Atlantic Area healthy food Ecosystem for growth of SMEs

Project code: EAPA_1071/2018

Deliverable number and name: D4.1 Analysis of current trends and best practices on H4 cooperation for innovation and growth in the AA

Work Package: WP4 Framework for cross-regional cooperation for innovation in healthy food & lifestyles

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Document history:

Version	Date of issue	Content and changes	Edited by
0.1	30/09/2019	First draft of each case study report	NUI Galway, CLUSAGA, NIFDA, Valorial, EIT Food, INSA, BIC Innovation
0.2	01/10/2019	Feedback from NUI Galway on each case study	NUI Galway
0.3	09/10/2019	Second draft from on each case study	NUI Galway, CLUSAGA, NIFDA, Valorial, EIT Food, INSA, BIC Innovation
0.4	22/10/2019	Collation of all partner contributions	NUI Galway
0.5	12/11/2019	Final formatting	NUI Galway

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D4.1 Analysis of current trends and best practices on H4 cooperation for innovation and growth in the AA

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Executive summary

This deliverable provides an overview of 4H innovation and insights on best practices for innovation cooperation in the healthy food sector. Current trends and existing collaborative experiences implemented by AHFES partners to support SMEs to innovate are reported and analysed. Each region provided an overview of the trends and existing experiences in their regions and identified a success story analysed as a mini case study. These reports and systemised knowledge across these reports provide insight and inspiration for policy makers, SMEs, academics, and citizen stakeholders working to further enhance healthy food innovation projects.

Effective cooperation between government, industry, academia, and citizens transcends traditional silos, bringing diverse perspectives, skills, and resources together in a way that promotes teamwork and the sharing of ideas and know-how. This quadruple helix (4H) approach creates shared value that benefits all participants in the innovation ecosystem. EU, National, and Regional policies, technologies supporting connectivity, innovation methods and strategies all play a key role in supporting productive network activity, experimentation, and innovation ecosystem development. In the context of healthy food innovation, value is characterised by a long-term view, focusing on improved societal wellbeing and sustainability, as well as economic, sector, and company performance; and success is measured for the societal and economic ecosystem as a whole, in addition to individual enterprises. It is therefore important to understand how 4H actors cooperate to successfully innovate in different regions, and how best to share this learning across regions as part of the broader inter-regional exchange of knowledge, resources, and skills, which is central to the EU INTERREG programme.

This deliverable provides a context for understanding Healthy Food Innovation challenges in Europe, the importance of cooperation and innovation in this context, and the significance of developing learning systems and establishing and maintaining innovation ecosystems.

Each partner provides a broad overview of key types of cooperation used in their region, including specific trends, methods, policies that inform types of cooperation, under the following headings:

- Regional trends in cooperation and innovation
- Policies that inform the types of cooperation used
- Technologies, tools and methods supporting cooperation and innovation

Each partner also reports on a specific case where actors cooperated successfully to innovate. A consolidated overview of the cases, including the nature of the problem addressed, methods and strategies of cooperation, key successes, challenges, and learning experiences is provided. This is followed by presentation of the full set of regional reports and case studies. Finally, key ideas in relation to cooperation and innovation are presented in a summary conclusion.

1 Introduction

Healthy food and food system innovation are essential to human wellbeing and environmental sustainability. EU healthy food innovations must respond to a range of challenges including the triple burden of malnutrition (undernutrition, obesity, and hidden hunger), food poverty, and an ageing population, which play out in a broader ecosystem of challenges including ongoing urbanisation, resource scarcity, climate change, migration, and a growing world population with increasingly complex and uncertain supply chains.

Healthy and sustainable food system design and delivery implies a need for both food security and nutrition security -- food systems must produce and provide affordable, safe, sufficient, convenient, tasty and nutritious food for healthy and sustainable diets; and they need to be environmentally sustainable by making efficient use of natural resources and by limiting negative environmental impacts.

In its broad design, healthy food innovation implies a cooperative effort that encompasses the entire value chain from ecosystem services to primary production, harvesting, storage, processing, packaging, distribution, food safety, retailing, food services, waste management and recycling, to engagement with consumers and the provision of nutrition for citizens' health and well-being.

Healthy food innovations need to focus on maximizing citizen health and well-being while also future-proofing food systems by making them more sustainable, resilient, responsible, diverse, competitive, and inclusive, thus contributing to the FOOD 2030 priorities: nutrition for sustainable and healthy diets; climate smart and environmentally sustainable food systems; circularity and resource efficiency of food systems; innovation and empowerment of communities¹.

Over the past decades, the European Commission has developed and implemented a range of programmes to support innovation and cooperative approaches to growth. The growth strategy aims at delivering more jobs and better lives, thereby achieving a more sustainable future by concentrating on the long-term effects of innovation. The broad strategic goals involve working to deliver smart, sustainable and inclusive growth, which involves investing in education, research and development. The flagship initiative for developing and delivering EU innovation policies, the Innovation Union, comprises over 30 action points, some of which focus on regional and inter-regional innovation systems and the development of knowledge and skills through the innovative design of education and training systems and by enhancing cooperative exchanges of knowledge and the interoperability of products and innovative systems. In an effort to enhance social and territorial cohesion, structural funds are invested in innovation activities. The European Innovation Partnerships promote collaboration between regional, national and European stakeholders involved in research and innovation, and this includes the interregional cooperation programmes (INTERREG) which have been successful in demonstrating the ability of innovation partners to cooperate, learn, and grow together.

Regions can benefit in many different ways from interregional cooperation and the exchange of these benefits is central to the current AHFES project. This deliverable (AHFES, D4.1) focuses on current trends and existing cooperative and collaborative experiences implemented to support SMEs to innovate in partner regions. Each partner provides an overview of trends and existing policies and practices in their regions and describes a success story in the context of a short case

¹ FOOD 2030: *Future-Proofing our Food systems through Research and Innovation*. EUROPEAN COMMISSION. Directorate-General for Research and Innovation.

study. Key learning experiences are synthesised and a number of recommendations on best practice in cooperation are proposed.

The current deliverable report is divided into three sections. Section 1, this section, presents the introduction and methodology, focusing in particular on the principles and practice of innovation cooperation and the case study method used for understanding partner experiences across regions. Section 2 presents the main part of the report, including a consolidated knowledge synthesis of key ideas in relation to innovation cooperation extracted from an analysis of eight case studies; and the individual regional reports. Finally, section 3 concludes with a summary of key ideas and key recommendations for innovation cooperation.

1.1 Cooperation and Innovation

Successful innovation is grounded in successful cooperation -- it depends fundamentally on how well partners and stakeholders in an innovation ecosystem work together, and it depends on how co-creation processes across team members and organisations function to create novel products and services that are quickly adopted. European regions are striving to improve regional industry competitiveness by designing, implementing, and evaluating policies and measures focused on increasing the level of innovation. The INTERREG programme offers a unique pan-European opportunity for cooperation, knowledge exchange, and learning how to better innovate. This is particularly important in the healthy food sector given current challenges and the dynamic nature of the food ecosystem, which requires ongoing adaptation for sustainable successful functioning.

Evolving models of innovation -- triple helix (3H), quadruple helix (4H), and Open Innovation (OI) – all emphasise the importance of cooperation within innovation ecosystems. The INTERREG programme adds an emphasis on the sharing of specific policies and practices on how to foster innovation at regional level. There is significant learning potential embedded in interregional exchange. This collective learning across the EU can result in the uptake of new innovation practices within regions and better integration of innovation policies, thus making European food innovation partnerships more competitive and sustainable while improving the wellbeing of European citizens.

The context for healthy food innovation, akin to other fields of innovation, includes mega-trends such as digitization, mass collaboration, and sustainability needs, which are coming together to create opportunities to enable a significant increase in shared value due to innovation. However, achieving genuine shared value implies the disciplined practice of a new paradigm of innovation based on principles of collaboration, systems thinking, co-created shared value, cultivated innovation ecosystems, cooperative technological mastery and transfer, and rapid adoption.

In an ecosystem that supports and reinforces cooperation, healthy food innovation can become a discipline practiced by many, rather than a skill mastered by few. Notably, the quadruple helix innovation (4H) model proposes that the effective collaboration of citizens, government, academia, and industry is essential. Successful collaboration and cooperation across stakeholder groups can drive innovations that extend far beyond the scope of what any one entity can achieve on its own. Every successful cooperation will serve to foster and reinforce the type of social and territorial cohesion that is central to the mission of the Innovation Union. With a mindset focused on teams, collaboration, and sharing, Europeans can deliver healthy food innovations that leverage the talents and resources of all stakeholders. By cultivating systems thinking and better shared value distribution, silos can be replaced with more creative commons and shared societal capital. Innovation is viewed not only as an imperative for economic and social progress, but also

as a societal asset that undergirds human wellbeing and sustainable progress. In collaboration with citizens, academia, and government, SMEs and larger companies shift from optimizing short-term financial performance to optimizing longer-term gains focused corporate, social, and environmental conditions. This involves joint pathfinding where individuals and groups work together to build product roadmaps that identify the pathways from research to results, and where research groups and business groups share resources, risks, and decisions jointly, and are supported by government in doing so².

Beyond the triple helix model which emphasised collaboration between academia, government, and companies, the 4H model also highlights the central importance of the user or citizen. As innovation involves the adoption of something new which creates value for the individuals that adopt it, the user or citizen is often central to where value is realized. As such, the 4H model reflects the progressive moves from open innovation and networked innovation to the increasingly participative innovation approaches which have developed over the past decade. Ultimately, successful collaborative and cooperative relations between all stakeholders in the 4H innovation process is important, as is an understanding of the context in which collaboration is occurring and the key targets and goals of 4H collaborative efforts (see figure 1).

As can be seen in Figure 1, the key roles and functions of different stakeholder groups are important to distinguish, and it is the synergistic effect of their diverse and complementary functions that maximizes the power and potential of 4H innovation cooperation. For instance, government roles and functions includes developing public services; support citizen involvement; developing and promoting healthy food innovation policies; supporting the development of industry and research organisations; and collecting and analysing data. Citizens can participate in policy development and implementation; provide information on needs and experiences; participate in the idea and development phase of innovation; and test products and services in real life contexts. Academia can work to produce knowledge relevant for innovation activities; train healthy food innovation experts; support technology transfer; and develop methods for innovation activities. Finally, industry can develop products and services; utilize know-how of experts and users; collect and analyse information about user needs and user experiences; and provide resources to sustain collaborative healthy food innovation projects.

² Curley M. & Salmelin B. (2013). Open Innovation 2.0 – A new Paradigm. EU Open Innovation and Strategy Policy Group. OI2 Conference Paper.

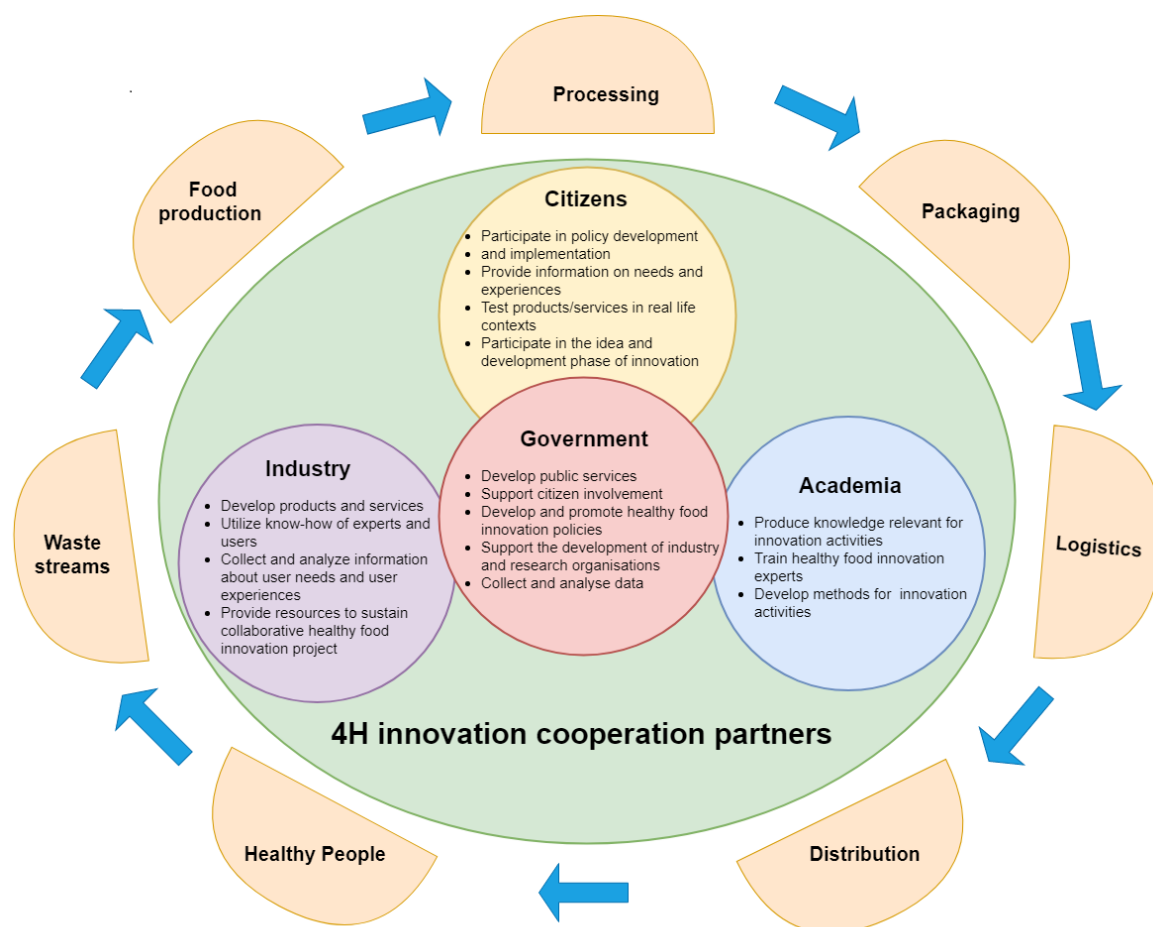


Figure 1. 4H innovation cooperation in the healthy food sector

The EU has the potential to lead international best practice in 4H healthy food innovation cooperation, but more work is needed to support ongoing learning and development in the sector. It is increasingly understood that the orchestration of successful innovation cooperation requires many elements, including well-functioning engagement platforms where people can develop their co-creation practices and learn together. An engagement platform can include concrete infrastructure such as a research facility, and co-creation labs, but it can also include social networking spaces. The Knowledge and Innovation Communities (KICs) supported by the European Institute of Innovation and Technology, and the ICT developed by these communities, provide good examples of engagement platforms. But every engagement platform, regardless of its design, requires high quality orchestration by co-creation facilitators and leaders, and every innovation project requires careful selection of key stakeholders and the right group of co-creators with relevant knowledge and expertise. Also needed are effective strategies and methods to support different stages of work throughout the co-creation process, and successful integration of specialised skills and competencies for different aspects of the overall innovation project. As such, successful 4H innovation cooperation entails a broad understanding of the innovation ecosystem and the design of bespoke innovation systems and operations for different innovation projects across regions. An analysis of different practices across regions, and specific case studies as presented in Section 2 of this report provide insight into the different ways in which innovation cooperation can manifest.

1.2 Systems of Learning

Successful cooperation is a relational activity that unfolds dynamically over time. This implies a focus on the relational system and the learning that takes place within the system as it adapts to changes over time. The cooperative exchange of information, and the cooperative coordination of skill, is essential for system learning and adaptive success in a dynamic and challenging environment. Through enhanced networking, 4H innovation systems can enhance social capital and enable more boundary spanning and the creation of new ways to leverage innovation options.

Systems of learning are most effective when the system is open to observation and control. While the individual actors of an innovation system may not view themselves as part of a 'system', the ability to observe and define themselves as a systems, is valuable as it facilitates deeper understanding of relational dynamics while also highlighting the importance of cooperation for adaptive control of operations³.

Peter Senge, in his book *The Fifth Discipline: The Art & Practice of a Learning Organization*, argued that achieving and maintaining organizational success is a cooperative, team effort⁴. Senge described five disciplines that need to be mastered in this context. First, the team need to develop a shared vision and clarity regarding the actions that are important to realize their vision. Second, group members need to understand the mental models (in particular, the assumptions and presumptions) that shape their particular view of reality. Third, they need to share their mental models of reality with one another to support team learning. Fourth, team members need to cultivate personal mastery: in particular, individuals in the group need to remain open to experience and learning, and constantly work to maintain a clear and unbiased view of reality. Finally, Senge argued that the discipline which binds these four other disciplines together is systems thinking, which is essential for holistic understanding of any problem situation or innovation challenge the team members are addressing. Systems thinking, says Senge, is essential to understand and leverage change within the complex web of interdependencies that exist in organizational environments.

Extending Senge's focus on cooperation within institutions, to regional innovation systems involves a broader model of cooperation. Regional innovation systems include a set of institutions which jointly and individually contribute to the development and diffusion of innovations, and provides the framework within which governments form and implement policies to influence the innovation process. Interconnected institutions create, store and transfer the knowledge, skills and artefacts which define innovations; and the incentive structures and competencies that determine the rate and direction of innovation learning.

As noted by Heydebreck, Gabrielsson, and Dahlöf (2014)⁵, the concept of an innovation system is useful as it highlights the interactions between various actors and the workings of the system as a whole rather than the performance of its individual components. The concept of an innovation system provides a tool for analysing regional specificities in the innovation process, as well as a guide for policy formulation. For example, understanding the relational capabilities of actors in an innovation system allows for greater cooperative potential in developing regional smart specialisation strategies, specifically, where there is an effort to identify high-value added

³ Stafford Beer (1979). *The Heart of Enterprise*, London and New York: John Wiley

⁴ Senge, P.M. (1990). *The Fifth Discipline – The Art & Practice of a Learning Organization*, New York: Doubleday

⁵ Heydebreck, P. Gabrielsson, N., & Dahlöf, C.A. (2014). Innovation Systems. INTERREG IVC Analysis report, INNO.

activities that offer the best chance of enhancing the region's competitiveness. Here, an ethos of open communication and cooperation is essential as smart specialisation involves businesses, research centres, universities, and citizen groups working together to identify a region's most promising areas of specialisation, and obstacles that need to be overcome to foster innovation. Essential for regional success are well-functioning innovation clusters made up of interacting companies that share competences and infrastructure, sustained knowledge creation through ongoing learning in research and innovation, instilling an entrepreneurial mind-set in a growing network of lifelong learners who are passionate about developing a region's innovation capabilities. Success depends on the design of an attractive regional research and innovation infrastructure, and a public sector dynamic that involves not only informed policymaking and policy learning, but also engagement in public procurement and an open embrace as risk taker and lead customer. In this way, public sector engagement can help to drive innovation by supporting innovative firms in their entry into the market.

Regional innovation systems involve 4H partner cooperation across a variety of specific functions that are important for the sustained success of innovation systems, innovation clusters, and the specific set of projects and smart specialisations that are developed in a region. These functions of innovation systems are presented in Figure 2.

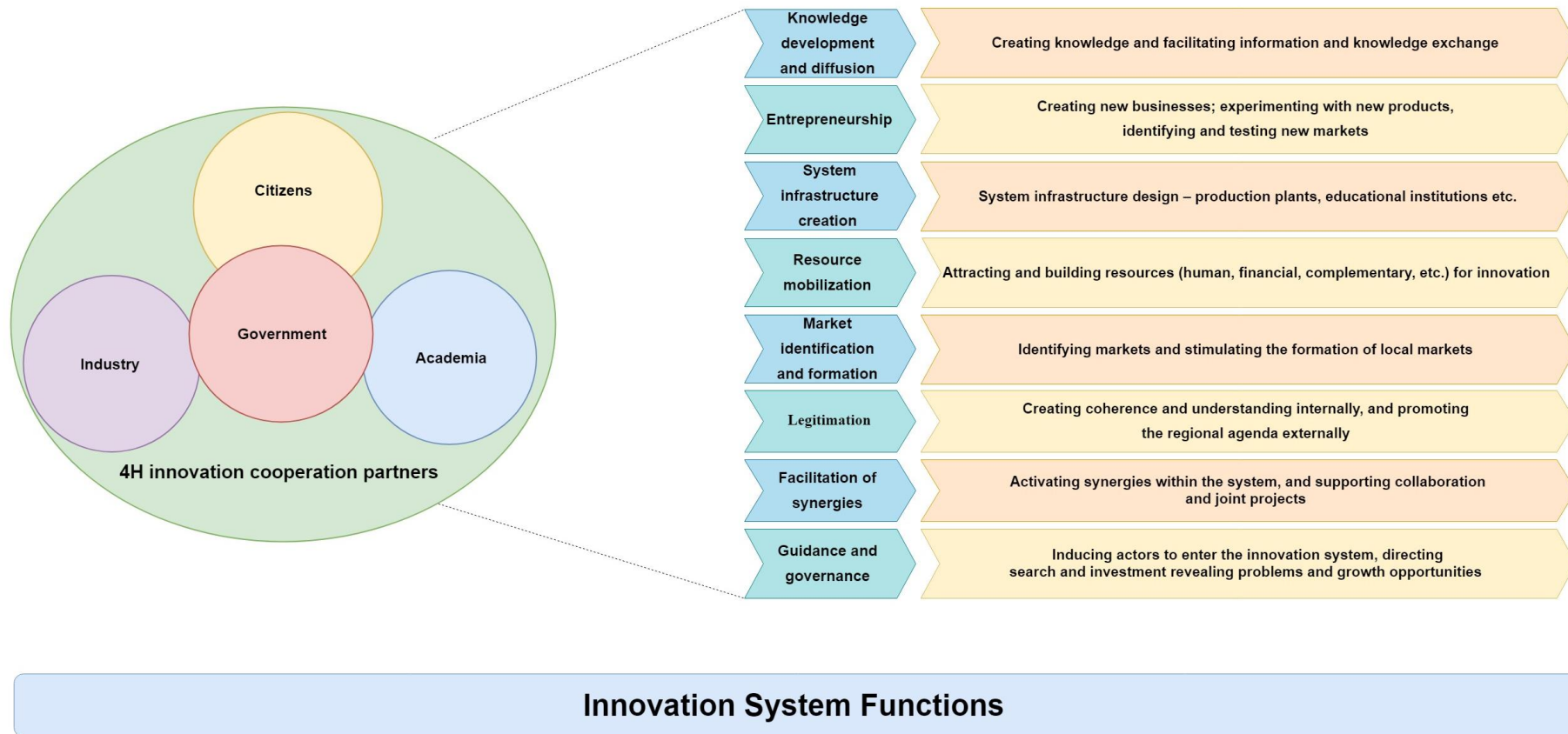


Figure 2. 4H innovation cooperation and the key functions of innovation systems

Heydebreck, Gabrielsson, and Dahlöf (2014) highlight a variety of generic functional and structural challenges that can negatively impact on the successful functioning of innovation clusters. These include a lack of resources in the form of poor performance and a low demand-orientation of partners. In particular, the actors in the regional innovation system do not focus on the assets that are needed most, and innovation services are not of sufficient quality. This functional challenge may be compounded by structural challenges associated with insufficient organisational power, in the sense that there are not enough players who can provide the innovation system with the necessary assets.

While lack of resources is often voiced as a critical problem by innovation partners, Heydebreck, Gabrielsson, and Dahlöf note that fragmentation of the innovation system is often the more critical problem in reality. For example, actors may not know how to cooperate, and there may be a lack of coordination and synergy between different activities in the innovation system. This can be compounded by structural and institutional mismatches that reinforce norms that inhibit partnership and synergy, whereby actors do not want to cooperate, or institutional frameworks -- rules, legislation, regulations -- that are not suitable for all partners. These structural and institutional challenges and mismatches can lead to mistrust and a reluctance to cooperate. Related is the problem of lock-ins, which can manifest in the form of functional or structural inertia. For example, certain shared values, norms and practices may hinder change and adaptation and this becomes visible when the system fails to bring new ideas and tools to target groups that have the potential to form innovative partnerships. Structurally these lock-in effects manifest as closed systems whereby groups and institutions are closed to the environment and slow to change.

The current deliverable (AHFES, D4.1) focuses on the learning that can be achieved through the analysis of case studies. An analysis of case studies provides a way of observing the system, along with reflection and focus on ways to enhance innovation in the food sector, in particular, by seeking to understand how partners in the AHFES consortium characterise successful cooperation and the challenges and learning experiences gained through some of their more successful cases. As noted by Heydebreck, Gabrielsson, and Dahlöf, the effective promotion of successful cases is necessary as an educational instrument to disseminate knowledge, overcome resistance and inertia and promote better cooperation. Notably, in regions where cooperation between business and academia is less advanced, actors from both sides tend to view such cooperation as risky, and yet examples of successful innovation and cooperation in other regions may provide a catalyst for embracing risk and taking on the challenges of cooperation.

In an analysis of ten INTEREG projects, Heydebreck, Gabrielsson, and Dahlöf worked with project leaders and asked them to highlight some of the good practices that support successful cooperative workings of their innovation systems. Some key quotes and ideas are presented in table 1 below. As can be seen from table 1, project leaders emphasise a number of key ideas including commitment, identity, clear communication, professional and financial supports, and networked infrastructure design and knowledge sharing.

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Table 1. Sample quotes from Project leaders on innovation cooperation success factors

1. General success factors identified ... include the presence of soft support structures, e.g. coordinators, networks and intermediaries.
2. Important success factors ... are the importance of having qualified staff and management resources within the network.
3. Inter-partner communication is essential, but this communication also needs to be well moderated.
4. Institutionalising the cooperative network ensures that a financial contribution is received from all the partners involved.
5. Investing in human resources within R&D can clearly act as an 'igniting spark' for innovative processes, as these resources are important for the overall innovation capacities.
6. Best practices for knowledge exchange between business and academia should be promoted among companies to get them to participate to a higher degree; very often, universities are the initiating partner in the exchange practices.
7. Successful knowledge exchange practices are often characterised by third party involvement in addition to the business and scientific partners...less advanced regions stand to benefit the most from additional partner involvement.
8. ...different levels of development of innovation policies between regions does not necessarily hamper cooperation, but can prove to be an opportunity for developing innovation systems to learn from the more mature ones.
9. Committed involvement of the relevant stakeholders is a crucial success factor; without active participation on their part, a project ... will not succeed.
10. It is important for prospective participants to make an inventory of their own goals and what they wish to learn.
11. It is crucial that the participants think about what specific results they want and identify both the weaknesses as well as the strengths in their environment at local, regional and national level.
12. Highly committed participation is important...
13. Ensure that policymakers are motivated to further develop their skills and make use of new tools and methodologies.
14. Design mutual learning platforms where policymakers can learn with (not just from) peers. Such platforms or arenas should be professionally facilitated.
15. Raise policymakers' awareness of the necessity to achieve impact. A good outline of the causal chains from policy to visible success (e.g. jobs created) will motivate and enable policymakers to plan for implementation early on...strengthen all dimensions of impact assessment (ex-ante and ex-post) and to plan for policy adaptations and sanctioning incentives depending on the impact achieved.
16. It is important to create a strong innovation system identity, which implies that all members should be aware that they are members and representatives of the system.
17. Clear and transparent communication, externally as well as internally, is of great importance not least to ensure that stakeholders stay fully engaged and involved.
18. Higher education best contributes to regional economic development when it works together with the public sector and regional business.
19. National policy should motivate and help universities to contribute to regional development ... in collaboration with regional government and businesses.

- | |
|--|
| 20. <i>In urban-rural cooperation, it is important to maintain a balance between the parties involved, i.e. to create mutual trust and a win-win situation so that both urban and rural parties can enjoy benefits from the cooperative arrangement.</i> |
| 21. <i>When building urban-rural partnerships, focusing initial cooperative efforts around less complex topics can build trust between stakeholders so that it can later gradually address the more complicated areas and topics.</i> |

1.3 Methodology and relationship between D4.1 and other AHFES deliverables

1.3.1 Methodology

The current deliverable (D4.1) adopts a regional analysis and case study method to examine collaborative experiences implemented by AHFES partners to support SMEs to innovate. Each region provided an overview the trends and existing experiences in their regions and identified a success story analysed as a case study.

More specifically, each partner was asked to write:

- a) An overview of key types of cooperation used in their region, and specific trends, methods, policies that inform types of cooperation
- b) A case study report describing and reflecting on a successful cooperative innovation project

The context for part (a) was communicated as follows:

The purpose of this action is to gather information on current trends and best practices in H4 cooperation. H4 cooperation transcends traditional silos between government, industry, academia, and civil participants, bringing perspectives and skills together in an environment that promotes teamwork and the sharing of ideas and know-how. This H4 'quadruple helix' approach creates shared value that benefits all participants in the innovation ecosystem. EU, National, and Regional policies, technologies supporting connectivity, methods and strategies supporting learning and innovation all play a key role in supporting networks, connectivity, experimentation, innovation, and development. In this new innovation context, value is characterised by a long-term view, focusing on improved societal wellbeing as well as company performance; and success is measured for the societal and economic ecosystem as a whole, rather than individual enterprises. It is therefore important to understand how H4 actors cooperate to successfully innovate in each region. As such, the goal in writing section (a) is to provide a broad overview of key types of cooperation used in each partner region, including specific trends, methods, policies that inform types of cooperation. Please use the following three headings when writing your summary:

1. *Regional trends in cooperation and innovation*
2. *Policies that inform the types of cooperation used*
3. *Technologies, tools and methods supporting cooperation and innovation*

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The guidelines for case study report (part b) included the following key points:

Identify a case where actors within your region cooperated successfully to innovate. A case study could include description and reflection on the case, including the nature of the cooperation, and how it contributed to the successful innovation. Please engage with key stakeholders directly and interview stakeholders as needed to fill any gaps in your knowledge of the case and to foster deeper understanding in relation to key issues listed in the structural outline below.

Structure: Please address the following questions in turn:

- 1) *The problem*
 - *What was the specific problem the innovation team were seeking to respond to?*
 - *What was the nature of the cooperation and why was this cooperation critical to address the problem?*
 - *Why did you select to focus on this case in particular?*
- 2) *The policies*
 - *Which EU, national, and regional policies shaped the specific innovation problem focus and cooperative approach?*
 - *How do these policies promote or facilitate innovation and cooperation?*
 - *Briefly describe the significance of these key policies in the context of the specific case in question.*
- 3) *Teams and competencies*
 - *Who were the team members involved in the innovation project (3H or 4H partnership)?*
 - *What key competencies did team members bring together in cooperative workings?*
 - *Comment on the impact/importance of these key competencies in cooperative innovation*
- 4) *Project timeline*
 - *What was the timeline of the project?*
 - *Highlight/describe in particular the key phases of cooperative work over time*
- 5) *Funds and/or resources*
 - *What funds/resources were available for innovation and cooperation?*
 - *How were funds/resources maximized to support cooperative work?*
- 6) *Tools, methods, strategies of cooperation*
 - *What tools, methods, strategies of cooperation were used?*
 - *How were specific tools, methods, strategies used to support cooperation during different phases of the project? This might include a focus on technologies to support networking and connectivity, tools for exchange of ideas, methods for meeting and innovating together, design methodologies, management approaches, experimental methods, market and consumer analysis/testing methods, and so on.)*
- 7) *Milestones and outcomes*
 - *What were some of the key innovation milestones?*
 - *What were the key outcomes?*
 - *Document KPIs, measured impact and outcomes.*
- 8) *Successes, challenges, and lessons*
 - *Bullet point the following:*
 - *Key project successes*
 - *Key challenges/limitations*
 - *Key lessons learned*

9) *Future cooperation and innovation*

- *Building on both the success and the lessons learned from this case study, what changes to cooperation and innovation practice might be made in future, similar projects?*

Key advantages of the case study method used in the current deliverable include:

- It turns partner observations into useable data, providing verifiable data from direct observations of the entities involved. These observations provide information about key innovation processes, which can be aggregated across cases to provide key shared learning experiences supporting enhanced regional and inter-regional innovation capability.
- Case studies provide facts that help innovation partners turn their opinions into information that shed light on positive or negative aspects of innovation cooperation development. Describing a specific case and specific activities also provides in-depth details about the path of innovation development, which enhances credibility for the outside observer, including potential 4H partners who may be interested in engaging in future innovation projects.
- Case studies are relevant to everyone who is participating in the INTERREG programme. 4H partners can also engage with case studies other than those they have contributed to and can develop their knowledge motivated by their interest in the case studies.
- The case study method is open-ended and cases can be further analysed from different perspectives, drawing upon multiple data sources including interviews, direct observation, databases, and so on. The case study method is also useful for formative research, development, and design work that is exploratory, iterative, and ongoing. For example, ongoing case study analyses can support the design of enhanced innovation tools and methods, and experimental approaches to project management and innovation ecosystem design.
- Finally, the case study method puts data into a readable format for those who study the case data and the factors influencing the case outcome. Importantly, the goal of the case study method is to help the reader to identify specific ideas that enhance their understanding of case dynamics and similar cases they are working on. This implies an active approach to reading and analysis which supports readers drawing conclusions relevant to their own experience.

1.3.2 The relationship between D4.1 and other deliverables

Deliverable 4.1 relates to other deliverables in the following ways:

As one of the first key deliverables in the AHFES project, D4.1 contributes to the overall aims of WP4, which seeks to inform a framework for innovation and growth in healthy food in the AA region. The understanding of cooperation and innovation policies and specific innovation methods and challenges across cases feeds into D4.2, which provides a mapping of the innovation ecosystem for healthy food & lifestyles.

D4.1 also feeds into WP3, focused on capitalization. For example, a review of the consolidated analysis and reflection on the cases will be a primary focus of the first joint learning session for D3.1.

D4.1 also aligns closely with D3.2, which provides an analysis of current strategies and policies for innovation growth in healthy food & lifestyles. While D3.2 focuses on the broader policy domain area, the specific focus on cooperation policies and practices in D4.1, and the systematised knowledge across WP3 and WP4 will be important both for the capitalization work of WP3, and also the work of WP5, which is focused on building intelligence for innovation and growth in healthy food and lifestyles.

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Similarly, the outputs of D4.1 provide key insights in relation to best practice in innovation cooperation, which will help to inform the design and implementation work central to WP6, focused on delivering support services for innovation and growth in healthy food and lifestyles.

Finally, D4.1 links directly to WP2, as key insights in relation to innovation cooperation will be communicated and disseminated to target groups, including SMEs, academics, citizens, and policy-makers – that is, the key players in 4H innovation in the AA region. Importantly, WP2 actions will raise awareness of the benefits of cross-sector and cross-regional cooperation to facilitate innovation in healthy food and lifestyles; inform on the innovation support services offered within the partnership; and directly address relevant target groups in the field of innovation in healthy food and lifestyles.

2 Overview of Case Studies, Consolidated Analysis, and Regional Reports

The current section, Section 2, provides an overview of regional case studies and a consolidated knowledge synthesis of key ideas in relation to innovation cooperation extracted from an analysis of eight case studies. Also included are the individual regional reports, which provide knowledge in relation to the range of innovation cooperation policies, methods, and strategies across regions.

2.1 Overview of Case Studies

A total of eight case studies are reported below in section 2.2. Here we provide an overview of the case studies and key successes reported across the full range of projects, and a consolidated summary of key challenges and learning outcomes related to best practice in cooperation.

Figure 3 illustrates the case study range across regions.

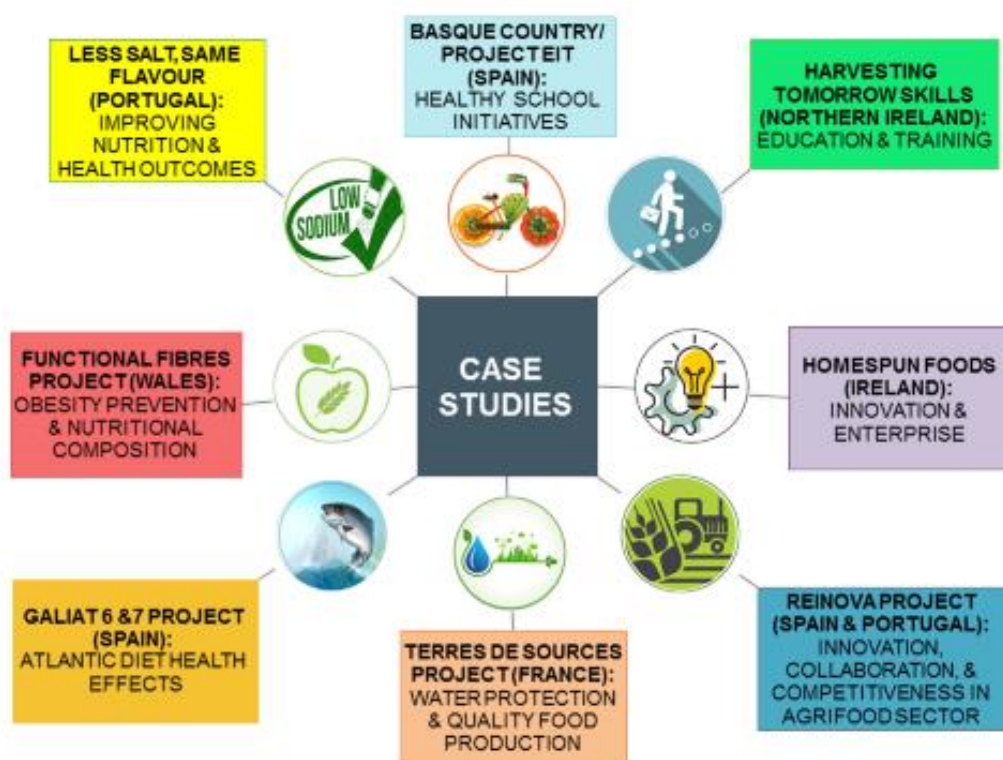


Figure 3. AHFES Case Studies

The case studies include a focus on specific healthy food innovations; addressing obesity through complex healthy eating and physical activity interventions; the protection of water resources and production and distribution of high-quality food products; recruitment and capacity building for future healthy food innovators; and the delivery of innovation supports to small companies to foster competitiveness in the agrifood sector.

For example, three case studies focus on specific healthy food innovations:

- The Homespun Foods project in Ireland focused on the innovation of a healthy granola cereal that met the health requirement for labelling food as high in Vitamin E, high in

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Magnesium and high in Fibre, Gluten, Dairy and Wheat Free, and a good source of iron, folic acid, and protein.

- The "Less salt, same flavour" project in Portugal focused on reducing the salt content in bread to improve health outcomes; and
- The Functional Fibres Project in Wales focused on innovations in the area of functional fibres to improve the nutritional composition of food for children.

Collaborators across these projects included government agencies, local business, educational centres, and public health institutes. Collectively, the projects focused on specific food innovations reported a variety of project successes including: the addition of **Homespun healthy foods** at Harrods Food Hall, while also supplying to Supervalu and other Irish food chains, and premium retailers in the Middle East. Homespun have also won awards at the Irish Food Awards 2016 and 2017, The Irish Quality Food Awards 2017, and The Guild of Fine Food Awards UK 2019. The **functional fibres** project in Wales deployed an effective collaboration process that enabled the concept to develop quickly within very short timeframes, and desirable manufactured products have been created from the functional fibres through the combined skills of the project team members; also consumer acceptance has been established for the pilot stage end products, and nutritional composition improvements have been proven with the fibre-based products having a lower calorie loading than existing products. Similarly, the **"less salt, same flavour"** project in Portugal reports the efficient collaboration between partners as a key success of the project, along with the timely achievement of the proposed project schedule, and with 66% of bakeries reaching the goal of 1g salt per 100g bread.

Two case studies focus on projects designed to address obesity through healthy eating and physical activity interventions, specifically, the Galiat 6 + 7 Project, which evaluated the health benefits of the Atlantic diet, and the Basque Country EIT Food School Network Project, which addresses rising obesity levels through healthy eating and physical activity interventions. Both projects report a number of key successes including, in the case of the Atlantic Diet intervention, the development of knowledge of certain bioactive compounds, and the incorporation of key recommendations into the local Health Plan, in addition to a strategic framework to make long-term intervention sustainable, and some of the companies launched new healthy products and commercially benefited from the project. The Basque Country EIT Food School Network Project was successful in developing an easy-to-use app “¿Cómo como yo? /‘How do I eat?’, as a fun, interactive web-based application that can be used to foster healthy eating patterns, by asking children about healthy products, preferences, consumption and their willingness to try new products. Valuable information gained from this is being shared across the network and used to further develop future activities and interventions.

The “Terres de Sources” Project in France reports on a challenging cooperative regional project focused on the protection of water resources and production and distribution of high quality food products. This regional project includes cooperation amongst community organisations, the scientific community, consumers and local businesses and producers. The project reports success in finding a legal way to connect public markets to the farms located upstream of the drinking water catchment, bringing together all the links in the food chain, from the lands to the tables, in the same project, while working to protect the environment, provide a fair remuneration to producers, upgrade the local economy, and produce healthier food. Similar to many other cases, this project highlights the challenge of building critical mass and the right set of incentives to sustain cooperation in the network.

A key challenge across the AA region and in the healthy food innovation in general is the challenge of recruiting the next generation of skilled workers in the area, and building and sustaining capacity in the sector. This challenge is addressed in the Harvesting Tomorrow Skills project, which seeks to improve recruitment, progression and retention in the food and drinks industry in Northern Ireland, by working collaboratively with further education colleges, local councils, career stakeholders, service providers and government departments. The case reports key project successes in coordination of engagement with local councils, schools and career bodies, and increased visibility of the food and drinks sector outside of normal recruitment channels. An additional success of the project is the creation of a new employee pipeline development process coordinated between careers teachers and industry. At the same time, the project highlights increased pressure on general recruitment, with many options made visible to students and increased competition within the Northern Ireland market. These challenges may be present across other innovation clusters in the AA region, and while the innovative recruitment strategies developed in the Harvesting Tomorrow Skills project may be transferable to other regions, the case reveals how time poor HR departments, insufficient potential employees, lack of engagement from the local population, and competition between regions can make recruitment and capacity building for the next generation of employees in the food and drinks industry difficult to achieve.

Finally, the Reinova Project focuses on broader delivery of innovation ecosystem services, in particular, delivery of innovation supports to small companies to foster competitiveness in the agrifood sector, in collaboration with business, technology and education partners. The key successes identified in the project include the range of methodologies used to develop and consolidate the partnership, and the service implementation for the companies. At the same time, it is noted that balancing the approach for the companies to suit their competences and balancing the level of service between regions can be difficult.

2.1.1 Cooperation challenges

Collectively, across all case studies, it is clear that innovation cooperation can be challenging. Figure 4 illustrates key themes emerging across case studies in the types of challenges faced by partners as they seek to work collaboratively on their innovation projects.

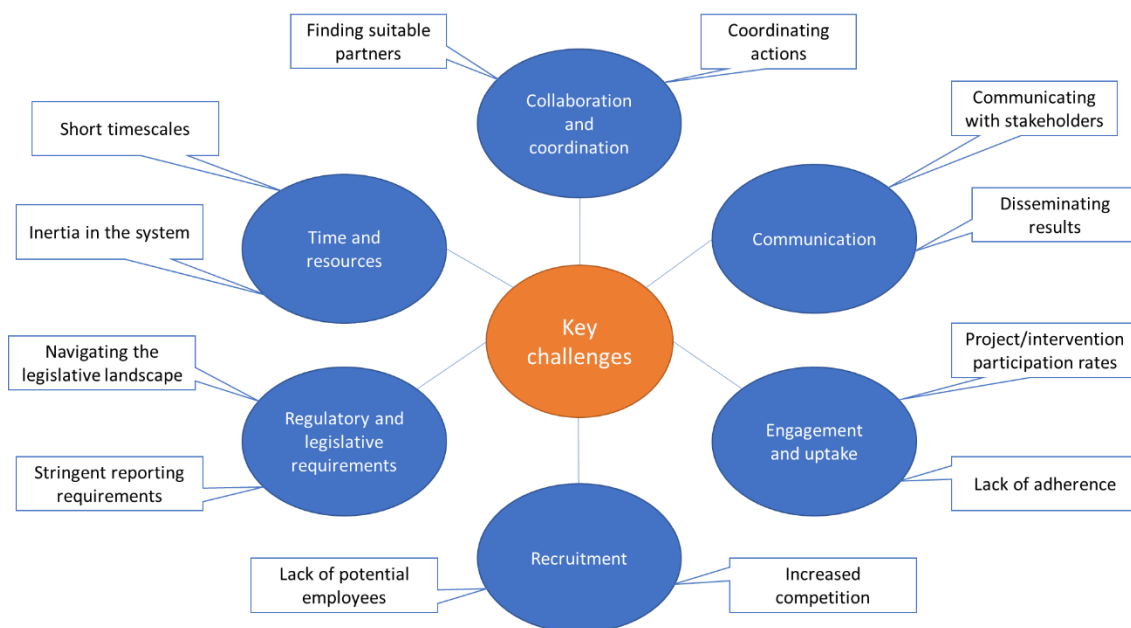


Figure 4. Challenges to Efficient and Effective Innovation Cooperation

The largest set of challenges identified across case studies relates to issues of **collaboration and coordination**. Included in this category are challenges in finding suitable collaborators (e.g. manufacturers) and securing the engagement of organisations to participate in research and innovation projects. In addition to challenges in forming collaborations, a number of coordination challenges were identified. These include challenges associated with coordinating activities with actors across multiple domains, and tailoring approaches to best suit the variety of needs across levels of collaborator competency, and across regional differences.

Communication emerged as a distinct category of challenges across case studies. Communication challenges, such as a lack of effective communication between stakeholders, was identified as a factor that can limit the impact of innovation projects. Similarly, a lack of effective dissemination of results and successes by companies, as well as the broader issue of difficulty in raising awareness of projects as a national level, were put forward as significant communication challenges.

Challenges linked to **time and resources** were also identified across case studies. In some cases these related to delays caused by external bodies (e.g. HR departments in collaborating organisation), or more global systemic inertia (e.g., in regional change dynamics). In other cases, the timescale between innovation, production, and delivery were considered to be extremely demanding, and posed significant challenges to smaller companies. Innovation can take time and a variety of process, organisational, and systemic delays need to be factored into any design and implementation process. As well as time pressures, resources such as the availability and competency in the use of complex equipment and machinery were highlighted as a considerable challenge to innovation.

Another category of challenges relates to issues of **engagement and uptake**, which are central to food research and innovation projects, but the challenges associated with engineering high levels of engagement and uptake are not always effectively planned for. This includes, for example, challenges in securing the engagement of school catering organisations, challenges in reaching a necessary threshold of participation from a target population in a project, and issues

with adherence of participants to project protocols. Addressing these challenges requires a dedicated focus and considerable time and energy.

Innovation cooperation challenges associated with navigating and meeting **regulatory and legislative requirements** were also highlighted among the case studies. For example, part of the overall innovation challenge in the healthy food and drinks industry involves creating products that meet key **regulatory and legislative** requirements as regards the kinds of nutritional claims which can and cannot be made when marketing products. Furthermore, depending on the 4H partnership and rules established by the partnership, levels of stringency as regards ongoing reporting requirements can be challenging to meet.

Finally, challenges in the category of **recruitment** relate to the difficulties of promoting the food innovation industry as a career path. Challenges include an insufficient pool of potential employees for companies innovating in this sector, as well as competition from other sectors which may draw potential employees from this already limited pool into other areas of work. As such, there is significant difficulty for companies in the sector to fill roles with the right personnel, and there is also competition with other similar companies and across regions in this regard.

2.1.2 Key learning experiences

A thematic analysis of key learning experiences reported across case studies revealed a number of related clusters of ideas, which are illustrated in Figure 5.

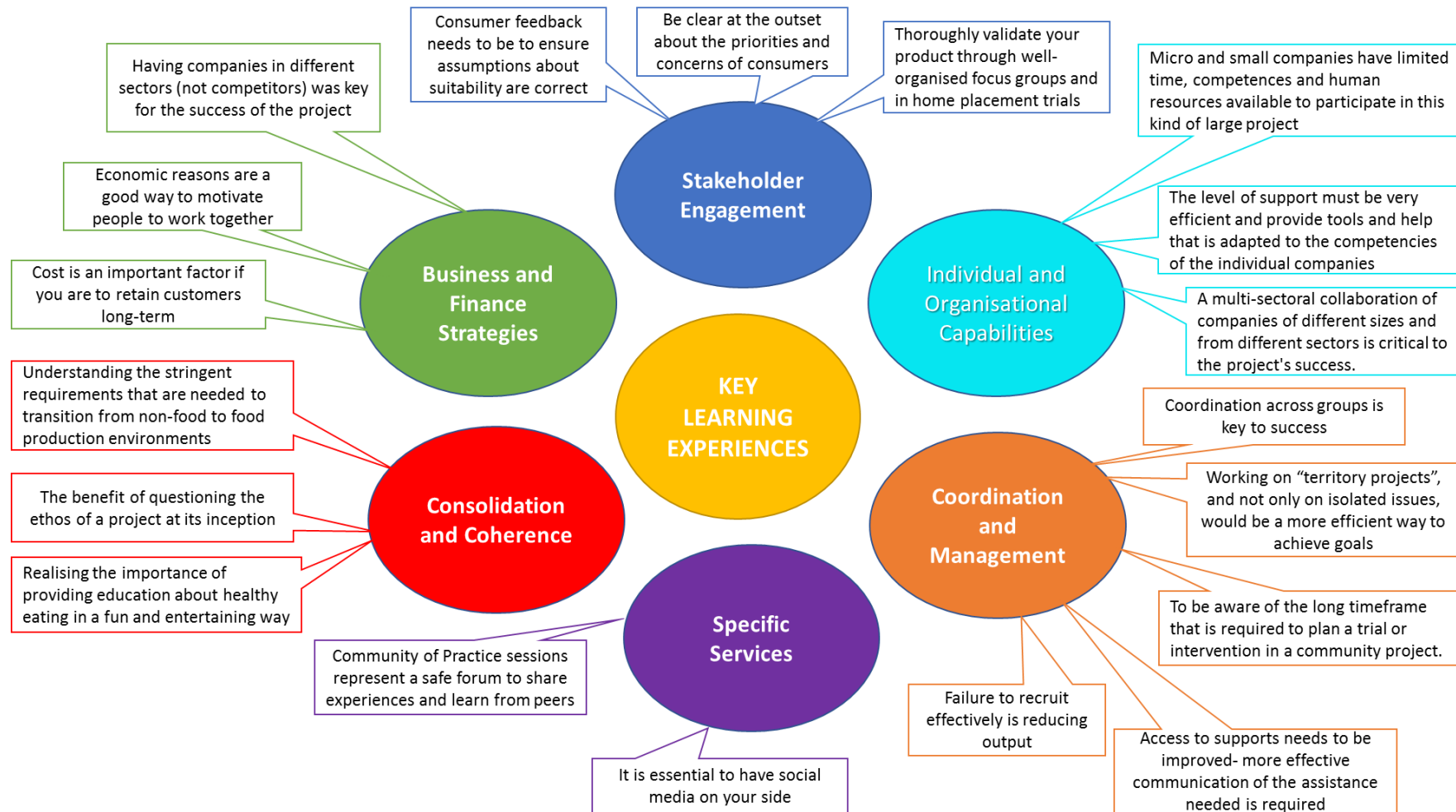


Figure 5. Key Learning Experiences arising from Innovation Cooperation

The largest set of learning experiences reported across case studies relate to **coordination and management** within projects. Included in this category are observations around both the positive and prohibitive aspects of working with different partner groups. For example, while coordination with different expert groups was cited as being central to project success, it was also noted that collaborations such as this can result in long delays to a project's expected timeframe. Reasons for this included too much of an emphasis being placed on specific issues and difficulties with communicating effectively across groups. It was noted that it is important to be aware of the impact that this may have on the expected milestones of a project.

Learning experiences related to **stakeholder engagement** also emerged as a distinct category across case studies. A common learning experience was about the value and importance of consumer feedback. It was noted that getting consumer feedback at the start of the project was extremely useful as it not only provided clarity about product suitability but also provided insight as regards what priorities and concerns needed to be taken into consideration from the outset of product development. Organised focus groups and in-home placement trials were also observed as being a very important and impactful way of ensuring product validation.

Learning experiences related to **individual and organisational capabilities** focused around awareness of the fact that micro and smaller companies have less time, competences and human resources available than larger organisations involved in a project and that supports need to be adapted accordingly to support smaller companies. It was highlighted that assessing the level of supports and tools that would be required in advance of a project would help the project progress more efficiently. It was stressed that it was important to have the multi-sectoral collaboration of different size companies involved due to the individual competencies that they provide and that this was critical to a project's success.

The category of **specific services** relates to learning experiences that were observed in relation to particular aspects of a project's product development. For example, it was noted that it was essential to engage with social media when launching a new product, it was noted how useful it is to facilitate Community of Practice sessions that seek to disseminate best practice for challenge owners. This was observed as being a helpful forum in which to share experiences and learn from peers in various aspects of the structural and administrative processes involved in innovation challenges.

The category of **consolidation and coherence** is comprised of learning experiences which impact on product development. For example, the importance of understanding the stringent requirements that are needed to transition from non-food to food production environments in advance was noted, as well as the benefit of questioning the ethos of a project at its inception, that is, whether the concept is intrinsically desirable or not. Understanding in advance how to appropriately target your desired consumers was also highlighted, for example, realising the importance of providing education about healthy eating in a fun and entertaining way for children.

Learning experiences related to **business and finance strategies** were also highlighted across case studies. From a business strategy point of view it was noted that having companies in different sectors (not competitors) was key for the success of the project. In terms of finance strategies, it was found that economic incentives are a good way to motivate stakeholders to work together. An additional learning outcome on cost referred to the importance of considering the long-term cost of a product in advance so that you can retain customers in the long-term. It was also observed that costs can be reduced once more companies participate in a project as fixed costs for large overheads, such as cost for running equipment, can then be distributed across a larger group to produce efficiencies of scale.

2.1.3 Methods, Tools, and Strategies of Cooperation

A thematic analysis of methods, tools, and strategies of cooperation reported across case studies revealed a number of related clusters of ideas, which are illustrated in Figure 6.

The **engagement and awareness** category is comprised of methods, tools, and strategies for engaging with the public and/or stakeholders, and raising awareness about products and services. This includes, for example, recruitment of ambassadors to represent the industry in school outreach events, sending promotional information directly to industry journalists and bloggers, as well as hosting outreach events in the local community to engage with citizens as regards their interests, and any feedback they can provide. This category also includes approaches to developing the image and recognition of SMEs, both online and offline.

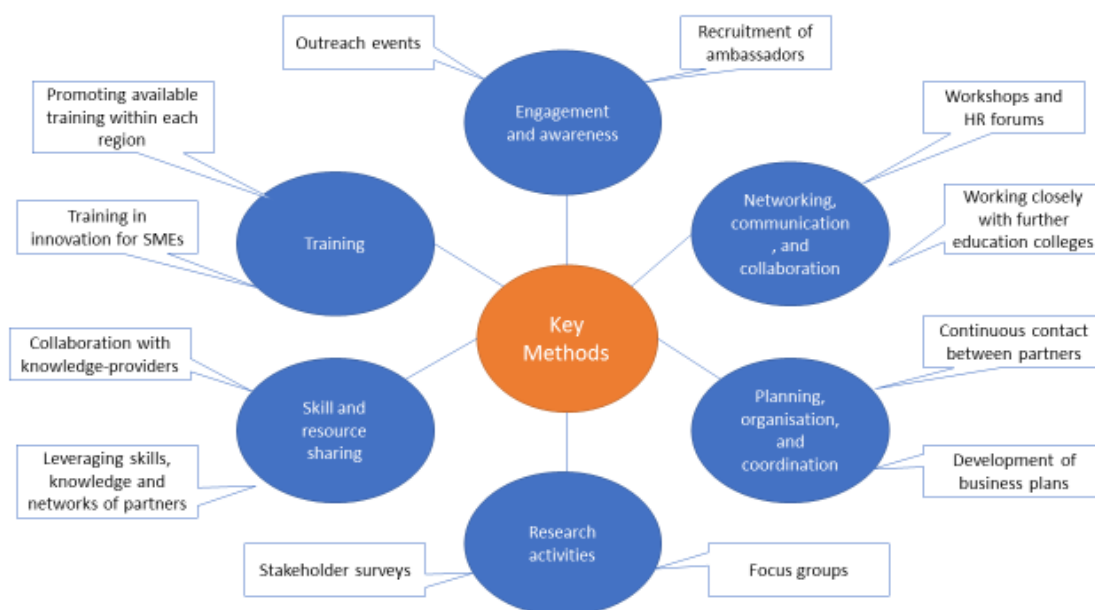


Figure 6. Methods, Tools, and Strategies of Cooperation

The **networking, communication, and collaboration** category relates to ways in which SMEs maintain, grow, and utilise networks to advance their goals. This includes, for example, forming a cooperative company to bring together various groups of stakeholders (e.g. employees, funders, producers, industries, institutional bodies, and consumers); facilitating meetings between different parties in the network; hosting idea generation workshops for companies to co-deliberate over new products or services; and facilitating fora which provide opportunities for companies to share information and address common issues.

The **planning, organisation, and cooperation** category consists of various tools, methods, and strategies used by SMEs in planning, organising, and coordinating their efforts. This includes a diverse set of strategies ranging from the development of research collaboration agreements, legal innovation methods, and business plans, to the use of file-sharing services such as Dropbox for easy co-working and coordination of resources. This category also addresses arrangements between partners for frequent meetings, as well as methods for maintaining regular or continuous communication throughout the course of collaborative innovation and shared projects.

The category of **research activities** addresses the diverse approaches to collaborative research utilised by SMEs. These include surveys of all stakeholders (e.g. bakeries) at a national level, focus groups with target market consumers for market validation, analysis of school curricula to establish levels of industry representation, and interviews with children and their parents as part of market analysis and consumer testing.

The **skill and resource sharing** category is comprised of various ways in which SMEs advanced their goals by sharing various skills, knowledge, and resources. For example, utilising the existing supply chains, experimentation capabilities and production facilities of organisations in each SME's network. Other examples of skill and resource sharing relate to collaborating with a knowledge-provider to develop a nutritional profile of key ingredients (e.g. quinoa), and the creation of a cross-city purchasing group to facilitate a more integrated service delivery.

The analysis of the case studies also revealed a focus on **training** as a way of embedding tools, methods, and strategies of cooperation. This category includes SMEs in the network providing training, for example, on export strategy, research, and business planning and implementation -- including upskilling support and apprenticeships, organising training and campaigns at cross-national, national and regional levels to promote products, and raising awareness of training opportunities available in each region.

2.1.4 Future cooperation and innovation

Moving forward, building on both the success and the lessons learned from their case studies, partners were asked to consider what changes to cooperation and innovation practice might be made in future, similar projects. A thematic analysis of ideas focused on future cooperation and innovation across case studies revealed a number of related clusters of ideas, which are illustrated in Figure 7.

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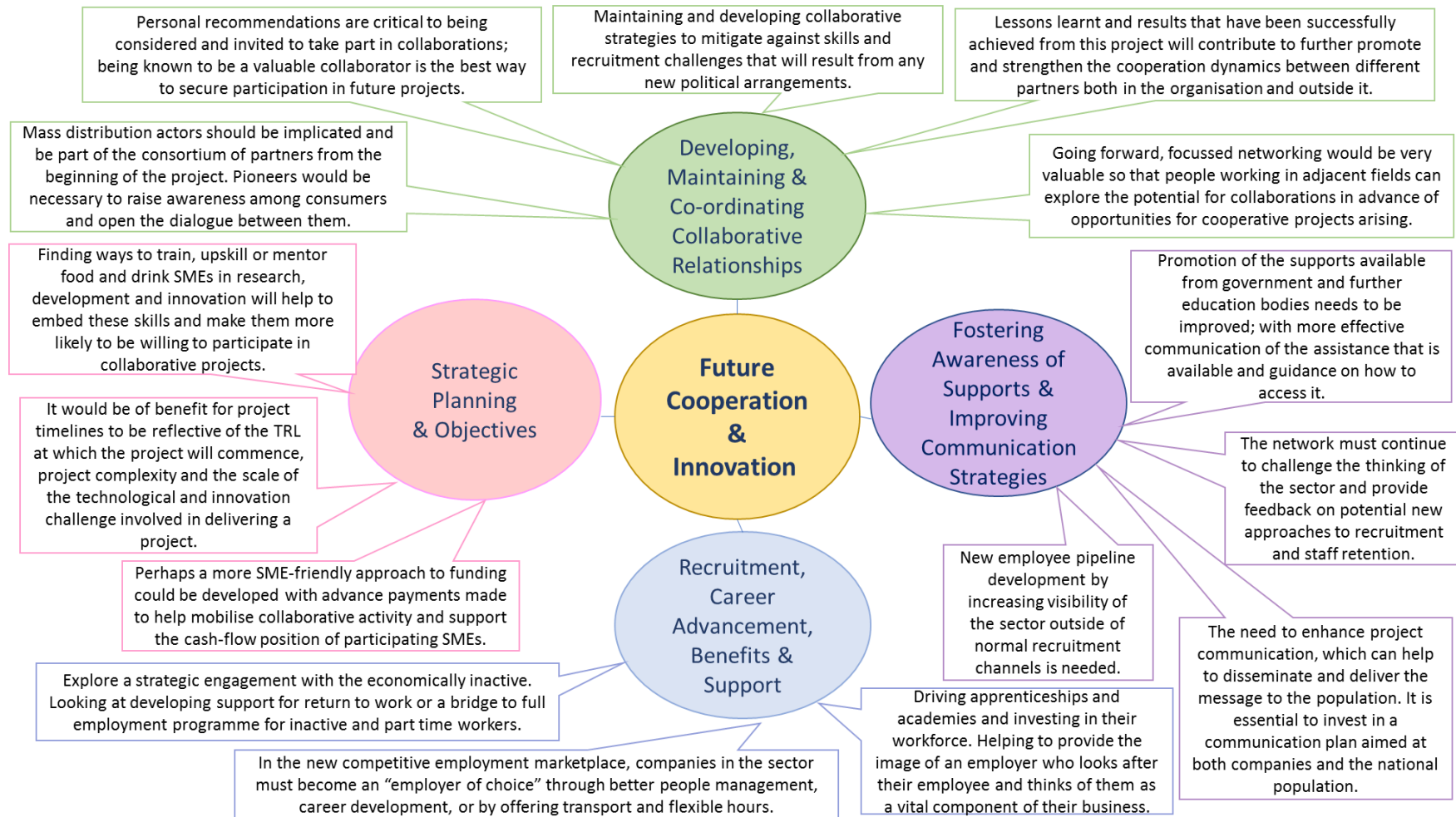


Figure 7. Future cooperation and innovation - key suggestions moving forward

The largest set of ideas focused on **developing, maintaining and co-ordinating collaborative relationships**. Included in this category are insights into what will be needed in the long-term to build and maintain relationships with collaborators, stakeholders, and the public. In general, it was noted that clear channels of communication between all collaborators and stakeholders needs to be established so that positive working relationships can be developed, coordination and engagement around goals can be maintained, and such that challenges can be addressed promptly and efficiently allowing for improvements in products/services to be made.

For example, the Functional Fibres team highlighted how creating and maintaining positive working relationships with collaborators can be beneficial as it not only provides potential for 'focussed networking' in advance of opportunities for cooperative projects, but it can be critical when engaging with collaborators outside your sector as having a personal recommendation can provide reassurance that you will be a valuable contributor. Other partners also believed that maintaining positive relationships with outside stakeholders could result in improvements in recruitment, training, and upskilling for employees. Harvesting Tomorrow Skills, for instance, noted that coordinating with local councils, education authorities and career bodies will be vital for them moving forward as it will assist with dissemination of current job opportunities and will create a more open platform for sharing regular updates and providing information and feedback on training courses.

Building upon relationships with outside stakeholders will also provide an opportunity to learn from each other's experiences and may help with adaptations that may need to be made to products or services in the future. For the partners on the GALICIA team, co-ordination across companies was seen as vital in the advancement of business-to-business and business-university collaboration practices in the region as it supported fluent and effective collaboration. The EIT Food team also echoed this and believed that going forward a crucial part of effective co-ordination for them will involve understanding the intrinsic differences between partners and cultures across regions so that they are able to adapt the program to the different outcomes across the country.

A second category of ideas relates to **fostering awareness of supports and improving communication strategies**. In general, there was a strong focus on the importance of improving public knowledge of supports available for businesses; the need for more effective communication of assistance that is available from government/public agencies; and increased awareness of the diverse range of career opportunities within the food sector. The Harvesting Tomorrow team noted that going forward there needs to be more effective communication of the assistance available from government and further education bodies, and guidance on how to access these supports needs to be provided. The Functional Fibres team echoed this and outlined how there is often no structured route to engaging with a range of experts, or guidance on how to obtain access to such knowledge, at the start of a project. However, this access to knowledge and expertise would be extremely beneficial as it would bring additional knowledge into projects, maximise efficiency and focus of resources, and help innovation teams achieve more successful outcomes. The benefits of having these supports from the outset of a project was reinforced by the Homespun Foods team who outlined the financial and training opportunities that came from partnering with Enterprise Ireland, and the Food Academy Programme in collaboration with SuperValu, St Angela's college and Bord Bia.

In relation to improving awareness of career opportunities within the sector, it was suggested that a new approach to recruitment may need to be considered going forward. More engagement with schools, providing funded training opportunities, and launching online promotional campaigns were suggested as some possible ways of increasing visibility of the sector outside of normal

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recruitment channels. It was also highlighted that sector marketing and social media outlets are now key to engaging with the public and informing potential employees about job opportunities. The Harvesting Tomorrow team noted that it will be important to recognise this change in recruitment practice and to use it to create greater awareness of the company/sector as a significant local employer and the place to develop a career.

Improving communication with the public was also seen as important in order to disseminate and deliver the message from a project to the population. The 'Less salt, same flavour' team, for instance, observed that it is essential to invest in a communication plan that is aimed at making both companies and the national population aware of the risk of excess salt in food. In order for this communication process to be more productive, they believe it will be vital to conduct thematic campaigns and interventions for the population that promote health literacy.

A focus on **recruitment, career advancement, benefits and support** also emerged as a distinct category across case studies. A common focus in this idea set was a focus on the importance of fostering a culture of support and recognition within businesses, and recognising the needs that both potential and current employees may have in order to succeed. The Harvesting Tomorrow team suggested exploring a strategic engagement with the economically inactive and noted that looking at developing support for 'a return to work' or a 'Bridge to full employment programme' for inactive and part time workers may be beneficial. It was also suggested that promoting and financially investing in apprenticeship placements and academies in the sector would be important in order to show that, as an employer, you recognise the value of prospective employees in the sector. In relation to sustainable employment and retention in the sector, it was noted that the retention of employees is a cost-effective way of maintaining staff levels as it reduces recruitment costs and employee down time. Working to create an employee friendly environment and experience was seen as vital in this sense so that employees would see food companies as an 'Employer of choice'. Some suggested ways to ensure positive wellbeing among employees within a company included better people management, career development, and providing transport or flexible working hours.

Finally, the category of **strategic planning and objectives** relates to specific strategies that would be valuable for SMEs moving forward. In general, it was noted that potential issues that could arise due to setbacks with financing should be considered at the start of a project and that the extra time that it takes to engage with outside stakeholders and collaborators should be factored in to a project timeline from the very beginning. In terms of finance, it was noted that it can be difficult to engage SMEs in public funded collaboration projects because many SMEs work on tight cash flows and many public funded collaborations are perceived as being too bureaucratic with a significant administrative burden. The usual practice of providing finance in arrears, with SMEs submitting grant claims with relatively long payment intervals, was also highlighted as being a potential barrier to these types of collaborations. It was suggested that going forward perhaps a more 'SME-friendly' approach to funding could be developed with advance payments made to help mobilise collaborative activity and support the cash-flow position of participating SMEs. The Functional Fibres team also highlighted that potential delays can occur if your project requires the use of particular technological equipment and suggested that going forward it would be of benefit for project timelines to be reflective of the Technology Readiness Levels at which the project will commence, the project complexity, and the scale of the technological and innovation challenge involved in delivering a project. In regards to setbacks with time due to engagement with outside collaborators, it was suggested that going forward it would be helpful to find ways to train, upskill or mentor food and drink SMEs in research, development and innovation as this would help to embed these skills and make them more likely to be willing to participate in collaborative projects in the future.

2.2 Regional reports

This section presents the case studies across regions. Each regional report includes a section on cooperation used in their region, including specific trends, methods, policies that inform types of cooperation, and a case study describing a specific problem and specific methods used to support cooperation, and key successes, challenges and learning experiences. The presentation of the individual reports is followed by a summary and conclusion section on key directions identified by partners for innovation cooperation in the future.

2.2.1 Homespun Foods (Ireland)

2.2.1.1 Short overview of key types of cooperation used in the region, and specific trends, methods, policies that inform types of cooperation

Regional trends in cooperation and innovation

In 2000, the European Union decided to create the European Research Area (ERA), a unified area for research and innovation in Europe which would enable seamless mobility of researchers, and the sharing of knowledge for social, business and policy purposes across borders.

The main objectives of the ERA was to create and encourage more jointed up collaborations and transnational cooperation and competition within the European Union. In 2015 the EU reaffirmed its commitment to the establishment of the ERA, and one of the major outcomes of the ERA was the establishment of the Horizon 2020 programme.

Horizon 2020 was the EU's biggest ever research and Innovation programme, with almost €80 billion funding available to suitable projects throughout the EU.

Ireland and Innovation

Ireland recently came out top in two of the ten areas covered by the European Innovation Scoreboard on Employment Impacts and Sales Impacts. Countries that score high have strong employment in knowledge-intensive activities and strong employment in fast-growing firms that work in innovative sectors ⁶.

Horizon 2020 is the financial instrument for implementing the Innovation Union. Horizon 2020 is at the heart of Europe's Innovation Union. The European Research Area was set up in responding to the economic crisis in the EU, to invest in future jobs and growth, and strengthening the EU's global position in research, innovation and technology.

The National Support Network for Horizon 2020's was established in Ireland to build on Ireland's Innovation track record. The network provides hands-on assistance to Ireland's researchers and companies to actively participate in Horizon 2020.

Policies that inform the types of cooperation used

On the back of Horizon 2020, Innovation 2020 sets out Ireland's Strategy for Research & Development, Science & Technology. Innovation 2020⁷ is a five-year strategy on research and development established to help sustain and further develop Ireland's pathway as a leader in Innovation. Innovation 2020 recognises the importance Innovation plays in driving productivity and fostering Ireland's competitiveness in a global economy where knowledge and innovation are fundamental. This Innovation strategy compliments other government initiatives, including the

⁶https://ec.europa.eu/ireland/news/ireland-top-in-europe%20for-employment-and-sales-impacts-european-innovation-scoreboard-2019_en

⁷ <https://www.horizon2020.ie/>

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Action Plan for Jobs and Enterprise 2018 (Dept. of Business, Enterprise & Innovation 2018). Both of these government initiatives have innovation as a central pillar. These initiatives are core to Ireland's strategic ambitions as a global leader in innovation, however they are not alone. Enterprise 2025 (Dept. of Enterprise & Innovation, 2018b) sets out a plan and vision for Ireland as the best place to succeed in business. The national strategy for higher education 2030 (Higher Education Authority, 2011) sets out plans for delivering on best quality outcomes for students. The national policy on Entrepreneurship (Dept. of Business Enterprise & Innovation, 2018c) sets an ambition for Ireland to become one of the most entrepreneurial driven economies in the world. The common thread in all these strategies is Innovation.

Science Foundation Ireland (SFI)

One of the key pillar stones in Ireland's Innovation goals, is Science Foundation Ireland. SFI is a statutory body in Ireland responsible for funding applied science and research, technology and engineering with a strategic focus. SFI was founded in 2003 under the Industrial Development Act, which also saw the creation of other state agencies including Enterprise Ireland and the IDA. All of these state agencies have Innovation and job creation as a key pillar. SFI's mission is to build and strengthen scientific and engineering research and its infrastructure in Ireland. Agenda 2020 (Science Foundation Ireland, 2018) is the SFI's ambitious plan to position Ireland as a global knowledge leader, and a society with scientific and engineering research at its core. SFI is a key element in Ireland's enterprise and innovation ecosystem.

Enterprise Ireland (EI)

One of Ireland's key drivers for Innovation and Enterprise Development is Enterprise Ireland. Enterprise Ireland was also established in 2003 under the Industrial Development Act.

Enterprise Ireland (EI) is the state agency responsible for supporting the development of Innovation and manufacturing in Ireland. EI's mission is to deliver major improvements in the international strength of Irish Enterprises across all regions by transforming the innovation and competitive capabilities of Irish companies.

Enterprise Ireland's Strategy 2017-2020 (Enterprise Ireland, 2017) is to 'Place Innovation at Centre Stage'. The 2017-2020 strategy is about inspiring and driving enterprise and innovation for scalability and commercialisation. Under the current strategic initiative, EI plans are to assist client business to create 60,000 new jobs by 2020, and to grow exports by €5 billion to €26 billion per annum. Innovation is a core feature of EI strategy. Their plan is to drive Innovation in Ireland to "unprecedented levels" through new supports to reach the target of €1.25 Billion in R&D expenditure per annum by 2020. A key pillar of the Innovation plan is to develop an enterprise support infrastructure nationally in conjunction with Local Enterprise Offices (LEO) and Higher Education Institutes. Another key function of EI is to improve access to funding capital and investment programmes such as the EU's Horizon 2020 R&D funding programme.

Enterprise Ireland (EI) Supports:

EI provides a wide range of supports to businesses tailored to suit every stage of business development. Funding is provided for start-ups, for High Potential Start-ups (HPSUs) through to established business and large companies employing up to 250 employees. EI's Research Development and Innovation (RD&I) funding supports are set up to help companies grow their sales and employment. These include the Exporting Innovation Grant, The Agile Innovation Fund, The Research and Development (R&D) Fund.

El Innovation 4 Growth

Innovation 4 growth⁸ has been specifically developed by EI for ambitious and entrepreneurial Irish companies seeking to use Innovation to capture more lucrative opportunities in the marketplace. Companies are brought on a journey of Innovation. In phase I, companies are put through an Innovation Audit, then through to Boost-camp, through to developing Innovation readiness plans. Fifteen successful companies continue the journey to phase II and III.

Collaboration on Innovation and R&D is central to EI's philosophy. Working with like-minded people, companies, and Educational Institutes is core to the success of EI's approach to Research and Innovation. Rather than going it alone, EI encourages business owners to collaborate with similar research agendas to share resources and knowledge. These include supports for working with other Companies or for working with research teams in Irish Higher Education Institutes as outlined later in this case study.

EI supports have been specifically designed to bring companies through the innovation journey. Working with research teams in Higher Education Institutes starts off with Enterprise Innovation vouchers, which give small business and start-ups a taster of Innovation with a €5,000 voucher towards work and collaboration on Innovation with a third level College or University on the Island of Ireland, both North and South. Innovation vouchers can lead to greater projects under initiatives such as the Innovation partnership programme, Technology Gateways Programme, or Technology Centre Programmes.

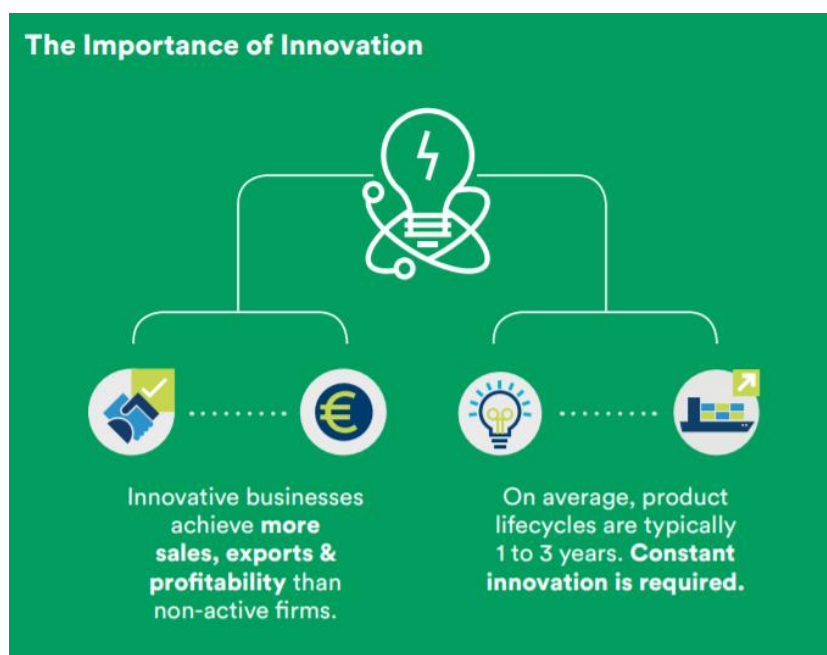


Figure 8. EI Innovation for growth infographic

El Innovation Supports:

- **Enterprise Ireland Innovation Vouchers:** Small companies or start-ups in Ireland can apply for a €5,000 EI Innovation voucher to fund collaboration with a registered third level knowledge provider, to help solve a technical or business challenge with an Innovation focus.

⁸<https://www.enterprise-ireland.com/en/funding-supports/Company/Esetablish-SME-Funding/Innovation-4-Growth-brochure.pdf>

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- **Innovation Partnership Programmes:** Offers financial support to companies to engage in collaborative research projects with Irish Universities and Institutes of Technology (ITs).
- **Enterprise Ireland R&D Fund:** Under the R&D Fund companies can get a collaboration bonus of up to 15% where there is collaboration between two companies on an R&D project.
- **Technology Centres Programme:** Technology Centres are market focused industry collaborative research centres serving markets of scale validated by EI and the Irish development Agency (IDA).

Food Wise 2025

The Agri-Food sector is Ireland's largest employer and indigenous business sector. It employs 8.4% of the working population. Collectively, the sector achieved revenues of €26 billion in 2015. The Irish food Industry is export orientated contributing to over 10% of total exports. Food Wise 2025 (Dept. Agriculture Food and Marine, 2015) is an Irish government initiative, designed to set out a 10-year plan for the Agri-Food Sector⁹. The Food Wise report was assembled by a committee based on their broad experience and knowledge of the Irish Food Industry. The 10-year Food Wise strategy aims to position Ireland as a world leader in sustainable Agri-food production.

Food Wise 2025 sets out a 10-year plan for the Irish Agri-food sector. It underlines the importance of the food Industry as fundamental to Ireland's economic performance. Food Wise identifies ambitious goals and objectives for the Food Industry, including

- 85% Increase in exports
- 70% increase in added value to 13 billion.
- The creation of 23,000 additional jobs with emphasis on high-end value-added product development.

Innovation for delivering growth is a key pillar of Food Wise 2025. A Strengths Weaknesses, Opportunities & Threats (SWOT) analysis conducted as part of Food Wise 2025 strategy identified levels of R&D investment by the private sector and in particular the Food Sector as a core weakness in Ireland that needed to be addressed. The SWOT analysis recognised the growth in global demand for nutritious food as a key opportunity for Ireland's Food Industry. The recovery of the domestic and international markets was also identified as an opportunity for growth through accessing new markets and continued innovative product development.

Some of the key recommendations for supporting Innovation in Food as outlined in Food Wise 2025 were:

- To improve coordination between Industry, State Agencies and Research Institutions, to support the delivery of research which will help deliver commercial outputs and products.
- To improve the capacity of the Agri-Food companies to absorb Research and Innovation outputs from Research Bodies. Some of the key resulting actions identified were that:
 - Enterprise Ireland would continue to engage with the Food industry, the Department of Agriculture Food and Marine (DAFM), research providers and other relevant stakeholders to establish food test incubation technology centres of excellence, to support consumer food development and innovation, and other sectors including

⁹<https://www.agriculture.gov.ie/media/migration/foodindustrydevelopmenttrademarkets/agri-foodandtheeconomy/foodwise2025/report/FoodWise2025.pdf>

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Horticulture, Beverage with a focus on pilot stage development, packaging and product innovation.

An implementation plan for Food Wise 2025 has been established and is well advanced.

Technologies, tools and methods supporting cooperation and innovation

Notwithstanding the plans outlined in Food Wise 2025, Ireland has a well-established network of tools and supports for the Agri-Food Sector including state bodies such as Teagasc, Regional food Hubs and Bord Bia

Teagasc is Ireland's Agriculture and Food Development Authority. Established in 1971 by the Department of Agriculture, it was opened as an agricultural college. Teagasc today, is the national body responsible for providing integrated food and Agri research, advisory and training services to the agriculture and Food Industry. Teagasc is responsible for delivering on a large part of the Food Wise 2025 Government initiative.

Food Hubs and Clusters in Ireland have been set up and developed to help small start-up and medium sized food business operators come together in specifically designed food production units, or as a cluster of companies working together to leverage their position and to help support each other. One of the most successful established Food Hubs in Ireland was set up in Drumshanbo, Co. Leitrim, in the North West of Ireland. The Food hub was built on the site of what was formerly Lairds Jam making factory. Established by local social enterprise the Food Hub boasts of being Ireland's premier Artisan multi-tenant food production enterprise centre, established by local social enterprise. The food hub is fully occupied with many start-ups and now established Artisan food producers. The Food hub has recently been awarded funds under the Government job creation initiative. The Funding will be used to develop a new 9000sq ft. Food Enterprise Zone, with the creation of 50 jobs. The current Food Hub in Drumshanbo is full and has a waiting list of food producers hoping to secure production space.

Bord Bia

Bord Bia, formerly the Irish Food Board, was established by an act of the Irish parliament in 1994. Bord Bia was set up to form a link between Irish food, drink and horticulture suppliers and existing and potential customers throughout the world. Bord Bia's objectives are to develop markets for Irish manufacturers and suppliers throughout the world.

Bord Bia's strategy for 2019 – 2021 builds on the objectives and recommendations established in Food Wise 2025, which sets out the strategic plan for Ireland's Food strategy to 2025.

Bord Bia Vantage, is an initiative run by Bord Bia for Food Producers, offers supports to small and medium sized Food Business operators, by assisting food producers and suppliers to explore sector dynamics, category, competition and consumer data.

Bord Bia's Food Academy Programme

One of Bord Bia's most successful initiatives in supporting Innovation and collaborations in the Food Industry, particularly for Irish Artisan and start-up food Business operators is "The Food Academy" training programme, established in 2013.

The Food Academy initiative was set up to be delivered through workshop style training, and supported by the SuperValu retail chain in the context of retail expertise, while also providing a real route to market for successful food producers. The whole initiative is a great example of cross collaborations with state agencies, food producers and retailer, designed to guide food businesses from a start-up position to obtaining their first retail listing with a major retail outlet.

The Food Academy programme has been a great success and proof of the value of collaborations between small business producers, Enterprise Ireland, Bod Bia and the retailer SuperValu. Many of the producers who have gone through the Food Academy programme since its conception, have gone on to establish very successful food companies, including Homespun Ltd who will be discussed further in this case study.

2.2.1.2 Case study report

SME: Homespun, Healthy Food Innovation

The Problem

The 2007 European Commission white paper for Europe on Nutrition, Overweight and Obesity¹⁰ and related health issues set out an integrated approach to combating poor nutrition in Europe, and the associated health issues. The paper built on previous initiatives undertaken by the Commission, the EU Platform for Action on Diet, Physical Activity and Health, and the Green Paper, *"Promoting healthy diets and physical activity: a European dimension for the prevention of overweight, obesity and chronic diseases"* (European Commission, 2007).

The commission recognised the need to address the continuing growth in obesity, where the levels of overweight and obesity in the EU population had risen dramatically, particularly among young children. Tackling this important public health issue entailed the integration of policies across the board spectrum from food and consumer, to sport, education and transport. Placing the consumer at the centre of the policy was key.

The Commission recognised the importance of food labelling in communicating with consumers. Nutrition labelling is one of the few ways that information can be passed on to consumers and used to support healthy decision-making in relation to the purchasing of food and drink. Food labelling is viewed as critical in terms of communicating with consumers, in particular providing access to clear, consistent and evidence-based information when deciding what foods to buy.

The white paper strategy set out in 2007, encompassed a range of policies with the objective of improving nutrition and preventing overweight and obesity in the EU. Many of the actions related directly to the functioning of the internal market, such as to create a common approach to food labelling, the making of health claims authorisations and control procedures. Other parts of the strategy were grounded in specific frameworks such as the Common Agricultural Policy (CAP).

The legislation and key policies which were of particular relevance to this case study, formed a common EU approach to food labelling and in particular addressed the issue of health and nutrition claims.

The policies

Food Labelling

In the EU there have been many changes to legislation governing food labelling over the last 20 years. At the heart of the legislation is the desire and will to fundamentally protect the consumer and to ensure that food labelling must not mislead the consumer.

Regulation (EU) No 1169/2011 on the provision of food information to consumers entered into application on 13 December 2014. Some of the key requirements was the mandatory provision of specific nutrition information, and strengthening the rules to prevent misleading consumers. The provision of detailed food information on labels, provides consumers with the key information

¹⁰

https://ec.europa.eu/health/ph_determinants/life_style/nutrition/documents/nutrition_wp_en.pdf

they need to make more informed purchase decision. The legislation set out to ensure that manufactures and marketers were less likely to make unsubstantiated health or nutrition claims on their food products.

General requirements of the legislation set out to ensure that food labelling must not mislead the consumer, by attributing to the food properties and characteristics that it does not possess, or to suggest specific properties which might be common to similar foods.

Nutrition Declaration

A key result of the policies framing food labelling was the resulting obligation by food manufacturers and suppliers to provide nutrition information for packaged food from 13 December 2016.

The nutrition information of a food which must be declared as:

- The energy value and,
- The amounts of fat, saturates, carbohydrate, sugars and protein and salt (FSAI)

It is not compulsory to declare the levels of vitamins and minerals, however when they are added to food labels, as selling point or to inform consumers, there is a specific format that manufactures must follow.

Vitamins & Minerals must be expressed as a (%) of the reference intakes (RI) set out as below:

Table 2. Nutrition Labelling on Packaged Foods.

Nutrient	Per 100g/ml
Energy	KJ/Kcal
Fat	g
Of which saturates	g
Carbohydrates	g
Of which sugars	g
Protein	g
Salt	g
Vitamin C	mg (%)
Vitamin D	µg (%)
Iron	mg (%)
Calcium	mg (%)

Nutrition & Health claims legislation

The legislation around making health claim on food labels is central to this case study. Efforts to protect the consumer from misleading nutrition and health claims form a large part of European Food safety regulatory requirements. Union rules in relation to nutrition and health claims were established by Regulation EC No 1924/2006, which came into effect in July 2007. This legislation was established to bring about the legal framework for food producers who want to highlight particular nutrient benefits associated with their food product. The objective was to ensure that any nutritional claims made such as “low fat”, “high in protein”, “high fibre” and to health claims such as “Vitamin D is needed for the normal growth and development of bones in children”. The objective of the legislation is to ensure that any claim made on a food labelling presentation or advertising in the European Union is clear, concise, accurate and based on substantiated sound scientific evidence. Foods bearing claims that mislead consumers are therefore prohibited from

sale within the EU. The European Food Safety Authority (EFSA) are responsible for approving health claims in the EU. A public register of Nutrition and Health claims lists all permitted nutrition claims and all established and authorised health claims.

Nutrition & Health Claims

A food producer making a nutrition and health claim about their product must comply with EU regulation 1924/2006 on Nutrition and Health Claims made on food. The European Food Safety Authority (EFSA) is responsible for approving health and nutrition claims relating to specific food ingredients. While The Food Safety Authority of Ireland (FSAI) are responsible for ensuring that all food products produced and imported into Ireland comply with legislative requirements.

Regulation 1924/2006 on Nutrition and Health claims came into effect on the 1st July 2007. The legislation defines a Nutrition claim as: any claim which states, suggest or implies that a food has a particular beneficial nutritional property. Health claims associated with foods have to undergo a rigorous and substantiated scientific assessment, where the burden is placed on the promoter to absolutely prove the scientific link between the food and the proposed health claim. This is a lengthy and costly process, and until this has been successfully completed the claim cannot be used in the labelling or marketing of foods. EFSA assesses the scientific evidence presented and will provide an opinion as to whether the science supports the claim, i.e. the claim has been substantiated, and what wording can be used in the making the claim.

Teams and competencies

The key collaborators in this case study in food Innovation were the food business owner **Homespun Ltd**, **St. Angela's Food Technology Centre** the Third level Knowledge Provider, **Enterprise Ireland** the State agency responsible for Enterprise development and funding supports, and **Bord Bia & Supervalu** the state agency and retailer responsible for running the SuperValu Food Academy programme.

St. Angela's College & Food Technology Centre

St. Angela's College (SAC) based in Sligo, Ireland, is a third level College of the National University of Ireland, Galway (NUIG). SAC is a provider of Home Economics Education, and Nursing education and research in the North West of Ireland. SAC is the only provider of Home Economics Teacher training in Ireland. SAC has a well-deserved reputation for delivering high quality programmes at undergraduate and postgraduate level.

St. Angela's Food Technology Centre (SAFTC) situated in the heart of SAC campus was established in 1998 in response to the needs of Food Business operators in the North West of Ireland. Nowadays SAFTC is regarded as one of Ireland's leading Food Development and Innovation hubs for small and start-up food businesses.

This side by side existence of St. Angela's College, NUIG and St. Angela's Food Technology Centre and NUIG, provides a valuable collaboration between education, research and industry expertise, Enterprise Ireland and food companies.

SAFTC is committed to the development of the very highest standards in all areas of food production and supply, catering to the needs of the food industry including food production and processing, hotels, restaurants, catering and retailers in the Border Midlands and West.

SAFTC offers a wide range of services from new product innovation and development supports to, food safety management, training and food factory design through a team of experienced Senior Food Scientists, Nutritionists, Researchers, Technologists and Culinary experts.

HomeSpun Limited

Entrepreneur Erica Sheehan founded her business Homespun in 2014. Erica was an established executive with Coca Cola, who had a huge interest in Food and Nutrition. Erica combined her key passion and interest for food and nutrition with her strong background in business and grocery.

Erica was a regular user of quinoa and noticed there were very little products available on the market that she would like to purchase. After reading the China Study by Colin Campbell, this book convinced her of the benefits of eating a plant based diet. The book is based on one of the largest studies on Human Nutrition. The study found that people who ate a plant based diet lived longer and had higher immunity than those who did not.

Erica changed her own diet and started to reduce her intake of animal based protein, and to consume more plant based protein. She decided to start working on the development of a range of Quinoa Granola products that blends the goodness of quinoa pops, seeds, nuts and berries.

Erica started selling her product at local farmers markets in 2014, to get some market feedback to determine how well liked the products were received. The feedback was very positive, and she realised she had a good business foundation and innovative product.

Promoting healthy diets and wellness became fundamental to Erica's business ethos and brand values. Homespun wanted to ensure that their new products were of the highest quality from an ingredient and nutritional perspective, and moreover were in line with Government and EU policy in promoting healthy diets. Homespun needed to ensure that their products would meet the specific scientific and nutritional criteria to meet qualified nutrition claims criteria.

The big unknown and Innovation challenge for Homespun Ltd was to determine the exact nutritional profile of the Quinoa Granola offering, with a view to determine what and if any health or nutrition claims could be made on the products, while keeping in line with European Food Safety Authority (EFSA) legislation on Nutrition and Health Claims. The nutritional values and possible nutrition claims were fundamental to the business overall positioning and unique selling proposition (USPs) to their customers.



Figure 9. Homespun Quinoa Crunch

Enterprise Ireland & Local Enterprise Office

The third actor in the collaboration was Enterprise Ireland (EI). As discussed earlier, Enterprise Ireland is the government agency in Ireland responsible for supporting Irish businesses. EI works in partnership with Irish Enterprises to help them to start up, grow and innovate. EI provided funding supports in the form of a €5,000 Innovation Voucher to Homespun in terms of the work conducted with St. Angela's Food Technology Centre.

Homespun's local Enterprise Office (LEO) in Dun Laoghaire supported Homespun through their participation in the SuperValu Academy programme, and funded a feasibility study undertaken by Homespun in 2016.

Bord Bia & SuperValu Food Academy Programme

The fourth partner in the collaboration was Bord Bia & SuperValu who run the Food Academy Initiative. The Food Academy Initiative as outlined earlier, is a great example of successful Innovation and supports for the Irish Food and Agri Sector. The local Enterprises Offices, SuperValu and Bord Bia came together to create the Food Academy Start Programme, a tailored programme for new and early stage food business owners. The programme is delivered as tailored workshops with a view to providing a solid business foundation for small food producers to move forward to obtaining listings with SuperValu retail outlets. The initiative is strongly supported by SuperValu in terms of retail expertise. SuperValu provides successful applicants with an opportunity to trial their product in local stores. To take full advantage of this opportunity the food business needs to have progressed their products to a point where they are ready for the super market shelves.

In this context it was essential that HomeSpun were in a position to maximise the opportunity presented through the Food Academy. It was fundamental that the business had established and

validated their unique selling proposition, in terms of having their products market and supermarket shelf-ready. Key to ensuring the products were ready for market was to validate the potential nutrition claims that could be made on the Quinoa Granola food labels, through the work conducted with SAFTC.



Figure 10. Supervalu food academy

Enterprise Ireland Innovation Voucher

The major successful collaboration on their path to success, according to Homespun foods limited was the work the business conducted with SAFTC, which meant that the business could be confident in their overall product proposition. EI approved a €5,000 Innovation Voucher in 2015 to fund research and knowledge transfer conducted with SAFTC.

Homespun Foods teamed up to collaborate with St. Angela's Food Technology, to avail of their expertise in Food Innovation, Nutrition and Food Regulatory requirements. SAFTC offers a wide range of services from new product Innovation & development, food safety management, training and food factory design through a team of experienced Senior Food Scientists, Nutritionists, Researchers, Technologists and Culinary experts.

Homespun Foods Nutrition Claims

Homespun foods and the retailer SuperValu were very keen that Homespun foods could make validated Nutrition claims on their Quinoa Granola. This would convey to the consumer the nutritional benefits inherent in the products. At a time when consumers were quite sceptical of food labelling, it was important for all the stakeholders that the products could make the key nutritional claims, "High in protein" "High in Fibre" and "High in Omega 3". A High in Protein claim can only be attributed to a food where at least 20% of the total kcal energy derived from the food is provided by the protein content. In the case of High in Omega 3 or a source of Omega 3 claims, the quantification is not as clear. Under regulation 1924/2006 on nutrition and health claims, a source of Omega 3 claim stipulates that the product must contain at least 0.3g alpha-linoleic acid per 100g and per 100 Kcal, or at least 40mg of the sum of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) per 100g and per 100Kcal. To make a high in Omega 3 claim, the food must contain twice the amount of alpha –linoleic acid, i.e. 0.6g per 100g and per 100Kcal, or at least 80mg of the sum of EPA and DHA.

Procedure & Tools employed by teams

SAFTC as the chosen knowledge provider in the collaboration were tasked with nutritionally profiling the current Quinoa Granola food offerings with a view to reengineering and adjusting the formulations where necessary to help meet the criteria in order for the products to make nutrition claims. From an ethical and customer perspective it was essential that Homespun and the Retailer Supervalu could stand over any nutritional claims attributed to the products.

The fundamental Innovation in this part of the project was to re-engineer the food formulations to meet policy regulations surrounding health. To do this SAFTC had to first understand and determine what the current nutritional profile of the food products were and reconcile these against EU legislative requirements.

Tools Employed

Microdiet is a nutrient analysis software employed by SAFTC. Microdiet was specifically designed for use by professional dieticians, nutritionists and food advisors to help them to analyse the diets of patients and to determine the nutrient profile of foods. The system was developed on the McCance and Widdowson' composition of foods database. In Ireland, McCance and Widdowson's composition of foods integrated dataset is the accepted data source for food nutrient compositions. The information presented in food composition tables can be quite complex, and it is important to validate calculated nutritional using approved and accredited analytical laboratory analysis.

In addition to the use of Microdiet, spreadsheets were created which could be manipulated to help calculate the nutrient profile of the foods, and more importantly to determine the effect on levels of nutrients by adjusting specific ingredients in the formulations.

Sensory Analysis

Sensory Analysis is a scientific discipline used to analyse reactions to stimuli perceived through the senses, such as Sight, Smell, Touch, Taste and Sound. Sensory Analysis is a vital tool for the Food Industry as a key component of food innovation and engineering. SAFTC uses Fizz Biosystems Software for their sensory analysis panels.

Sensory analysis, Just About Right (JAR) scales were employed as a key tool by SAFTC as a key stage in evaluating the redeveloped recipes to ensure they remained sensory appealing to the consumer.

Discrimination tests were conducted with sensory panellists to determine if consumers could discriminate between the redeveloped formulations versus the original formulations derived by Homespun.

SAFTC determined the typical nutritional profile for the Quinoa Granolas. The macronutrient carbohydrates, sugars, proteins, saturated and unsaturated fats, fibre content, along with the vitamin and mineral contents were calculated. Using this data it was then possible to evaluate, what if any nutrition claims could be made for the Quinoa Granolas.



Figure 11. Sensory analysis

Project timeline

2014	2015	2016	2017	2018 & 2019
<ul style="list-style-type: none"> •Sept: Began trading in Farmers Markets •Oct: Applied for EI voucher 	<ul style="list-style-type: none"> •Mar: Awarded EI Innovation voucher •Mar: Commenced work with SATFC •Apr-Nov: SATFC conducted nutritional profiling and recipe reformulation •Nov: Finalised product specifications including nutritionally profiling and Nutrition claims were provided by SAFTC 	<ul style="list-style-type: none"> •Undertook LEO Feasibility study •May: First production runs of the new products with the third party manufacturer were conducted •Jul-Oct: Took part in the Bord Bia Supervalu Food Academy programme •Oct: Successful pitch to Supervalu •Oct: Started supplying local Dublin-based Supervalus 	<ul style="list-style-type: none"> •May: Listed for the Health and Wellness aisle in Supervalu stores nationwide 	<ul style="list-style-type: none"> •MAP grant for Marketing awarded by Bord Bia

Figure 12. HomeSpun timeline

Homespun was established in 2014 and began trading in Farmers Markets in September 2014

Homespun applied for their EI voucher in October 2014 and was awarded the voucher in March 2015, commencing work on the project with SAFTC in March 2015. SAFTC conducted nutritional profiling and recipe reformulation from April 2015 to November 2015, and the Homespun-LEO Feasibility study was conducted in 2016. First production runs were conducted in May 2016. Homespun took part in the Bord Bia Supervalu Food Academy programme from July 2016 to October 2016, culminating in a successful pitch to Supervalu in October 2016, and in May 2017 Homespun got a listing for the Health and Wellness aisle with Supervalu stores nationwide. An MAP grant for marketing by Bord Bia was awarded in 2018 and 2019.

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Funds and/or resources

As noted in section 2.3, EI provided funding supports in the form of a €5,000 Innovation Voucher to Homespun in terms of the work conducted with St. Angela's Food Technology Centre.

Support was also leveraged through the local Enterprise Office (LEO) in Dun Laoghaire, which supported their participation in the SuperValu Academy programme, and funded a feasibility study undertaken by Homespun in 2016, as described above.

Tools, methods, strategies of cooperation

Erica found the advice and mentorship in Food Academy to be invaluable, and the supports provided by SAFTC meant that she could be confident in the bona fide nutrition claims she was making about her product.

The Food Academy programme was a major successful tool in supporting the development of Homespun Ltd, in terms of providing a platform for growth and development resulting in listings with the Supermarket chain. Erica took part in the SuperValu Food Academy programme training and workshops run on 4 different days. Erica's advice to other Entrepreneurs, is when starting out, apply for accelerators. *"I was lucky enough to take part in the Supervalu Food Academy, Enterprise Ireland's New Frontiers and also Starting Strong, the precursor to Going for Growth, which is geared towards female entrepreneurs. Through each, I met friends, peers and mentors who have really helped me move forward and have inspired me. I can't recommend these programs enough!"*

Erica states *"Working in collaboration with Sean Gilbride Food Scientist and Product Innovator from SAFTC, Homespun was able to bring to market two new multi award winning products - our two flavours of Quinoa Crunch - which with little or no marketing resources, have resonated with consumers because of their taste, nutrition and innovation and have since gone on to won listings with major retailers in a short time. The well-balanced recipes appeal to consumer's taste buds, the ingredients resonate with the health-conscious shopper and the quinoa angle engages both retailers and consumers."*

Milestones and outcomes

Results of nutrition analysis

A review of the calculated nutritional profiles revealed that one the two products could claim to be a source of protein and high in Fibre without any modifications to the formulations, however neither products met the criteria to achieve a source of high in Omega 3 nutrition claim.

By reverse engineering the formulation guided by typical compositional values, SAFTC could advise Homespun on modifications that could be made to the product formulations, that would help achieve and optimise possible nutritional claims. After changes were made to the formulations, representative samples of the new formulation granolas were analytically analysed by a third-party accredited laboratory. The Quinoa Granolas were also tested for gluten and lactose to ensure that the products could also claim to be gluten and lactose free. Only foods containing 20 parts per million (ppm) gluten or less can be labelled as gluten free. The results of the analysis demonstrated a gluten level of less than 5 ppm.

Further modifications were recommended for the formulations and this process of recipe development continued until it was felt the formulations had been optimised in terms of their potential nutritional profile, while still maintaining their sensory quality. The Finalised Quinoa Crunch product formulations ensured the products could claim to be high in **Vitamin E, High in Magnesium and High in Fibre, Gluten, Dairy and Wheat Free, and could also claim to be a good source of Iron and folic acid and protein.**

Homespun Product Listings to date:

Homespun has gone from Framers' market stall to Harrods Food Hall. In addition to supplying Supervalu and other Irish food chains, Home spun has been listed in many Premium retailers in as far away as the Middle East.

- Homespun was listed with Spinneys a large premium supermarket chain in the Middle East in November 2017.
- Homespun products were launched in Selfridges Food Hall in August 2018. Selfridges is a chain of high-end department stores in the United Kingdom, operated by Selfridges Group.
- Homespun products were Launched on Ocado, the world's largest dedicated online grocer, in November 2018

Awards & Accolades:

Launched in June 2016, Quinoa Crunch was awarded a Gold and Silver at the Irish 'Free From' Food

Awards. Since then Homespun have won many awards, including:

- Gold - Free From Food Awards 2017
- Winner: Best Free From Cereal - Irish Quality Food Awards 2017
- UK The Guild of Fine Food - Great taste award 2019.

Successes, challenges, and lessons

Key successes

The Food Academy programme in conjunction with the Enterprise Ireland Innovation voucher initiative and resulting product development and nutritional assessment conducted with SAFTC was instrumental in providing Homespun with a solid platform and foundation to grow and develop further, confident that the supports and collaboration they received were at the highest quality.

Undertaking the Food Academy programme provided Erica and Homespun with training in modules and workshops covering "The Market" and "Market Analysis", "Lifestyle trends" and "Gap Analysis", Food legislation, Product pricing through to product presentation. These modules were delivered by SuperValu and Bord Bia, at regional and national level.

Fundamental to ensuring the products were ready for market was the collaboration with St. Angela's Food Technology Centre, the third-Party Manufacturer.

The multi-faceted collaboration undertaken with Homespun and Bord Bia, Supervalu, Enterprise Ireland, Local Enterprise Office and SAFTC collectively, brought the business from a start-up idea through to a thriving business. The key competencies of Food Science Nutrition and Regulatory experience brought by SAFTC, in line with the Food business and retail expertise provided for through the Food Academy was instrumental in providing Homespun with the know and route to market to successfully commercialise their new product offerings.

Bringing the key competencies and skills of the Food Technology Centre, Supervalu and Homespun with support from Enterprise Ireland and Local Enterprise Office was crucial in the success of the project. This practice of cooperation between state bodies and private entities was

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crucial to the success of Homespun Ltd. Homespun Ltd has gone from a company supplying their local Farmers Market to achieving international recognition for their products combining genuine nutrition, great taste and real innovation.

Key challenges/limitations

Homespun had adopted a balance of a healthy business practice model, including marketing, product, brand, communication, and promotion. In general most food and beverage entrepreneurs will only focus only one of these key corner stones. There has to be a balance between them. Homespun had a good balance, however as with many start up food producers there were many challenges for HomeSpun in terms of getting their product to market.

In particular navigating the legislative landscape on food and in particular what Nutrition claims can and cannot be made was particularly difficult for HomeSpun. This is a challenge for many small food companies who don't have the expertise in-house to create recipes to meet specific nutritional requirements, which will also tick the boxes in terms of legislative requirements. The process of product development can be supported by Food Knowledge professionals such as SAFTC, however the second part of the process namely process development, i.e. the upscaling of the product in a factory environment is less supported and relies heavily on the business working with a third-party manufacturer who can accommodate their product through their specific production process.

Erica has stated the hurdles around meeting food legislative requirements and obtaining a suitable manufacturer were substantial, and the wider availability of suitable food hubs which could house food start-ups would have been of great help.

Key lessons learned

Erica makes the point that it is essential to understand your consumer needs and priorities before setting out on a Food Innovation Project: "during the product development phase, consumer concerns about sugar were not as high as they are now. Homespun were more focused on protein claims and other health claims (source of protein etc.). In hindsight, focussing more on lowering sugars would have been a better strategy. At 12g and 13g of sugar per 100g, our products are lower than other granolas on the market, but had I been more focussed on the question of sugars, I would have discovered alternative natural sweeteners (stevia, chicory fibre) which could have helped us reduce sugars further. This would offer a competitive advantage." Having been able to capitalise on consumer insights through Bord Bia, or facilitating focus groups, would have highlighted this as a potential issue at the time and the formulations could have been adjusted to reduce the overall naturally occurring sugar.

Key lesson - Erica emphasised the need to be clear at the outset about the priorities and concerns of consumers; not to make assumptions about what your customers care about; and thoroughly validate your product through well organised focus groups and in-home placement trials.

Future cooperation and innovation

The supports provided by Enterprise Ireland for Industry are excellent and world standard. There are areas where improvements can be made in terms of the overall food production environment. Food production and in particular artisan food production has come on leaps and bounds in the last ten years in Ireland. Retailers such as SuperValu have been instrumental in helping to support small food producers get their product to market. The main barriers for Homespun to get over were the high cost associated with analysing food products, in terms of shelf life and nutritional profiling and the high costs surrounding food safety and upscaling food production.

The main obstacles for start-up food producers is the cost associated with establishing a food production environment that will meet the specific legislative and food safety requirements. In this

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case study HomeSpun were lucky in securing a suitable third party manufacturer. Many start up Food Producers have some very good food products, which they have created and have successfully brought to prototype, however a lot of these business will not make it to market due to the lack of suitable available production space. The wider development of food hubs designed for certain specific food sectors, supported by Food Technical experts, would be of great assistance to food starts in ensuring they are fast tracked through the technical hurdles associated with bringing foods to market.

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2.2.2 Less Salt, same flavour (Portugal)

2.2.2.1 Introduction and context of case study

The present section presents the main aspects of the Portugal context, which is relevant for the case study presented in the report. The selected case study was the “Bread Seal: Less salt, same flavour” project, implemented by five Portuguese entities, included food associations, governmental entities and research groups. This project is the result of the national program for the promotion of healthy eating in which one of the measures is the reduction of salt in food.

Regional trends in cooperation and innovation

According to Regional Innovation Scoreboard, over time Portugal has shown increased innovation performance since 2011, and in 2019 was classified as a Moderate Innovator. The strongest innovation dimensions are the innovators, innovation-friendly environmental, and the attractive research systems. However, the lowest indicator scores are the PCT patent applications, public-private co-publications, and knowledge-intensive services exports.

In terms of region, Lisbon is considered a strong innovator, where performance has increased by 5.7% between 2011 and 2019. Figure 1 demonstrated the relative strengths of the Lisbon region compared to Portugal (orange line) and the EU (blue line). Lisbon is stronger in terms of SMEs innovating in-house and at the same time weak in the PCT patent applications.

For innovation, there is a need to involve internal and external cooperation, since companies often do not have all the know-how for the innovation process under study. Therefore, in Portugal, there are different regional trends with regards to cooperation in innovation. Regional data demonstrated that collaboration/partnership enterprises were more frequent with companies, universities, technology centres, business associations, public bodies and other stakeholders. An example is the INTERFACE Program, which is part of Portugal 2020, and aims to promote the link between higher education institutions and Portuguese businesses. INTERFACE proposes promoting this link for technology enhancement and transfer to increase knowledge-intensive economic activities and innovation-based value creation by addressing the challenges of access to knowledge, flexibility and globalization of markets. Furthermore, in the Portugal 2020 program, there is the Research and Technological Development Incentive Scheme, designed to meet the challenge of promoting cooperation between science and business, leveraging R&D activities in Portugal and translating this collaboration into knowledge applicable to new products, processes and organizations. In Portugal, the Enterprise Europe Network is formed by a set of public and private entities that form a consortium, EEN-PORTUGAL, led by IAPMEI. EEN-PORTUGAL's main objective is to help Portuguese companies, particularly small and medium-sized enterprises and startups, to become more innovative and competitive in international markets by providing them with strategic information and support services and knowledge.

Overall, based on the innovation theoretical framework used to analyse the national context, Portugal is characterised by an embryonic Triple-helix innovation ecosystem. Portugal needs to increase the collaboration between smart city actors and civil society in the urban innovation process. So, to build an attractive, sustainable and inclusive innovation ecosystem, in 2017, the government created the EIPAS, which is a result of a collaboration between several ministries, including Finance, Internal Affairs, Education, Health, Economy, Agriculture, and Sea Ministries.

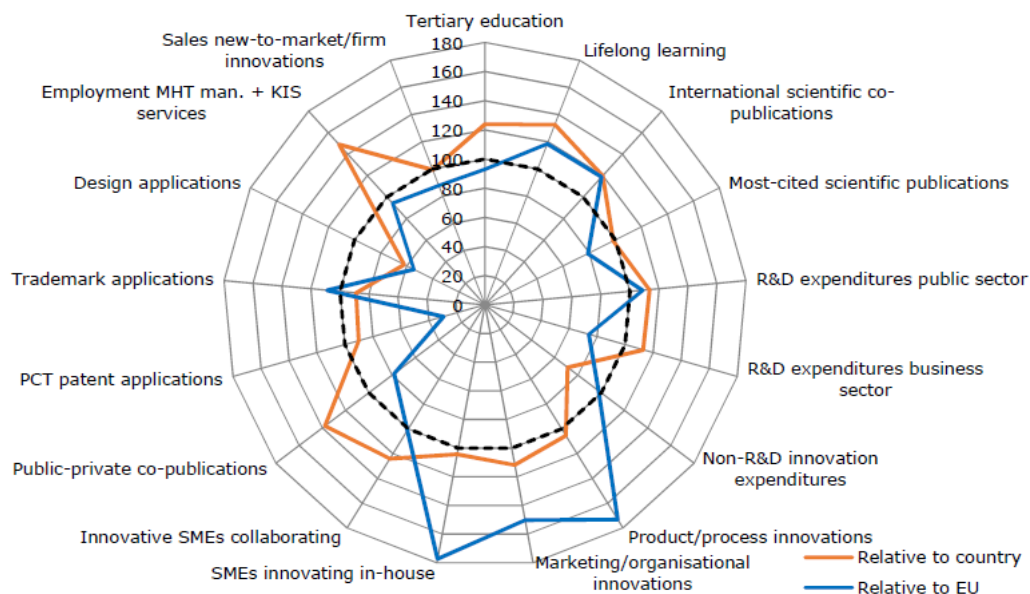


Figure 13. Lisbon Regional Innovation Scoreboard profile, relative to Portugal and to the EU

Source: Regional Innovation Scoreboard 2019

Policies that inform the types of cooperation used

In Portugal, collaborative innovation is mainly developed by the National Agency of Innovation. The ANI aims to support technological and business innovation in Portugal, contributing to the consolidation of the National Innovation System (SNI) and to strengthening the competitiveness of the national economy in the Global markets. ANI has a financial incentive, R&D in Copromotion. This Incentive System, Research and Technological Development, provides support to projects of companies in co-promotion with other companies or other entities of the R&I System, aimed at strengthening their competitiveness and international insertion through the conduct of industrial research and experimental development activities. Also, ANI is part of the following international networks:

Horizon 2020 is the European Commission's Framework Programme for Research and Innovation funding, in force between 2014 and 2020. The European Commission's Framework Programmes are the main instruments for funding research and innovation in Europe. They created a vibrant internal market for science and technology for building the future of Europe.

Eureka network projects are R&D projects aimed at the market and developed in an environment of international cooperation. They are aimed at developing market-oriented innovative products, services and businesses. They cover all areas of technology, and the subject matters, activities and priorities are defined by the proposers.

The PERIN network, which results from the professionalisation of the R&TD Framework Programme Promotion Office (FPPO), and arises in the context of national priority that the promotion of R&D, innovation and digital transformation activities has assumed in the framework of public policies and its effective insertion in the European context.

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The KTForce project has produced several strategic recommendations for the design of future innovation policies in Europe by benchmarking Knowledge Transfer policies and practices that can contribute to more dynamic and competitive European regions.

The S34Growth - Enhancing Policies Through Inter-Regional Cooperation: New Industrial Value Chains for Growth project aims to develop and improve public policies and instruments that contribute to the implementation of new forms of industrial innovation.

The HELIUM - Health Innovation Experimental Landscape through Policy Improvement project aims to promote an environment of experimental innovation in health through the optimisation of public policies.

The SMART FINANCE project - Smart financing for SMEs and space entrepreneurs SUDOE is a European project funded by the European Commission, that aims to create the first transnational platform for access and management of funding, offering companies alternative funding, personalised advice, monitoring and training.

ANI established strategic vectors for Technological and Business Innovation to be achieved between 2018-2030:

1. Increased investment in research and development;
2. Entrepreneurship;
3. Valorisation and transfer of technology;
4. Internationalisation;
5. Improve the implementation of European Structural and Investment Funds;
6. Reinforcement of Interface Centers;
7. Promotion of valuing innovation;
8. Monitoring.

Technologies, tools and methods supporting cooperation and innovation

Eye@RIS3 - visualises public investment priorities for innovation across Europe. It enables public managers and stakeholders to position their territory in comparison to other territories and to find potential partners for collaboration.

Cultural and creative industries

Advanced services to companies

Health research, technologies and services

Mobility and transport

Marine resources

Tourism and hospitality

Regional Benchmarking: it is an interactive tool for Regional Benchmarking which helps identifying structurally similar regions across Europe with a simple click. The tool has been developed by the S3 Platform in collaboration with Orkestra - Basque Institute of Competitiveness,

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and will be progressively equipped with additional links and functionalities aimed to improve integration with other S3 tools and with the dedicated pages that have been produced for each of the regions and countries registered in the S3 Platform.

R&I Regional Viewer: This tool allows to visualize and compare Research & Innovation investments under different funding channels and EU programmes across EU Regions, i.e. economic indicators from Eurostat, planned R&I-related investments under ESIF, and Horizon 2020 funding captured by stakeholders.

Digital Innovation Hubs: it is an online catalogue which contains comprehensive information on digital innovation hubs in Europe. The ultimate purpose of the tool is to help companies get access to competences needed in order to digitize their products and services.

HUB for Agriculture (HUB4AGRI): aims to create a multi-sector cooperation network that promotes the connection between technology providers and the needs of the agricultural sector supporting innovation connected with digital decision support tools and R&D activities, serving as a one-stop shop for the provision through a European cooperation network.

2.2.2.2 Case study: Project “Bread Seal: Less salt, same flavour”

The Problem

In recent years, with increasing production of processed foods, rapid urbanization and changing lifestyles, the dietary patterns of the population are changing. People are consuming more energy-dense foods, with a high concentration of saturated fats, trans fats, sugars, and salt. Salt is the primary source of sodium, and the excess of sodium intake causes raised blood pressure and thereby increased the risk of cardiovascular diseases, stroke and coronary heart disease¹.

Based on a study on salt consumption in the Portuguese population between 2011 and 2012, the daily salt intake was 10.7 g/day. This value exceeds the value recommended by the world health organization, 5g/day. As the amount of salt consumed in Europe exceeds levels recommended by the World Health Organization (WHO), salt reduction was recommended as a “best buy” policy, specifically, as one of the most cost-effective and feasible approaches to prevent non-communicable diseases (NCDs). Therefore, some countries in the WHO European Region initiated sodium reduction strategies, including reformulation, interpretative front-of-pack labelling, and behaviour change communication¹.

In Portugal, through the national program for the promotion of healthy eating, an incentive to reduce the salt content of bread was created. A collaboration protocol was then created between the Directorate-General for Health, the Ministry of Health's Shared Services (SPMS), the public health units ARS, the National Bakeries Association and the National Institute of Health. At the end of the project it was given a distinctive mention (seal): Bread with "Less salt, same flavour". The DGS is the entity responsible for the national public health plan, and in this project, it is responsible for awarding the distinctive mention. The ARS Public Health Units are responsible for local management of the project, including sample collection.

The Ministry of Health's Shared Services (SPMS) are responsible for building and maintaining a basic process information management system in close collaboration with the project coordination team (DGS) and INSA and ARS. INSA is the entity responsible for the salt content analysis, and in turn, the ARS Public Health laboratories aim to validate the analysis methods so that in the future they are autonomous in the salt content evaluation in foods.

Currently, the leading cause of death worldwide is cardiovascular disease, resulting in 31% of all global deaths². The causes of these diseases are tobacco, unhealthy diet, physical inactivity and harmful use of alcohol. The high salt intake (the primary source of sodium) by the population is

associated with hypertension problems and increased risk of heart attack and stroke. Most people consume an average of 9 to 12 grams per day, which is double the WHO's recommended maximum intake level. In the case of Portugal, 66% of women and 86% of men have presented a sodium intake above the tolerable upper intake level ². The main food products that contribute to the high salt intake are bread, meat products and vegetable soups. In this case, the bread matrix was selected to reduce salt content, as bread is a basic component of the Portuguese diet and at the same time an essential source of carbohydrates, proteins, vitamins, minerals and fibre.

To prevent and control noncommunicable diseases, WHO and its Member States have set a global target to reduce the population's average sodium intake by 30% by 2025. In line with the recommendations of the WHO European Food and Nutrition Action Plan, several countries in the WHO European Region have begun to develop national strategies to reduce sodium in food¹.

In the area of health, the Portuguese government sets health promotion as a priority, arguing that the achievement of health gains results from intervention in the various determinants, highlighting as fundamental the policy of promoting healthy eating. Portugal, in 2012, implemented the first national food and nutrition policy - National Program for the Promotion of Healthy Eating (PNPAS). This program's mission was to improve the nutritional status of the population by promoting the physical and economic availability of healthy foods. However, during the implementation of PNPAS, the challenge emerges regarding food and nutrition policies, the difficulty of having a multisectoral approach remained, establishing alliances and partnerships between different sectors of government. In 2015, the Portuguese government created an inter-ministerial working group, EIPAS (Integrated Strategy for the Promotion of Healthy Eating), to promote the adequacy of nutritional profiles for specific food categories. This program recognizes the partnerships established between ministries, the health sector, the local authority, international institutions (WHO and the European Union), the food industry and distribution sectors, entities that regulate and oversee the food sector, consumer protection entities, media, civil society, and schools. In 2017, the government published the Order No. 11418/2017, December 29th, which establishes a set of interventions, highlighting the goals for the reformulation of salt in various foods:

- Bread: 1 g per 100g of bread by 2021;
- Ready-to-eat soups: 0.9g per 100g meal by 2023;
- Pizza: reduce up to 10%;
- Breakfast cereals: 1 g of salt per 100g;
- Chips and other snacks: reduce up to 12%

With the definition of the goals for reducing salt in food by EIPAS, it was possible to establish a protocol between political entities, business entities and public health institutes to achieve the purpose of reducing salt in one of the most consumed foods by the Portuguese population: bread.

Teams and competencies

This project involves a total of 5 entities, Directorate-General for Health, the Ministry of Health's Shared Services (SPMS), the public health units ARS, the National Bakeries Association and the National Institute of Health. Each partner has an essential function in the present project.

The Portuguese Directorate-General for Health has expertise in coordinating interventions by the Ministry of Health Services and bodies and in evaluating the implementation of the proposed measures.

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The Ministry of Health's Shared Services (SPMS) has expertise in the construction and maintenance of a base management system, allowing, in this case, to be responsible for managing the information arising from the process.

The Public Health Units of ARS have the task of managing intervention programs in the context of prevention, promotion and protection of the health of the population in general or specific groups. In this case, they are responsible for collecting samples regularly and for assigning them the Seal after analytical evaluation.

INSA is a public institution whose mission is to contribute to public health gains through research and technological development activities and the reference laboratory activity. In this case, having experience in analyzing the quantification of salt content in foods INSA is responsible for analyzing the salt content in each selected bread.

In turn, the Association of Bakery, Pastry and Similar Industry Manufacturers has the function and objective of providing information and technical food and nutritional training related to the sector. Therefore, the role of communicating to bakeries the purpose of this project and its importance at the national level.

Project timeline

The project "Less salt, same flavour" has an annual application, review, and reward timeline. Every year there is an application process for bakeries wishing to join the Seal Bread project with "Less salt, same flavour". After the application phase, there is then the bread collection phase (4 to 5 different bread) at two different times over 3 months apart.

Then begins the process of analyzing the salt content of bread, carried out by INSA, and based on the results obtained the bread seal is awarded or not awarded to the bakery, for each type of bread. However, since 1g salt per 100g bread is a goal to be achieved by 2021, there is a parallel goal of achieving 4-phase salt reduction:

- i. 1.3 g of salt per 100 g of bread by 12.31.2018;
- ii. 1.2 g of salt per 100 g of bread by 12.31.2019;
- iii. 1.1 g of salt per 100 g of bread by 31.12.2020;
- iv. 1.0 g of salt per 100 g of bread by 12.31.20.

Funds and/or resources

The realization of this project has no funds or resources involved as it is a project resulting from PNAS and EIPAS.

Tools, methods and strategies of cooperation

One of the essential strategies developed early in the project implementation was the selection of each participating entity so that there was intersectoral cooperation/collaboration (Directorate-General for Health, the Ministry of Health's Shared Services (SPMS), the public health units ARS, the National Bakeries Association and the National Institute of Health). As the project was the result of one of the measures developed by EIPAS, it has no access to funds under the Portugal 2020 program. Thus, to be able to perform the tasks of coordination, collection and analytical evaluation of salt content in bread, as part of the registration process each bakery was asked to make a monetary contribution.

Regarding the methods applied, a survey was made of all existing bakeries at the national level. Thus, it was possible to know what the project sampling was. Besides, this initial study also

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identified which SARS public health entities would be involved and was crucial in designing the timeline and which activities were needed by each partner. Then it was necessary to define how the sampling process would be carried out, and when it would be done, using a schedule that allowed all partners to coordinate with each other. It is essential to mention that the bakery companies did not have access to the program evaluation schedule such that no change in the cooking method occurred during the sampling and evaluation work. During the project, strategies were also developed to sensitize the professionals of the member companies to the theme of salt and health. To this end, training and campaigns were conducted at national and regional levels to promote bread consumption and the risks associated with high salt consumption.

Milestones and outcomes

The Seal Bread project “Less salt, same flavour” is still ongoing, and so far there are only results for the year 2018. In the year 2018, 12 bakeries participated, in which 2 belong to the Lisbon region, 7 to the North region, 1 to the Alentejo region and 2 to the Algarve region. During the process of analyzing the salt content of bread, two collection phases were carried out, more than 3 months apart. It was found that in a first collection out of a total of 58 samples collected from all bakeries, only 47 contain less than 1g salt per 100g bread. However, in the second phase, the number of samples below the target set increased to 51.

Thus, by the end of 2018, eight out of twelve bakeries met the project objective.

Successes, challenges and lessons

Key project successes:

- Efficient collaboration between entities;
- The initially planned schedule was completed successfully. This success was based on good cooperation and understanding between partners. Also, it is essential to note that the timeline was designed addressing critical points identified by the partners.
- 66% of bakeries reached the goal of 1g salt per 100g bread.

Key challenges/limitations:

- Little adherence of bakeries nationwide;
- Little dissemination of the project at national level;
- Low literacy: Portugal has a low level of health literacy. The scientific literature identifies low literacy as a risk factor for several diseases, namely obesity, diabetes, cardiovascular diseases, among others. The Portuguese population and companies' literacy was considered one of the difficulties for successful cooperation and adherence of bakeries;
- In rural areas, cooperation between project entities was not sufficient for high adherence and at the same time to achieve the project objective. This area has low literacy, requiring more significant investment and involvement of nearby population entities (schools, health authorities and priests) to increase health literacy.

Key lessons learned:

Lower the registration fee: Since the project had no funding, the companies joined up at a cost, which took into account the travel for sample collection, analysis of the salt content of bakery products and the expected number of companies. It is under consideration currently to half the registration fee, taking into account: the use of electric cars and the analytical cost can be reduced once more companies participate in the project, since costs for running equipment is reduced through multiple sample analysis.

It's essential to have social media on our side;

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It is possible to reduce the salt content and not to alter the sensory characteristics of the product;

Partner collaboration: A multi-sectoral collaboration of companies of different sizes (media) and from different sectors (media, universities, healthcare organizations) was critical to the project's success.

Future cooperation and innovation

Since the project is still ongoing and based on the challenges and lessons learned during the first year, it is possible to mention which future cooperation and innovations will be carried out next year. One of the objectives is to extend the process to more bakeries at the national level, which is why it is necessary to lower the membership price when applying for participation in this project.

Another important point is need to enhance project communication, which can help to disseminate and deliver the message to the population. Therefore, it is essential to invest in a communication plan aimed at making both companies and the national population aware of the risk of excess salt in food. For the communication process to be more productive, it is necessary to increase the literacy of the population. Thus, it is vital to conduct thematic campaigns and interventions for the population that promote health literacy.

Bibliography:

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² SNS: Guia para a atribuição do Selo Pão “Menos sal, mesmo sabor” (2018)

2.2.3 Functional Fibres (Wales)

Introduction and context of case study

This introduction outlines the main aspects within the regional context that influenced the case study selected to demonstrate activity in Wales. The case study chosen was a Small Business and Research Initiative (SBRI) project, funded by Welsh Government and Innovate UK, in which commercial enterprises and academia collaborated to create a nutritionally advantageous functional fibre from a food by-product. The research and development required the input of children and their families, thus introducing the fourth element of the Quadruple Helix concept.

Regional trends in cooperation and innovation

Wales has developed its own devolved approach to cooperation and innovation within the food industry, with its foundations emanating from the policies of the Welsh Government (see Point 2). Aiming to redress the issue that R&D (Research and Development) expenditure in the food and drink sector is lower in Wales than the UK (United Kingdom) average, the government has focused on “priming the pumps” of innovation and growth for the industry. This acts as a catalyst for other helices to come together to create tangible outputs and outcomes, including those in the innovation of healthy food products.

This model of government working through commercial businesses to deliver on their objectives, vision and agenda for the food industry is also used to support SME's (Small & Medium Sized Enterprises) in several tailored arenas that impact upon healthy product development. These cover a variety of distinct but complementary areas including: consumer and market insight to identify targets for both domestic and export sales growth; access to finance for job creation and business growth via grants and more recently encouragement of investment in support for innovation and product development at various Technological Readiness Levels and; helping with grant applications via practical expert advice from concept to scale up. Advice is also offered in staff recruitment and skills building as well as food safety matters such as accreditation,

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implementation of HACCP plans and lean processing, along with support on ensuring legal compliance of processes, product composition and packaging.

The government has also been proactive in organising high-profile events to drive interest in Welsh products such as the biennial Blas Cymru/Taste Wales event. Other initiatives include facilitating helices collaboration to deliver effective promotion and positive PR for Welsh produced food products at various trade and consumer events (e.g. ANUGA/IFE), supporting targeted international trade missions and promoting domestic and internationally focused food tourism mechanisms such as food festivals and markets.

Digital transformation is a key trend, spanning aspects as diverse as the innovative and effective use of big data and artificial intelligence, the design of smart buildings and a connectivity infrastructure to support businesses in rural areas.

Policies that inform the types of cooperation used

Polices exist at both a devolved Welsh level and from UK Government which have very significant impacts on the interaction of helices in the development of healthy products.

At a Welsh level, the Welsh Government have a comprehensive suite of policies which impact upon the food and drink sector and influence how the helices collaborate for innovation purposes.

The major sector specific policy in Wales is **“Towards Sustainable Growth: An Action Plan for the Food and Drink Industry 2014-2020”**,¹¹ which sets out the vision, growth targets and implementation framework for government support in the sector. Since the plan’s inception, the food and drink sector in Wales has seen a significant boost in growth and has almost reached its target of increasing the economic value of this sector by 30% by 2020 (to £7 billion). To build on this success the Welsh Government has recently launched its consultation for a successor action plan **‘Our Ambition to Further Develop Wales Food and Drink Sector’**¹².

Underpinning these sector specific policies lie several other wide-ranging policies which also influence how government interest and resources - including investment priorities and financial support, infrastructure building and promotional focus - are manifested in the food and drink sector. In recent years there has been a distinct trend away from grant aid to supported investment schemes requiring matched funding from businesses and operating as the loan of last resort.

In relation to Welsh health policy, the Welsh Government has recently consulted on a new Obesity Strategy to prevent and reduce obesity within Wales. Food reformulation to include healthier alternatives is one focus within its proposals, the strategy is due to be published in the Autumn.

In addition to policy, the Welsh Government has enacted the Well-Being of Future Generations (Wales) Act (2015)¹³; the Act sets out seven well-being goals that must be considered by public authorities in its policy and decision making. The vision being to ensure any actions taken now

¹¹ Welsh Government “Towards Sustainable Growth : An Action Plan for the Food & Drink Industry 2014-2020” <https://businesswales.gov.wales/foodanddrink/about-us/action-plan>

¹² Welsh Government : Our Ambition to Further Develop Wales Food and Drink Sector <https://gov.wales/sites/default/files/consultations/2019-07/food-and-drink-consultation-document.pdf>

¹³ Well-Being of Future Generations (Wales) Act (2015) <https://gov.wales/well-being-future-generations-act-essentials>

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are carefully considered in the context of their future effects and long-term impacts are not ignored in the clamour for short term gains.

“Taking Wales Forward 2016-2021” groups the Government’s policies and aspirations for Wales into four themed segments which are

Prosperous and Secure - Healthy and Active - Ambitious and Learning - United and Connected

The influence of these areas of policy is felt within our sector in a diverse range of matters including-

- Innovation Wales priorities, and ERDF initiatives such as Horizon 2020, are pursued via the integrated SMART Innovation programme supporting Welsh businesses to deliver R&D, design new or improved products and processes, enhance manufacturing efficiency, deploy technology effectively and to manage their intellectual property.
- Business finance initiatives support SME’s investment plans and pursues job creation and safeguarding.
- Public health campaigns promote healthy food choices as part of a healthy lifestyle for Welsh citizens - which in turn creates product development opportunities for health products.
- Investment is being made in the Higher Education sector, upgrading and upskilling Welsh Universities to attract the next generation of Welsh and International students. In addition to creating a skilled and resourceful workforce for the future, cutting edge research and entrepreneurship are actively promoted to manifest projects at all Technology Readiness Levels, ready for roll out into industry.
- Further commitment to build skills for young people and the existing workforce includes support for an infrastructure of training and funding for apprenticeships and continuous professional development.
- Implementation of fast, reliable internet and mobile phone connections is also a boost to the productivity of rural food businesses and assist their reach into the wider community – both locally and globally - facilitating project collaboration and sales growth opportunities.

At a UK level, food and drink manufacturing is the single largest manufacturing sector at 19% of UK manufacturing output, contributing £31.1b to the economy and employing over 450,000 people.

Taking the full food and drink supply chain into account £121 billion is generated and employment given to over 4 million people¹⁴. It is therefore not surprising that UK government policies and the flow of funding acknowledges the importance of the food and drink sector.

Recent consolidation of government funded bodies (Research Councils, Innovate UK and Research England) has created “UK Research and Innovation” which aims to improve the focus and coherence of cooperation and seeks to maximise the new body’s positive impact during the disruptive Brexit situation.

¹⁴ **Our Industry: Food and Drink Federation 2019** <https://www.fdf.org.uk/statsataglance.aspx>

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UK Government policy in the public health arena is also having a direct impact on the innovation and development of new products and reformulation of existing ones. The so called “Sugar Tax” (Soft Drinks Industry Levy 2018) has resulted in the widescale reformulation of soft drinks products.

SACN (Scientific Advisory Committee on Nutrition) reports and guidelines continue to set the agenda for food development through nutritional intake recommendations including sugar, salt, fibre and vitamins and FSA (Food Standards Authority) initiatives drive improvements in food safety.

One example of helices interaction is how consumer demand for healthier products leads to a desire from major retailers and food service operators to be seen to be in line with the public health agenda as part of their CSR (Corporate Social Responsibility). This in turn leads their suppliers – particularly in private label products which form on average 47% of market share in the UK¹⁵ – to seek reformulation and new product opportunities. This stimulates research and development of new innovative raw materials and ingredients and processing methods and equipment which may come from both commercial enterprises and research or academic bodies.

Innovative branded suppliers can also take advantage of these trends and the consequent extension of shelf space in stores - and menu items in food service outlets - to bring healthier products to market. For example since early 2018 there has been a huge growth of supermarket shelf space for chilled and frozen plant based foods, also dedicated “health and wellness” aisles in supermarkets, bespoke “Free From” fixtures for both ambient and now chilled, frozen foods and drinks and “food to go” cabinets as well as the strong growth of allergen aware menus in restaurants and QSR outlets.

Healthy products are specifically named in the top 3 most prominent growth opportunities identified for the sector for 2019 and beyond.¹⁶

Technologies, tools and methods supporting cooperation and innovation

In Wales 8 Food and Drink Clusters have been formed to enhance the innovation and performance of Welsh businesses in the sector.

The Clusters are managed by specialist consultancy companies, some originating as spin offs from academic bodies and some being commercial businesses, who act as the organisers and facilitators of activities, collaborative projects and events of interest to the Cluster members.

They are responsible for securing industry engagement from food businesses, research bodies and interested social and citizen organisation, scoping projects and maintaining the impetus of these to achieve the project objectives, as well as having accountability to Welsh Government for outputs and outcomes.

¹⁵ **United Kingdom Retail Foods Report - June 2018 : United States Department of Agriculture : Prepared By:** Julie Vasquez-Nicholson

https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Retail%20Foods_London_United%20Kingdom_6-15-2018.pdf.

¹⁶ Our Industry: Food and Drink Federation 2019 <https://www.fdf.org.uk/statsataglance.aspx>

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In addition, there are a wide range of bodies and mechanisms which can be accessed by Food & Drink companies in Wales to support their innovation and development programmes. These are outlined in Table 1.

Table 3. The spectrum of mechanisms and organisations in place to support Welsh Food and Drink businesses

Initiative	Delivered By	Support Offered	Target for Support	Conditions of Support
Project Helix	Food Innovation Wales	Expert advice for food innovation, NPD (New Product Development) and reformulation innovation. Incubator kitchens, scale up pilot plant facilities. Legal and food safety compliance advice.	Food and drink businesses across Wales	Funding from the European Agricultural Fund for Rural Development for SME's.
Cluster Events	Cluster Leader Organisations e.g. BIC Innovation, Levercliff, Menter A Busnes.	Events to share information and outputs from like-minded helices in specialist interest areas including Honey, CEO, Drinks, Nutrition, Export, Horticulture, Seafood and Fine Foods	Businesses with capabilities to achieve accelerated growth in sales, profits and employment.	
SBRI (Small Business Research Initiative)	Innovate UK	Provides solutions to government public sector challenges by engaging with small businesses who may provide innovative solutions, creating economic growth whilst solving public sector issues.	Technology focused small companies with scope for growth and capacity to deliver projects through a sequence of increasing funding opportunities.	
KTN (Knowledge Transfer Network)	KTN Agri-Food Division	Driving the conversion of the UK's bioscience knowledge into innovative agricultural, food and industrial	Links those with new ideas and opportunities with expertise, markets and finance through a network of	

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		bioscience products and processes.	businesses, universities, funders and investors	
Future Foods	BIC Innovation and Institute of Biological, Environmental and Rural Sciences (IBERS)	Drives collaboration on food science, technology and nutrition R&D to improve knowledge, competitiveness and achieve sustainability and growth through development of healthy, market creating products.	Welsh food and drink companies with innovation ambitions in the healthy and sustainable sector	
Horizon 2020 Food and Healthy Diet		Research includes consumer preferences and attitudes, needs, behaviour, lifestyle and education. Research on healthy foods and diets, nutritional needs and the impact of food in physiological, physical and mental aspects. Food design, packaging, process design and control, waste reduction and creating value from by-products.	Collaborative helices from industry, research and academia.	Through a process of tendering and grant applications.
Enterprise Europe Network (EEN)	In Wales, Swansea University and BIC Innovation	Helps businesses innovate and grow on an international scale. It is the world's largest support network for small and medium-sized enterprises (SMEs) with international ambitions.		

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SMART Cymru Innovation Programmes	Welsh Government and delivery partners	Consultancy and diagnostics covering manufacturing processes, design, innovation including open innovation schemes, IP management, technology transfer and implementation. Provides access to funding and grants	All Welsh businesses and academic bodies in collaborative projects. Food and drink sector businesses can apply for the support programmes and funding via Innovation vouchers.	
Innovate2Succeed	Designated partners through ERDF funding.	Fully funded programme designed offering up to 7 days of tailored support from an Innovation Adviser to support the senior team in a business address important areas of innovation management.	SME's with innovation requirements to support their business growth. Food and drink businesses can apply.	
AIEC (Aberystwyth Innovation and Enterprise Campus)	Aberystwyth University and Biotechnology and Biological Sciences Research Council (BBSRC)	The aim of AIEC is to establish a thriving bioscience centre in Mid-Wales to foster start up/spin out company formation and promote new inward collaborative activity which improves the translation of the knowledge base in food, animal health and the bio-economy into industrial application.	Start-ups and spin out companies arising from AIEC activities, access to AIEC facilities for Welsh food and drink businesses including laboratories, pilot processing areas, offices and meeting spaces.	
R&D Tax Credits	UK Government	To offset certain qualifying research and development costs against UK tax liability.	To encourage and support UK businesses in research, development and innovation. Food	Projects must demonstrate technological risk and uncertainty and not be such that a

			and drink businesses can apply.	knowledgeable professional could be reasonably be expected to resolve in the course of their duties.
Diabetes Research Unit Cymru	Swansea University	The core infrastructure links scientists, clinicians, patients and the third sector (voluntary and community organisations (both registered charities and other organisations e.g. associations, self-help groups and community groups), social enterprises, mutuals and co-operatives) to facilitate cross-disciplinary and cross-professional collaboration, together with wider collaborations across the health and care infrastructure in Wales.	Researchers, scientists, clinicians working in the diabetes sector and patients affected diabetes by in Wales. Includes patient participation in human intervention trials.	
Private Sector Investment Seed Capital, Venture Capital and Investment Angels	Many examples including food businesses such as Tate and Lyle Ventures, Unilever Ventures, financial businesses and wealthy individuals.	Seed capital is aimed at start up and early stage businesses with venture capital funding business growth and expansion.	All businesses from start up to larger organisations.	

2.2.3.1 Case Study: Functional Fibres Project: Wales

This case study outlines the Functional Fibres project which was a Welsh Government and Innovate UK funded project implemented from 2017 to 2019 by a consortium of commercial

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businesses and academic bodies. The aim of the project was to create an edible fibre ingredient, which could be produced from food by-products which would otherwise enter the waste stream, to nutritionally enhance prepared food products targeted at children.

The Problem

The Welsh Government is the competent authority for public health policy in Wales and is committed to improving health and wellbeing and reducing health inequalities for people in Wales. This commitment is enshrined in its enactment of the Well-being and Future Generations (Wales) Act 2015 which places a duty on all public authorities to consider seven well-being goals¹⁷ when introducing new policies and making decisions that would impact future generations.

For all countries, health policy is a significant issue that requires continuous development. In Wales, a key societal challenge identified is that of childhood obesity, with the issue beginning from a very young age. In 2016, 23% of Welsh children were obese by the age of 11, with 40.5% being either overweight or obese. This is higher than Northern Ireland – 39.9%; England - 35% and Scotland – 33% for the same age group. Obesity rates do not decline as citizens age and in Wales remain higher than the UK average. In 2016, 60% of Welsh adults were overweight or obese, with increased incidence amongst the poorest families. In order to meet the clear challenges associated with providing affordable nutritious meals in school and in support of obesity reduction measures, the Welsh Government, in collaboration with [Innovate UK](#), set a competition challenge in March 2017 entitled:

“How can we improve the nutritional composition of food and drink for children whilst driving down cost?”

The competition was undertaken through the Small Business and Research Initiative (SBRI) via competitive tender. The SBRI is a scheme designed to stimulate innovative approaches to societal challenges through collaborative working across businesses, academia and third sector organisations, with significant input from Government. It acknowledges the risks inherently present within innovation and accepts that not all projects will reach successful outcomes. Its ethos is to be a catalyst at the start of an “innovation addressing societal challenge” project’s lifecycle and anticipates that further routes will/may need to be deployed to bring innovation to final market.

The Collaboration: Functional Fibres Project: Wales

The Functional Fibres Project was a collaborative effort by three entities - [Pennotec](#), [Bangor University \(BioComposites Centre\)](#) both based in Wales, and [CyberColloids Ltd](#), based in Ireland - to propose converting a food bi-product into highly functional fibres which would have fat and sugar mimetic characteristics.

The project’s aim was for these fibres to be used in manufactured food products targeted at children.

This would improve the nutritional composition of those products by reducing fat and sugar in recipes, thus decreasing the calorie loading per gram of consumed product whilst enhancing dietary fibre intake, which is another goal of public health policy.

¹⁷ A prosperous Wales; A resilient Wales; A more equal Wales; A healthier Wales; A Wales of cohesive communities; A Wales of vibrant culture and Welsh language and; A globally responsible Wales.

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A critical objective of the project was that this be done without detriment to the products' organoleptic properties or undermining the desire for children to eat the new healthier versions.

This case study has been selected as the submission from Wales because it represents a Quadruple Helix project, with Government (Welsh Government, Public Health and Innovate UK) providing the funding; academic input provided by Bangor University (BioComposites Centre); commercial expertise provided by private sector i.e. Pennotec, CyberColloids Ltd and Food Technology Centre; and consumer input provided by citizens (school children and parent groups). Cooperation between these project partners was critical to addressing the problem effectively by combining their different, yet complementary skill sets, varied experience, market knowledge and diverse networks of contacts. Together they formed a team which was stronger and more dynamic, capable and effective in achieving successful outcomes, within clearly defined timelines and budgets than any single organisation may have done alone.

Policies Shaping the Approach

Several Welsh Government policies shaped the specific focus of the project, including:

- The *'Healthy Eating in Schools (Nutritional Standards and Requirements) (Wales) Regulations 2013'*¹⁸ govern the provision of food and drink in schools in Wales. These regulations replaced the Appetite for Life guidelines and set out the type of food and drink that can and cannot be provided in schools. These regulations are part of the wider *"Healthy Eating in Schools Measure" 2009* which 'places a legal requirement on local authorities and governing bodies to promote healthy eating and drinking by pupils in maintained schools throughout Wales'.
- *The 'Well-being of Future Generations (Wales) Act (2015)'*¹⁹ aims to improve the social, economic, environmental and cultural well-being of Wales. The Act sets out seven goals which represent the long-term vision for Wales.
- *Towards Sustainable Growth: An Action Plan for the Food and Drink Industry 2014-2020*²⁰ is the strategic action plan developed by Government and the Food and Drink Wales Industry Board that sets out key actions to support and grow the Food and Drink industry in Wales. The Plan sets an ambitious target of growing the Welsh food and drink economy by 30% to £7 billion by 2020 (highly likely the target will be met, as £6.8 billion was achieved in 2018). A key theme throughout the Plan is support for innovation and collaboration.

Within UK Government there lies a strong fundamental policy to support innovation within the country to ensure economic resilience and boost international competitiveness for our industries. Food and drink manufacturing is the single largest UK manufacturing sector at 19% of all UK manufacturing output, contributing £31.1b to the economy and employing over 450,000 people.

Across the full food and drink supply chain, £121 billion is generated and employment given to over 4 million people.²¹ One route for UK Government to direct funding for innovation initiatives is through Innovate UK and some of this funding is used to support collaborative projects, such as

¹⁸ Welsh Government Healthy Eating in Schools (Nutritional Standards and Requirements) (Wales) Regulations 2013 <http://www.legislation.gov.uk/wsi/2013/1984/made>

¹⁹ The 'Well-being of Future Generations (Wales) Act (2015) <https://gov.wales/well-being-future-generations-act-essentials>

²⁰ Welsh Government "Towards Sustainable Growth : An Action Plan for the Food & Drink Industry 2014-2020" <https://businesswales.gov.wales/foodanddrink/about-us/action-plan>

²¹ Our Industry: Food and Drink Federation 2019 <https://www.fdf.org.uk/statsataglance.aspx>

this particular SBRI challenge, where Innovate UK were a co-funding stakeholder in the Functional Fibres project.

The Teams Involved and Their Competencies

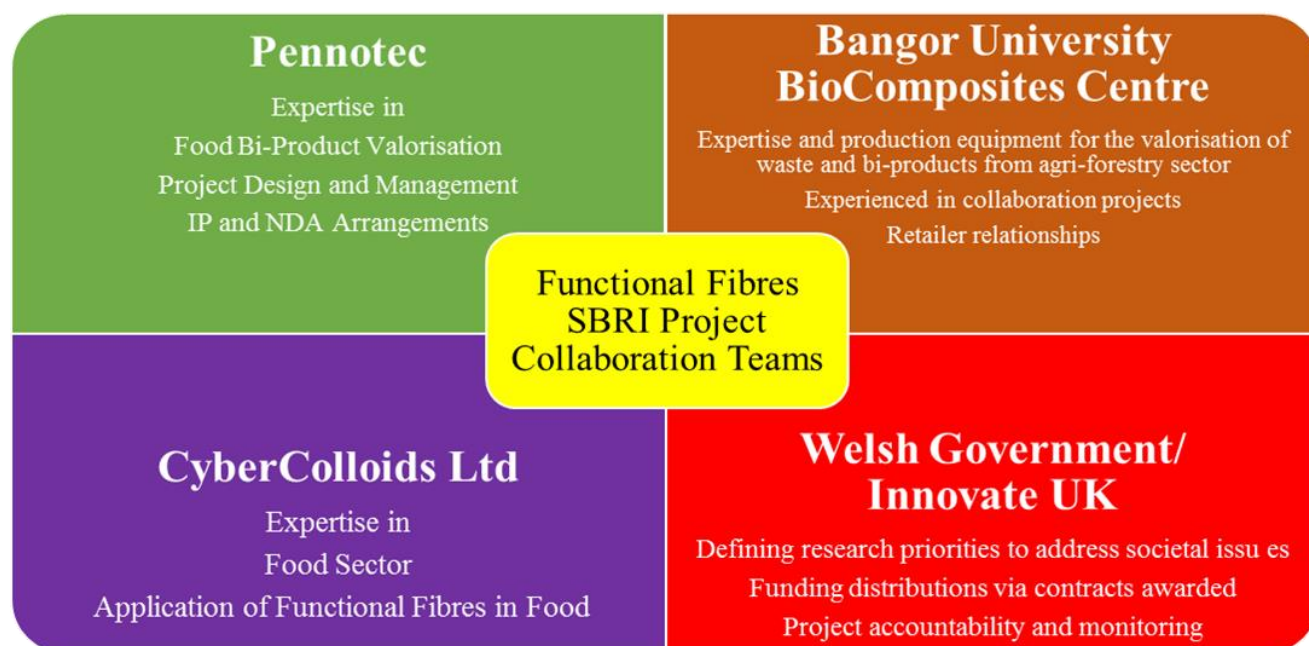


Figure 14. Phase 1 Collaboration Teams

The team members involved in Phase 1 of the Functional Fibres project were

1. Pennotec – Dr Jonathan Hughes leading a team of post doctorate chemists and environmental scientists
2. Bangor University (BioComposites Centre) – Dr Adam Charlton leading a team of 4 colleagues in the Agri-forestry bi-products processing division
3. CyberColloids Ltd – Dr Sarah Hotchkiss leading a team of food scientists
4. Welsh Government and Public Authorities/Innovate UK – from Welsh Government a cross functional team from the Food Division, Sectors & Business-Innovation Team and representatives of the Public Health Policy and Pupil Wellbeing Policy teams; along with staff from the Welsh Local Government Association, Commercial Innovation Procurement and Innovate UK.

In **Phase 2** of the project, the collaboration was joined by other sub-contracted experts from

1. [Food Technology Centre](#), part of Food Innovation Wales – Ann Marie Flinn leading a team of food scientists & technologists who advised & trained the other project partners in food safety and food production methods, advised and conducted sensory testing & provided a food grade pilot production environment to produce and test samples. They also facilitated connections to food companies who might purchase the fibres & who gave a valuable commercial perspective through feedback throughout the project.
2. [Bangor Centre for Activity and Eating Research](#) who, through the services of a psychology undergraduate, provided expertise in sensory testing and the design of

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consumer attitudinal surveys. This was especially important as there were several ethical considerations to sensory testing products with children, meaning appropriate test design and methodology standards had to be met.

These varied and complementary competencies within the innovation collaboration gave them the ability to move at pace in each designated work stream due to focused expertise. Breadth and depth of knowledge allowed challenges and risks to be anticipated and mitigated. As unforeseeable issues arose, viable solutions were delivered promptly. This was very important to meeting the project milestones, deadlines and keeping within budget.

Project Timeline

The Functional Fibres project moved from application to the SRBI competition in July 2017, through two Project Phases of 3 months and 12 months and is now post project and seeking further funding to progress even further.

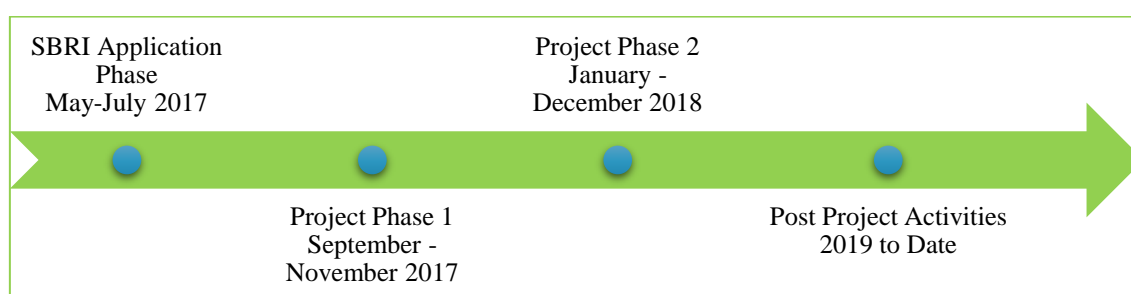


Figure 15. Project Timeline

Table 4. Project Key Phase Highlights

Application Phase	Project Phase 1	Project Phase 2	Post Project
May to July 2017	September to November 2017	January to December 2018	January 2019 to March 2019 – unfunded finalising of the project March 2019 to present – publicity events and funding applications
Pennotec instigated the applications and sought collaboration with CyberColloids Ltd and Bangor University (BioComposite Centre) to scope and draft a viable, attractive and ambitious application	Phase 1 was an intense 3 months of activity to move from a TRL (Technology Readiness Level) 1 concept to prototype apple fibres which could be baked into a muffin. This required sourcing a viable quantity of Apple Pomace, handling protocols for this highly perishable medium to be devised, processing of the	Phase 2 ran for 12 months and moved the concept to TRL 4 with the use of fibres expanded into a number of end products including baked goods and sausages. The supply chain was explored to determine if seasonality challenges could be overcome. Welsh apples are traditionally picked in late summer/early	The project partners continued to work on the project after the funding period expired, in order to bring the project to a stage at which it could be progressed to commercialisation if the funding and circumstances allow. The Functional Fibres have been showcased at trade events such as Blas

	<p>material into a stable usable format by Bangor University (BioComposites Centre) then conversion into a food grade product with the desired functionality by CyberColloids Ltd. From this raw material baking properties were tested and a muffin end product produced for assessment vs control samples with standard recipes.</p> <p>The end product with the most desirable eating quality was selected for nutritional testing to demonstrate the enhanced nutritional composition vs the control.</p> <p>Physical samples and the evidence of nutritional data were presented at the end of Phase 1 to the Welsh Government and innovate UK funding board.</p>	<p>Autumn only whereas a 52-week supply would be needed for ongoing large-scale production. Consumer trials were held to determine that the product eating quality and proposition were acceptable to children, their parents, purchasing decision makers in the school catering system and other potential commercial customers.</p> <p>Further nutritional investigation was undertaken along with publicity activities to raise awareness of the project.</p>	<p>Cymru/Taste Wales (March 2019) and public facing events including Festival of Discovery (May 2019).</p> <p>A funding application has been made under Horizon 2020 and is pending confirmation of success.</p>
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Funds and Resources

Following success at the two consecutive phases of the SBRI competition, project funds, in the form of contracts, were awarded to Pennotec by Welsh Government and Innovate UK. Bangor University (BioComposite Centre) and CyberColloids Ltd joined the collaboration as subcontractors, with a Research Collaboration Agreement in place for all three entities.

Phase 1 was an award of £42k, for a 3-month project to establish the feasibility of the proposed innovation.

On the successful completion of this demanding 1st phase, a presentation was made to the competition awarding board which showcased progress and gave a detailed scoping of the proposed 2nd phase of the project.

The collaborators were successful in securing a 2nd Phase funding, of £291k, which supported the next 12 months of the project.

Other resources were offered by Welsh Government and Innovate UK in the form of expert advice on project management, supportive problem solving as issues arose and assistance to overcome

potential blocks to progress, for example access to contacts in the school catering sector. They also promoted the project through Government newsfeeds and at events, such as Blas Cymru /Taste Wales.

Funds and resources were optimised through a very robust, joint planning process by the collaborating partners. This was achieved through a face to face meeting of the three partners, at which a structured planning approach was used to create the project plan.

Thus, from the very beginning of the project, agreement of the project objectives, success criteria and detailed scoping of the various work packages required was put in place. Likewise, tasks were clearly assigned with risk assessments and mitigation steps identified.

This ensured effective working together, with clear accountability and avoidance of duplication of tasks or of efforts being diverted into activities which were outside the scope of the project.

Very robust monitoring of progress was observed throughout the project. Regular reporting to the Welsh Government and Innovate UK stakeholders kept a strong impetus in the project as achievement of deadlines, KPI's (Key Performance Indicators) and milestones and expenditure was closely tracked. This was aimed at delivering a successful outcome whilst avoiding over runs of time or money.

Furthermore, the trust which existed between the partners meant that Bangor University (BioComposite Centre) and CyberColloids Ltd, were willing to wait for their payment for expenses incurred, until after contract funding had been transferred to Pennotec, thus minimising cashflow concerns.

Tools, Methods and Strategies of Cooperation

The strategy behind the collaborative way of working was to leverage the skills, knowledge base and contact networks of the experienced staff provided by both the partner and nominated sub-contracted organisations, also utilising the supply chains, experimentation capabilities and production facilities they each had available.

This collaboration was underpinned by the parties signing a Research Collaboration Agreement which gave rights of ownership of their resulting IP (intellectual Property) to each of the 3 entities; the agreement also guaranteed Welsh Government with royalty free, non-exclusive rights in consideration of their role as funder.

This agreement was fundamental to the free flow of collaborative effort and sharing of knowledge and ideas in the pursuit of addressing the project's many challenges.

By working collaboratively, an effective workflow was established, with each partner stepping in to take up their phase of the project as it progressed.

In terms of tools used to work collaboratively, a platform was established using Dropbox where all relevant documentation could be accessed quickly and easily. Thus data, discussions and results could be shared simultaneously in live time.

Very clear practical methods were employed such as the structured coding of samples. This ensured that the origin and processes undergone by each sample could be robustly tracked, allowing clear understanding by all concerned as to which actions and variables had been successful or unsuccessful.

Continuous contact was maintained by the lead person in each of the participants, via email and telephone calls. One person at Pennotec was designated to administrate the project, including

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reporting and finance tracking. On a monthly basis the project partners jointly held a detailed review of each work package and the tasks within it, looking at progress, achievements and outcomes against their time-plan, KPIs and success criteria.

Methods used for design and experimentation included the need to scale down the large, paper industry sized equipment at Bangor University to a smaller, mobile version which was compliant with food production regulations and of a suitable size to be housed in the Food Technology Centre facilities on the Isle of Anglesey. This required close coordination between the 2 parties, to achieve a successful plant set up within the food production compliant facility to allow samples suitable for human consumption to be made.

With a key success criterion being that any products made with the new functional fibres should be of a texture, flavour and appearance that would appeal to the intended target market of school aged children, it was important that market analysis and consumer testing was conducted with children. Questionnaires were designed, using psychologically robust methodology, to interview children and their parents – this had to be done within the ethical guidelines defined for market research involving children.

Research involved collaboration between the project partners, the Food Technology Centre and the general public at events such as the [Anglesey Agricultural Show](#).

Pennotec also undertook a number of outreach events, speaking to local community groups in order to engage citizen interest in the project and to gain feedback as to whether the concept, with its “Health by Stealth” approach, was meeting consumer needs and would drive future sales of the fibres.

The ethos of collaborative working was also a distinctive feature within the Welsh Government team, the project challenge saw the coming together of a diverse cross functional team from varying disciplines. These included the Innovation and Food and Drink Divisions along with Public Health and Procurement representatives. In this way, a variety of competing, and sometimes conflicting, objectives and agendas were identified, and the stakeholder consortium allowed these to be discussed, issues explored, and common ground found. This process resulted in a more targeted focus for the project which was healthier foods for school aged children rather than for the general population.

Milestones and Outcomes

Key milestones were set throughout the Functional Fibres innovation project. These were agreed during the robust joint planning process undertaken by the partners at the outset of the project.

Reporting to, and monitoring by, the funding teams at Welsh Government and Innovate UK was extensive and ongoing.

This comprised:

- Fortnightly Checkpoint Reports, based on Prince 2 principles, which summarised the previous fortnight’s activities against planned deadlines and looked forward to the coming fortnight, outlining next steps and any risks or issues. The report was submitted and a follow up call between Pennotec and the funders was held to discuss and address any issues.
- Quarterly update meetings, between the funders and project partners, were held at the Cardiff headquarters of the funders and once at the Food Technology Centre for a site

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visit to see the project in action. These comprised detailed reviews of milestones, timelines and outcomes vs. objectives

- At the mid-point between these quarterly meetings, collaborative Workshops were held which proved very useful in airing issues and working together with the funders to devise solutions.
- In addition, there was a rolling programme of sensory reviews in which the partners would meet to assess samples and either sign off as ready to progress or agree immediate actions to amend or improve, as appropriate.

The project KPI's were defined at the start of the project and are reflected in the key outcomes from the project.

- The project has met its aim of proving that food grade fibres can be produced from apple pomace.
- That the fibres produced have the functionality to mimic and replace fat and sugar in manufactured products. Whilst this proof of concept is on a small scale, the project team are confident that with the correct investment, a commercially viable sale of production could be achieved in future.
- The fibres have been tested and proven to reduce the overall calorific value and increase the dietary fibre of the end-product vs. standard recipes.
- This has been achieved whilst ensuring that the products have good eating qualities in terms of texture, mouthfeel and flavour whilst not undermining fundamental product characteristics such as aeration in baked goods or binding in sausages.
- Consumer acceptance – from both the purchasing bodies and from children themselves – has been explored and initial findings are positive.
- The impact of achieving these KPI's are that the project is now at a stage where, if further investment can be secured, scale up of the production of fibres for commercial sale could be realised.
- If the fibres were to be extensively used in manufactured products targeted at children, then the calorie intake per gram of product would be reduced.
- Reduction of calorie intake by children with issues of obesity and overweight is a fundamental aim of the Welsh Government in order to improve the health and well-being of Welsh citizens and to reduce the cost to the tax payer of healthcare needed due to obesity related ill-health.

Successes, challenges and lessons

The reflections on the project from the participants are as follows :-

Key successes of the Functional Fibres project were:

- **Moving the concept from TRL 1 to TRL 4 in the very short timeframes** designated by the SBRI competition. This was majorly influenced by the effective collaboration process deployed in the project and by the fact that the partners skills set interlocked effectively, allowing the milestones to be reached successfully.

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- **Being able to reach proof of concept**, albeit on a small scale, to show the potential for food production bi-products, which added to the Food Waste crisis in the UK, to be diverted into high value food stuffs fit for human consumption.
- **An innovation leap occurred** due to the combining of expertise from the partners which created a pan-industry perspective and resulted in technology used in forestry/the paper industry being applied to achieve food grade compliant fibres. Without the project participants each contributing from their unique knowledge base, this would not have occurred.
- **Desirable manufactured products** have been created from the functional fibres through the combined skills of the project team members
- **Consumer acceptance** has been established for the pilot stage end products
- **Nutritional composition improvements** have been proven with the fibre-based products having a lower calorie loading than existing products gram for gram of finished product.
- **The potential to move through the next TRL's to full commercialisation** has been advanced
- **The level of collaboration internally between various Government Departments** working together on such a project was a new way of working for Welsh Government, and they found it to be highly beneficial. It is a cross functional model that they have gone on to adopt with continued success in other projects.

The Main Challenges in bringing the project to fruition were:

- **The short timescales** of the project which was starting at TRL 1. With Phase 1 in particular being merely 3 months in duration, the timeline was extremely demanding.
- **The scaling down** of very large-scale machinery, designed to process wood fibres for the paper industry, proved technologically challenging along with the need for this to be constructed of materials and to a design which was suitable to produce food safe fibres.
- **The stringent ongoing reporting process** was challenging to conform to, whilst also executing the project tasks, but it did provide strong impetus for the project's timely progression and created a forum in which the funders were proactive partners in the project, providing advice and practical help to push through obstacles.
- **Securing the engagement** of schools catering organisations proved much more difficult than anticipated and was an example of where Welsh Government staff were able to facilitate connections within a complex supply chain to ensure feedback from this critical group of potential end users.

The Limitations to the project were primarily that:

- Whilst significant progress has been made, the processing methodology of the fibres has only been proven to prototype stage.
- In order to deliver on Welsh Government's ambition for an actionable outcome that will create products with better nutritional profiles, and thus help tackle obesity levels in Wales, the process now has to traverse the so-called "Valley of Death" from TRL 4 to

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TRL 6 or 7 at which the fibres could be taken into full commercial production for sale to the public and private food production sectors.

- The project had an aspiration to create a functional ingredient which would be a means for products served in school meals to have improved nutritional attributes. Review of the school meals menus in Wales has shown that these menus are very robust in providing health meal options for children with the school premises. However, obesity rates remain high in this age group; so upon reflection it might be said that efforts to promote ingredients with high nutritional density need to be focused on products consumed in the home or wider society, rather than just within schools. The fibres would therefore need to be ultimately marketed to a wider manufacturing base in the commercial sector to achieve impact.

Key Learnings from the project included:

- Understanding the stringent requirements needed to transition from non-food to food production environments
- The scaling down of equipment for pilot production
- The need for consumer feedback to be sought at an early stage of the project critical path to ensure that assumptions made about product suitability are correct
- The benefit of questioning the ethos of a project at its inception. In this case, whether creating lower calorie manufactured products like muffins and sausages is intrinsically desirable. Should public health policy purely encourage the eating of naturally healthy products such as fruit and vegetables, wholegrains and legumes for example, or is it indeed pragmatic to assume that people will still want to eat favourite, if unhealthy, products therefore offering nutritionally superior versions at comparable pricing has real merit.
- The desirability of there being a mechanism in place to fully realise the potential of projects, which have progressed to prototype proof of concept, to deliver the ambition to bring nutritionally superior products to market on a scale that will tackle to obesity issue in Wales.
- Welsh Government now facilitate regular Welsh Community of Practice sessions which seek to disseminate best practice for challenge owners. These sessions represent a safe forum in which to share experiences and learn from peers in various aspects of the structural and administrative processes involved in running the innovation challenges. These include complexities in interactions with suppliers and particularly in the procurement sector, where SBRI is a relatively unknown quantity. SBRI, by its very nature is accepting of risk, ambiguity and unknowable outcomes. It therefore provokes thinking beyond the norms of traditional procurement and this often requires cultivating a new level of understanding amongst the commercial and legal teams involved in procurement.

Ancillary Benefits of Working on Collaborative Projects

The participants in this project also identified several positive outcomes and wider, longer lasting benefits from collaborating, beyond achieving the actual aims of the project or research:

- It can create new networks of contacts for the participants and cement existing relationships

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- It can lead to further opportunities and is a pathway to future working with people or organisations that they would not otherwise have encountered
- It broadens the perspective of the business, beyond the immediate day-to-day, and gives them insight and learning on how to resolve different problems
- It provides a mechanism to access expertise that would normally not be available to a smaller business
- It helps to bridge the research-industry gap - which is still an issue for many small companies that have not gained any experience in collaborative projects
- It creates positive public exposure for, and raises the profile of, a business when projects and their outcomes are disseminated (including in case studies such as this) and also are promoted in the general consumer media, specialist, business or academic press and via online social media.

Thinking of the Future for Cooperation and Innovation

Thinking about how collaboration and cooperation could be used for maximum benefit in future projects, the partners cited the value of focussed networking, so that people working in adjacent fields can explore the potential for collaborations in advance of opportunities for cooperative projects arising.

These networks should bring together diverse experience and knowledge bases across the various helices and allow the building of understanding of who and how partners might come together to deliver innovation step-changes.

The partners also highlighted that personal recommendations are critical to being considered and invited to take part in collaborations; being known to be a valuable collaborator is the best way to secure participation in future projects.

In order for projects seeking to develop healthy food products to have the maximum impact, there should be an easy way or structured route to be able to engage with healthcare professionals, those working in nutrition, dietetics and people who are servicing the public with food choices. This would bring valuable additional knowledge into projects and help them achieve successful outcomes.

It would be of benefit for project timelines to be reflective of the TRL at which the project will commence, project complexity and the scale of the technological and innovation challenge involved in delivering a project.

For example, the initial, Phase 1, time window of 3-months may have been adequate for a recipe variation or change to an established production process, but embryonic concepts such as the Functional Fibres would benefit from, say, 6 or 9 months allocated to this initial feasibility investigation phase.

Involvement of partners with food technology and food safety knowledge from the outset of a healthy foods project would be valuable. This would ensure that the project plan takes the requirements to achieve food grade samples and products into consideration from the beginning, thus maximising efficiency and focus of resources.

It can be difficult to engage SMEs in public funded collaboration projects because many SMEs work on tight cash flows and many public funded collaborations are perceived as being too bureaucratic with a significant administrative burden.

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The usual practice of providing finance in arrears, with SMEs submitting grant claims with relatively long payment intervals can be a block to these types of collaborations. Perhaps a more SME-friendly approach to funding could be developed with advance payments made to help mobilise collaborative activity and support the cash-flow position of participating SMEs.

Both of the private sector players in this collaborative project are experienced in research and development and managing projects. However, many food and drink SMEs do not have this level of experience and competency. Therefore, finding ways to train, upskill or mentor food and drink SMEs in research, development and innovation will help to embed these skills and make them more likely to be willing to participate in collaborative projects.

A further barrier to SMEs engaging in collaborative projects to develop healthy food products aimed at public sector catering such as hospitals, schools, care homes, prisons is the knowledge that these public sector buyers have very limited budgets. The R&D costs for developing innovative food solutions to the obesity crisis are therefore unlikely to be recovered unless these costs can be supported through public funding or grants.

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Acknowledgments and thanks:

Sincere thanks are due to the persons below for their kind support, contribution and insight in the preparation of this case study:

Dr Jonathan Hughes – Pennotec (Pennog Ltd)

Dr Adam Charlton – Bangor University (BioComposite Centre)

Dr Sarah Hotchkiss – CyberColloids Ltd

Hena Monaf, Andrew Thomas and Gareth Browning – Welsh Government

Paul Roberts and Ann Marie Flinn – Food Technology Centre

2.2.4 Galiat 6+7 (Spain)

2.2.4.1 Introduction and context of case study

This section presents the main aspects in the regional context that influenced the case study presented in this report. The selected case study was the “GALIAT 6+7” project, implemented by a consortium of six Galician food companies and seven research groups. The main purpose of the project was to evaluate the role of the Atlantic Diet as a healthy and bioactive diet and demonstrate its beneficial effects on health. For that, it included the implementation of a nutritional intervention trial, thus involving the population in the activities.

Regional trends in cooperation and innovation

According to the Regional Innovation Scoreboard 2019²², Galicia is a Moderate-Innovator; however, the regional innovation performance has increased over time (2.5% in 2011-2019). Attending to its relative position, Galicia's scores are below those of Spain and of the European Union (**Error! Reference source not found.**) in most of the indicators, except for population with tertiary education (above Spain and European Union) and innovative SMEs collaborating (above

²² Directorate General Internal Market, Industry, Entrepreneurship and SMEs, European Commission, https://ec.europa.eu/growth/industry/innovation/facts-figures/regional_en

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Spain). As shown in **Error! Reference source not found.**, the innovation dimensions in which Galicia presents the poorest scores are those related to innovation outputs (public-private publications, PCT²³ patent applications and design applications). On the other hand, the dimensions where the region has better comparative performance are: tertiary education, innovative SMEs collaborating, product/ process innovations, lifelong learning, international scientific co-publications, most-cited scientific publications, R&D expenditures in public sector and non-R&D innovation expenditures.

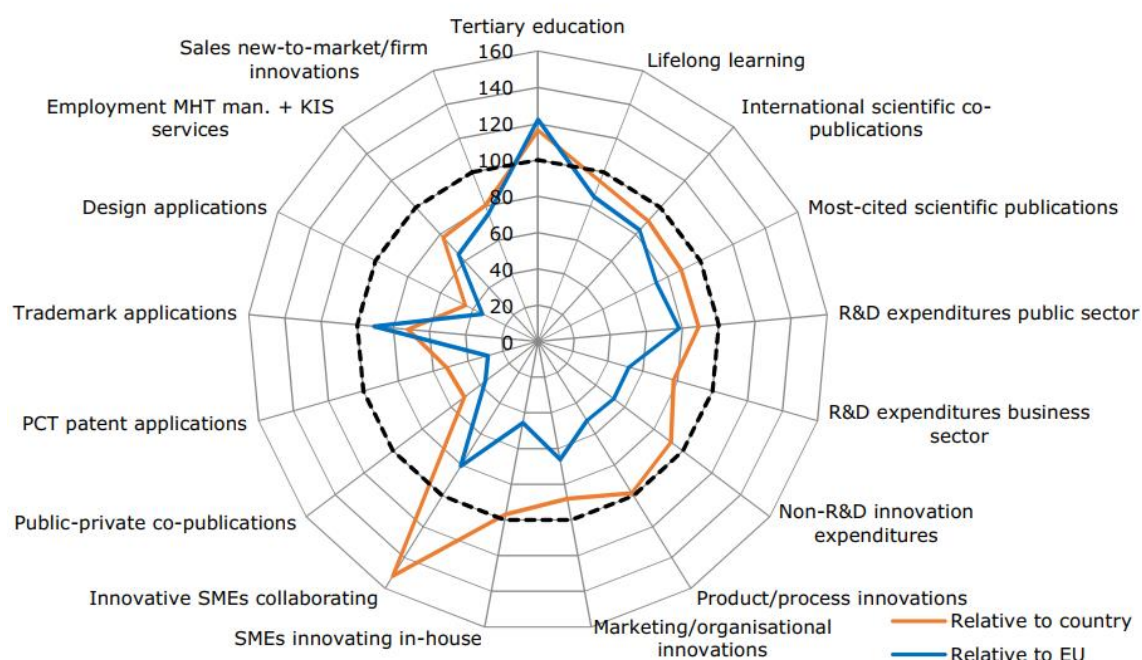


Figure 16. Galicia Regional Innovation Scoreboard profile, relative to Spain and to the EU

Source: Regional Innovation Scoreboard 2019

Collaborative innovation at the industry-industry and industry- university (as well as technology centres) level has been successfully promoted by public policies and initiatives –mainly at the regional level– in the last years. This public support has been key to foster this kind of cooperation. However, public support may have created certain dependence on public funds, as indicated by M. González-López, Manuel et al²⁴. According to their research, despite the improvements in collaborative innovation, there is still a gap in university-industry cooperation, mainly related to the contrast between university long-term views with industry short-term and concrete needs. Furthermore, in many cases the R&D&I activities are biased by the university scientific and departmental specialisation and too little by industrial specialisation. They also mention that this might be related to the low-tech profile of regional industry but probably an adjustment of the university offer in terms of research and academy is also needed. Some traditional activities, like the food industry in the Galician case, have progressively been involved in collaboration actions with universities.

²³ Patent Cooperation Treaty

²⁴ González-López, Manuel & Dileo, Ivano & Losurdo, Franco. (2014). University-Industry Collaboration in the European Regional Context: The Cases of Galicia and Apulia Region. Journal of Entrepreneurship, Management and Innovation. 10. 10.2139/ssrn.2578691.

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Quadruple helix (H4) innovation processes are still very limited in the region. R&D and innovation projects based on co-creation processes with citizens and or end-user communities are still starting to be fostered by public innovation support mechanisms and innovation facilities. In this regard, the region has only one living lab²⁵ (Zinkinn²⁶), which is focused on the healthcare field. However, this living lab might be an opportunity for the development of new healthy food products and lifestyle practices. Similarly, citizen science initiatives are also in an emerging stage, and they are limited to certain projects, mainly related to environmental protection and biodiversity.

Furthermore, the involvement of the public authorities in innovation projects or initiatives is limited to those areas of special public interest or high-strategic relevance. In most cases, their role is limited to policymaking, not being very involved in implementation actions.

In summary, collaborative innovation in Galicia can be characterised by the following aspects:

- Significant promotion and performance of collaboration between innovative SMEs, and between SMEs and large enterprises;
- Significant promotion and performance of collaborative innovation between companies and universities and/ or technology centres;
- Little involvement of citizens and or end-user communities.

Policies that inform the types of cooperation used

Innovation, and subsequently collaborative innovation, is mainly promoted by the Galician Innovation Agency (GAIN) through the following main strategies, plans and innovation-support actions:

RIS3 Galicia

The Galician RIS3²⁷ establishes three challenges that will drive the smart specialisation in the period 2014-2020:

- New management models of natural and cultural resources based on innovation: a) valorisation of sea; b) aquaculture; c) biomass and marine energies; d) modernisation of primary sectors; e) ICT-Tourism;
- New industrial model based on competitiveness and knowledge: a) diversification of driving sectors; b) competitiveness in the industrial sector; c) knowledge economy: ICT and KETs;
- New model of healthy living based on the active aging of the population: a) active aging; b) food and nutrition.

²⁵ According to the European Network of Living Labs (<https://enoll.org>), Living Labs are defined as user-centred, open innovation ecosystems based on systematic user co-creation approach, integrating research and innovation processes in real life communities and settings.

²⁶ Zinkinn, an initiative promoted by Roche Farma, is a platform for innovators focused on promoting health projects, designed to improve health, quality of life or processes related to healthcare professionals, patients and their environment.

²⁷ RIS3 Galicia: www.ris3galicia.es/wp-content/uploads/2015/09/RIS3_Strategy.pdf

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The RIS3 proposes to promote open innovation through incentives for cooperation among SMEs and all other agents in the Regional Innovation System. The quadruple helix has little representation in the RIS3, being only referred in relation to its governance and management.

Plan “Galicia Innova 2020”

The plan “Galicia Innova 2020”²⁸ is the instrumental framework to articulate and reinforce Galician R&D&I policy and achieve the objectives of the Galician RIS3 and the Galician Strategic Plan 2015-2020. The main challenges of the Plan are the enhancement of scientific-technological research, the improvement of the knowledge transfer to the business fabric and the translation of investments in greater activity and economic growth.

This plan aims to foster a qualitative change in the collaboration among the Galician Regional Innovation System. Actually, the plan indicates that *“it is necessary for the Administration to articulate and promote, in collaboration with all the key agents, new open collaboration models capable of bringing cohesion into the innovation system, while promoting transformation to improve the impact, the effectiveness and the efficiency of the R&D&I public policies and its sustainability”*. This plan aims to foster an innovation model based on a wide and articulated collaboration, using bottom-up approaches and closely linking all stakeholders (end users, advisors, researchers, companies, and others) throughout the R&D&I process. The main instrument for the development of this innovation model is the Digital Innovation Hubs (DIH) programme.

The Plan also refers to open science, aiming to promote a participatory society in the scientific-technological field by promoting the innovation culture, raising awareness about the potential impact of innovation on value creation, improving services and, by thus, in the progress of companies and society at large.

Technologies, tools and methods supporting cooperation and innovation

As mentioned in the previous section, the regional Digital Innovation Hubs (DIH) will be the main tool to foster collaborative innovation in the region,



aimed to be performed under a new paradigm of quadruple helix. A public call was launched under the DIH programme, resulting in the approval of two DIH. Under this programme, DIH are defined as follows: *“functional support structure that helps companies, especially SMEs, to become more competitive and to improve their business or production processes, as well as their products and services through digital technology. Its main objective is to foster value creation through the adoption of new technologies. Hubs, such as open and structured innovation ecosystems that provide services to industry, allow for more efficient alignment of knowledge with the needs of the business fabric and markets”*²⁹.

The two DIH approved under the call in December 2018³⁰ were:

- GALICIAFOFHUB, promoted by the Galician Automotive Cluster (CEAGA);

²⁸ Plan “Galicia Innova 2020”: http://gain.xunta.gal/repo/7-PlanGaliciaInnova2020_DocumentoCompleto.pdf

²⁹ www.xunta.gal/dog/Publicados/2018/20181218/AnuncioG0198-101218-0001_gl.pdf

³⁰ www.xunta.gal/dog/Publicados/2019/20190503/AnuncioG0198-220419-0001_gl.html

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- DiH DATALIFE, promoted by the Life Sciences Business and Technology Cluster (BIOGA).

These two DIH are still starting to be implemented, therefore, no information about its activities and results can be shown at this stage.

It should also be highlighted the role and activity of the different regional cluster organisations, which focus significantly in fostering innovation and collaboration in their respective core sectors or value chains. For example, the Galician Food Cluster (Clusaga) fosters collaborative innovation among their members in different ways, including the promotion of innovation projects, dynamisation of working groups and dissemination of innovation opportunities. For the topic of AHFES, it may also be worth to mention the work of the Life Sciences Cluster (BIOGA)

In terms of fostering collaborative R&D&I between companies and universities and/or technology centres, there are different support mechanisms both at the regional and national level, including the following:

- Joint research units: aiming to support regional strategic consortia between universities, technology innovation centres and companies, which may become catalysers for new R&D lines;
- Conecta Peme: support for R&D collaborative projects between companies and other agents of the regional innovation system in strategic areas for Galicia;
- Collaboration-Challenges: national call to support cooperation projects between companies and research organisations to promote the development of technologies, the business application of new ideas and techniques and the creation of products and services.

2.2.4.2 Case study: Project “GALIAT 6+7” – Galicia Alimentación Atlántica (Atlantic Food)

This case study focuses on the GALIAT 6+7 project, which was a national-funded project implemented in 2013-2014 by a consortium of six Galician food companies and seven research groups. The main purpose of the project was to evaluate the role of the Atlantic Diet as a healthy and bioactive diet and demonstrate its beneficial effects on health.

The Problem

Galicia is the second Spanish region with the highest rates of overweight and obesity³¹. In the last decades, the Galician traditional diet has been replaced by a westernised diet with an excess of energy intake, total fat, saturated fat, simple sugars and salt, as well as with a deficit of w3, long chain fatty acids, fibre and functional components. These changes in the diet and lifestyle have contributed to a rise in pathologies related to obesity and cardiovascular risks at increasingly early ages³². In contrast, the traditional Galician diet has been linked to metabolic health, low coronary mortality and increased longevity of the inhabitants of the northwest of the Iberian Peninsula³³.

³¹ Aranceta-Bartrina J, Pérez-Rodrigo C, Alberdi-Aresti G, Ramos-Carrera N, Lázaro-Masedo S. Prevalence of General Obesity and Abdominal Obesity in the Spanish Adult Population (Aged 25–64 Years) 2014–2015: The ENPE Study. *Rev Esp Cardiol*. 2016;69:579-87

³² <http://galiat6mas7.com>

³³ Guallar-Castillón P, Oliveira A, Lopes C, López-García E, Rodríguez-Artalejo F. The Southern European Atlantic Diet is associated with lower concentrations of markers of coronary risk. *Atherosclerosis*. 2013;226:502–9.

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In this context, the purpose of the GALIAT 6+7 project is to evaluate the role of the Atlantic Diet as a healthy and bioactive diet and demonstrate its beneficial effects on health, incorporating its consumption into prevention strategies and nutritional intervention, from childhood to adulthood³⁴. The project specific objectives were the following:

- To characterise, analyse, determine and identify, simultaneously, in the Galician agri-food and marine resources object of the study those compounds susceptible to presenting functional properties;
- Test the compounds-molecules detected in the extracts of the foods included in the project, to evaluate their anticancer and antimetastatic potential;
- Conduct a nutritional intervention trial in families of Galicia, including the provision, for six months, of free of charge food that is part of the Atlantic Diet. In addition, families were given records with recipes, menus and nutritional recommendations characteristic of the Atlantic Diet.

The GALIAT 6+7 project was implemented by a public-private consortium. It included six Galician food companies with products that are considered typical of the Galician Atlantic Diet, together with seven scientific groups of universities, research organisations and public healthcare administration. The scientific groups had a range of food, nutritional and health competences. In addition, the project included the implementation of a controlled clinical trial by the Clinic Hospital of Santiago de Compostela. The trial aimed to conduct a nutritional intervention lasting six months in 250 families in Galicia; thus, bringing the 4H approach to the project³⁵. The application of the 4H approach was crucial for this project, which involves agrifood products, health research and eating and lifestyle behaviours.

Therefore, the combination of a 4H approach and the thematic scope (healthy food and lifestyle based on Atlantic Diet) has been the main reason for the selection of this case study. Furthermore, the project was awarded the “NAOS Strategy Prize”, in its 2017 edition; thus, being recognised as an excellent practice for the promotion of healthy eating in the family and community environment.

The policies

The GALIAT 6+7 project was implemented in 2013-2014. Considering its timeframe, the project was framed by the following policies:

Regional level

- Galicia’ Strategic Plan 2010-2014³⁶: this plan included a strategic objective aiming to ensure the provision of public and high-quality healthcare services for all Galician citizens. As part of this, it included the proposal of a programme to promote healthy lifestyles;
- Galician Plan for Research, Innovation, and Growth 2011–2015³⁷: One of the measures proposed by this plan was to support the development of R&D&I projects by SMEs, giving priority to projects in collaboration with technology centres and universities of the Galician

³⁴ <http://galiat6mas7.com>

³⁵ <http://galiat6mas7.com>

³⁶ Galicia’ Strategic Plan 2010-2014: www.conselleriadefacenda.es/plan-estrategico/pdfs/plan_estrategico_version_web.pdf

³⁷ Galician Plan for Research, Innovation, and Growth 2011–2015: http://documentos.galiciainnovacion.es/PlanI2C/Plan-i2c_galego.pdf

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R&D&I system. Furthermore, the Plan included different actions devoted to foster the development of open innovation models and dynamics.

National level

- National Plan for Scientific and Technical Research and Innovation 2013-2016³⁸: the plan included a programme to leverage the R&D&I business leadership, which at the same time, encompassed actions to foster collaborative R&D&I oriented to the demands of the business fabric. Furthermore, this National Plan included another programme focused on R&D&I oriented to Society Challenges, including health, demographic change and wellbeing, as well as food safety and quality, agricultural and productive activity and sustainable, sustainability of natural resources, marine and maritime research;
- NAOS Strategy (Strategy for Nutrition, Physical Activity and Obesity Prevention)³⁹: health strategy that, in line with the policies set by international health agencies (World Health Organization, European Union), aims to reverse the trend of obesity prevalence by promoting healthy eating and the practice of physical activity and, thereby, to substantially reduce the high rates of morbidity and mortality attributable to noncommunicable diseases. The Strategy was launched in 2005 and later consolidated and leveraged by the Law 17/2011 (5th July)⁴⁰ of food safety and nutrition.

European level

- Strategy on nutrition, overweight and obesity-related health issues⁴¹: In 2007, the European Commission established a community strategy to address the issues of overweight and obesity, by adopting the white paper “A Strategy on Nutrition, Overweight, and Obesity-related health issues” focussing on actions that can be taken at local, regional, national and European levels to reduce the risks associated with poor nutrition and limited physical exercise.

The policies and strategies above frame the relevance and appropriateness of the GALIAT 6+7 project, as healthy food and nutrition were already a major topic for public health policies nationally and internationally. On the other hand, the national and regional R&D&I plans referred above promote collaborative and open innovation; thus, fostering the collaboration between different types of agents in the innovation system, which is key for the success of a project such as GALIAT 6+7.

Teams and competencies

The GALIAT 6+7 project was implemented under a 4H approach, as shown below:

1. Companies: the project included the participation of six Galician companies (**Error! Reference source not found.**) that produce foods typical of Galicia's Atlantic Diet:

Table 5. Companies involved in the project

Vine (wine, pomace and seeds of four	Brassica Species	Galician native olives	Galician estuary mussel	Dairy products of Galician origin
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³⁸ National Plan for Scientific and Technical Research and Innovation 2013-2016: www.ciencia.gob.es/stfls/MICINN/Investigacion/FICHEROS/Plan_Estatal_Inves_cientifica_tecnica_innovacion.pdf

³⁹ NAOS Strategy: www.aecosan.msssi.gob.es/AECOSAN/web/nutricion/seccion/estrategia_naos.htm

⁴⁰ www.boe.es/eli/es/l/2011/07/05/17

⁴¹ European Strategy on nutrition, overweight and obesity-related health issues: https://ec.europa.eu/health/nutrition_physical_activity/policy/strategy_en

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native varieties)				

These companies were the promoters of the national-funded project that allowed the implementation of the activities through public funding. The objectives of these companies in the project related mainly to the investigation of bioactive compounds in their raw materials and products, the exploitation of by-products and the investigation of health effects of the bioactive compounds. These specific research activities were done in collaboration with a respective research group, specialised in each specific topic.

2. Public research organisations: the consortium included seven research groups (**Error! Reference source not found.**) specialised in the nutritional research of the foods addressed by the project:

Table 6. Research organisations involved in the project

		Universidade de Vigo		
<ul style="list-style-type: none"> • Viticulture Research Group • Research Group for genetic improvement of Brassica plants • Marine Research Institute 	<ul style="list-style-type: none"> • Agri-environmental and Food Research Group 	<ul style="list-style-type: none"> • Pharmacology Department • Dairy Products and Food Technologies Platform 	<ul style="list-style-type: none"> • Clinic Group of the University Clinic Hospital 	

3. Public authorities: besides the financial support received from the Spanish government, the project had the support and involvement of the Galician Healthcare Service and a local healthcare centre for the design and implementation of the clinical trial in families.
4. Local community: the project included the implementation of a nutritional intervention clinical trial in 250 families of a Galician municipality, including the intervention and the control groups. For six months, the families of the intervention group participated in a programme consisting of four individual sessions of nutritional, food and gastronomic education, and were given support material with nutritional recommendations, menu planning, recipes and culinary training. They also received Galician diet food products from the companies involved in the project, supplied free of charge and in enough quantity. All participants (intervention and control) underwent clinical and analytical controls at baseline assessment, at three months and at the final assessment.

More than 80 healthcare professionals of the local primary healthcare centre participated as collaborative researchers and received theoretical and practical training for the implementation of

the trial. Furthermore, the trial had the support of the community, including the town hall, local media, local businesses, a hospitality school and local restaurants⁴².

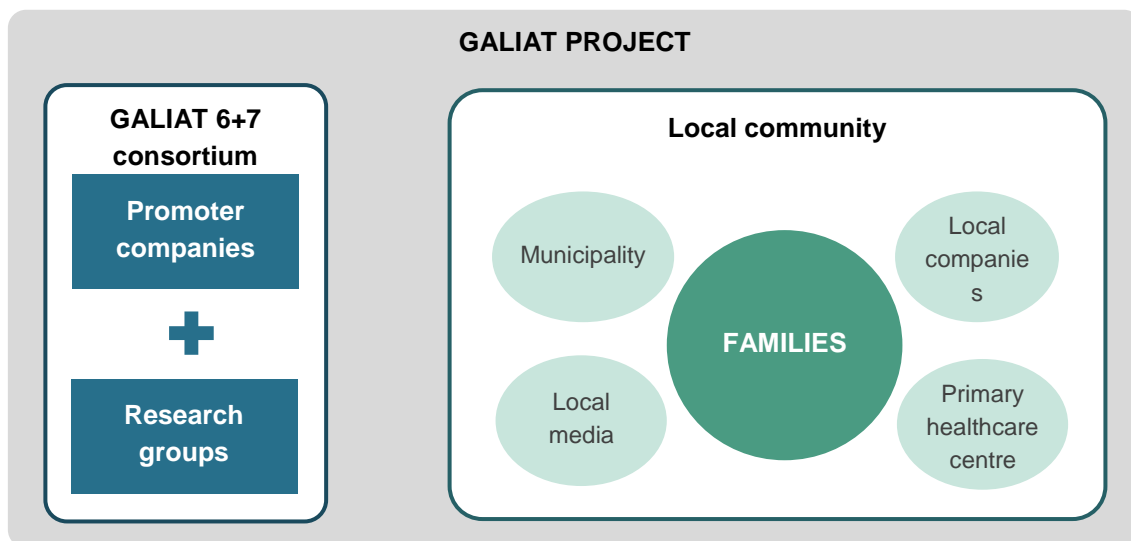


Figure 17. Representation of actors involved in GALIAT project

Source: own elaboration based on information from

www.aecosan.msssi.gob.es/AECOSAN/docs/documentos/nutricion/premios/2017/2-AFC-AS07.pdf

Therefore, as shown above, the consortium and external collaborators brought together different competences required to achieve the project objectives (**Error! Reference source not found.**):

Table 7. Competences of the different actors involved in the project

Companies	<ul style="list-style-type: none"> • R&D&I competences for the research of bioactive compounds in their raw materials and products • Provision of products and raw materials related to the Galician Atlantic Diet, to allow the research regarding bioactive molecules and compounds and their benefit on health issues related to cancer and cardiovascular diseases • Provision of supplies for the nutritional intervention trial with real market products • Exploitation of knowledge results for the development of new healthy products
Research centres	<ul style="list-style-type: none"> • Scientific knowledge and competences to identify, analyse and characterise the bioactive molecules/ compounds, as well as their potential health impact • Design of the nutritional intervention trial • Development of nutritional recommendations, menu planning, etc. • Analysis of results and extraction of conclusions
Public authorities	<ul style="list-style-type: none"> • Facilitation of the implementation of a clinical trial • Valorisation/ exploitation of conclusions in the regional healthcare system
Local community	<ul style="list-style-type: none"> • Implementation of the trial in a real environment • Dissemination of information and mobilisation of the population to engage them in the trial

Project timeline

The GALIAT 6+7 corresponds to a national funded project, named *INNGAL AGROMARSALUD - Characterisation of agrifood and marine resources of Galicia and assessment of its potential as*

⁴² www.aecosan.msssi.gob.es/AECOSAN/docs/documentos/nutricion/premios/2017/2-AFC-AS07.pdf

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a health source. This project had a duration of 21 months, being implemented from April 2013 to December 2014. This project included the collaboration between the promoter companies and their associated research groups to investigate the molecules and compounds with bioactive properties. The design and implementation of the nutritional intervention trial was also expected in this project. However, due to the difficult task of designing such an intervention and engaging the local healthcare staff and authorities, the intervention continued during 2015.

The interesting results of *INNGAL* were further continued and exploited in another national funded project titled *BIOFUNCIOGAL - Enhancement of functional biomolecules in food products of Galician origin through agrobiotechnology research*⁴³, continued by some of the companies involved in the first consortium. This second project had a duration of 30 months, being implemented from July 2015 to December 2017. In summary, GALIAT activities took more than 50 months; thus, being a quite large dimension in the context of industry-university cooperation.

Funds and/or resources

As already mentioned, the objectives of GALIAT 6+7 could be achieved thanks to the financial support received from two national-funded projects:

- INNGAL AGROMARSALUD - Characterisation of agrifood and marine resources of Galicia and assessment of its potential as a health source
- INNGAL BIOFUNCIOGAL - Enhancement of functional biomolecules in food products of Galician origin through agrobiotechnology research

These projects received ERDF grants, through a national public call called *FEDER Interconnecta*, managed by the Centre for the Industrial Technological Development (CDTI, Spanish acronym). The purpose of this call was to foster stable public-private collaboration in R&D, especially in areas of strategic relevance for the Spanish economy. This call was addressed to companies, which should subcontract the participation and support of public research organisations.

Furthermore, the collaboration with the resources provided by the local primary healthcare centre, as well as the coordination with the Local Healthcare Plan, allowed the implementation of the nutritional intervention trial.

Tools, methods and strategies of cooperation

The following tools were used to facilitate cooperation in the project:

- Frequent meetings between the organisations involved in the project. At least four meetings per year took place with the involvement of all partners. Additional meetings were held in the first stages of the project;
- Website intranet: the GALIAT 6+7 website includes an intranet section to facilitate communication, exchange of information and documents, etc. among the companies in the consortium and the research organisations involved;
- Social networks: the project had a Facebook and Twitter profiles to foster the dissemination of the activities and results, contributing to facilitate the engagement of the local community.

⁴³ Note: three of the six companies involved in the first project continued in the implementation of the second project.

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Furthermore, communication and engagement of local media and stakeholders was key to foster the participation of families in the nutritional trial.

Milestones and outcomes

In terms of the nutritional intervention trial, the project showed that the application of the designed Atlantic Diet helped to reduce cholesterol, weight and fat mass percentage, as the reduction in these parameters was statistically significant. Additionally, the intervention helped to change nutritional behaviours towards more healthy patterns. The study also had a carry-over effect in population not addressed by the study.

Furthermore, in terms of the R&D&I company results, the following were achieved:

- *Bodegas Terras Gauda*: the project R&D results confirmed an improved performance in the grapes production using a leaf fertiliser and leaf thinning. In addition, these actions improved the concentration of flavanols in peels, seeds, juice and wine in the three wine varieties studied. Furthermore, the wines subjected to the flavanol enriching process (designed by a research organisation involved in the project and protected by a trade secret shared by the company and the research centre) showed a very high concentration of flavanols, much higher than the blank wines. These wines were also less acid and aggressive organoleptically than the blank wines.

The oils extracted from the seeds of each of the varieties are within the limits established in the Codex Alimentarius for edible vegetable oils. In the fatty acid profile, the high content of linoleic, oleic, palmitic acid and the presence of long chain fatty acids stood out. The three oils stood out for presenting very high total tocopherols and tocotrienols values, even above what the Codex Alimentarius marks.

- *Conservas A Rosaleira*: the company focused mainly in the revalorisation of by-products. In this regard, the residues of the brassica species (cabbage and turnip greens) showed a high glucosinolate content, similar or even higher than in fresh leaves, thus indicating that these waste products are interesting sources for their revalorisation. The fresh leaves of the cabbage and turnip greens showed a greater antioxidant capacity than plant residues, although the residues continued to maintain high concentrations with losses of approximately 25% compared to useful leaves. However, the leaves after the industrial scalding preserved high values of antioxidant capacity, with little loss compared to the useful fresh material. Thus, the vegetable residues of cabbage and turnip greens, considered as waste products during industrial packaging, constitute an important source of vitamins and minerals, with potassium contents exceedingly even the useful leaves used for consumption.
- *Quescrem*: through the project, the company managed to exploit a by-product that in principle had no value (ultrafiltration permeate, a by-product of the manufacture of cream cheese that is rich in natural sugars and mineral salts), generating functional compounds of high added value and with healthy properties. The company developed a refreshing drink of prebiotic character for human consumption by fermentation with kefir and enriched in functional compounds (galacto-oligosacharides and kefirans). The drink was very well accepted by the population in the nutritional intervention trial.

In addition, it is worth to mention the results achieved in terms of the anticancer properties of the studies compounds. With respect to the compounds derived from the vine, the results suggested that two of them show effects against different phenotypes of breast cancer cells. Also, two compounds present in the brassica plants, showed positive effects on prostate cancer cells.

Successes, challenges and lessons

In summary, the project resulted in the following successes and lessons, having overcome also a set of challenges.

Key project successes:

- New R&D&I projects to expand on the knowledge of certain bioactive compounds;
- Some of the companies launched new healthy products and commercially benefited from the project;
- The incorporation of the recommendations into the local Health Plan, a strategic framework to make long-term intervention sustainable.

Key project lessons learned:

- Long time needed to plan a trial or intervention in a community, especially when requires effort from people not directly involved in the project;
- Key to have the multisectoral collaboration of different size companies. Also having companies in different sectors (not competitors) was key for the success of the project.

Key project challenges/limitations:

- Difficulty to exploit or valorise the results of the nutritional intervention trial by the companies;
- Combination of different purposes merged in the project: i) identification and test of new healthy products for companies; and ii) nutritional intervention trial for researchers;
- Difficult to integrate the public health personnel in collaboration with companies as physicians usually refuse to make visible the direct collaboration with companies.

Future cooperation and innovation

The project resulted in some lessons learnt and results that can contribute to further promote and strengthen the cooperation dynamics between different types of organisations.

Firstly, it should be highlighted that the GALIAT 6+7 project included the first nutritional intervention trial with population implemented in Galicia. As mentioned in the introduction, the participation of citizens in R&D&I projects in the region is very limited. Thus, the project can be considered an initial but significant step that may contribute to opening citizens' minds (as well as researchers' minds) to participate in similar studies in the future. In terms of the benefit for the companies, the intervention study was an additional channel to promote their products among the local population, and even in some cases to test the acceptance of some new products (as was the case of the prebiotic drink with kefir and enriched in functional compounds developed by Quescrem). This is of course a very valuable outcome for the companies. Having said that, it was challenging for the companies to identify a way to capitalise (in terms of revenues for the company) the health results of the intervention study. This challenge might discourage companies in starting activities that involve similar types of nutritional or health interventions in their projects.

Furthermore, the project contributed to the advancement of business-to-business and business-university R&D&I collaboration practices in the region. Although in the present is common that companies participate in collaborative R&D&I projects, the number and diversity of partners in the GALIAT consortium represented a higher level of difficulty for innovation and collaboration management, compared to more usual projects. In this regard, it should be mentioned that the

GALIAT cooperation strategy involving companies that are not competitors working together was key in supporting fluent and effective collaboration. It is less clear how to support effective collaborations between competitors.

In relation to the above, it should also be mentioned that the project demonstrated the difficulty of establishing a smooth collaboration between public medical/ healthcare professionals and companies. It is likely that public medical/healthcare professionals are reluctant to collaborate (or publicly make visible their collaboration) with companies, as they may consider it can cause suspicion among the population. The interests of companies and public medical/ healthcare professionals are quite different and not easy to complement. Possibly, a very careful and intense transparency in this kind of project might help to build trust, although transparency in R&D&I project activities is still not very common in regional companies.

2.2.5 EIT Food School Network (Spain)

2.2.5.1 Introduction and context of case study

Regional trends in cooperation and innovation

Commitment to innovation is the hallmark of the Basque Country, commitment that has brought with it both recognition and resources at European level. The Basque Country is the Spanish autonomous community that assigns the highest percentage of its GDP to R&D, 2.03%⁴⁴.

According to the Regional Innovation Scoreboard 2019 published by the European Commission⁴⁵, The Basque Country or Euskadi is a Moderate + Innovator; the innovation performance has increased over time (8.8%).

Basque country is still the Spanish best positioned region in the Regional Innovation Scoreboard 2019 but has lost its position in the European framework. Although, in the set of indicators, Basque has made advances in innovation since the previous report (RIS 2017), across the whole of the EU28, Switzerland and Norway have made more progress. As a result, Euskadi has lost relative weight with respect to the average, going from being classified as a region of “high innovation” to “moderate plus”.

Basque Country demonstrates its most prominent strength in innovation, compared to the average, in the training of the population in tertiary education, while its greatest weakness lies in the lack of design applications and European patent applications.

⁴⁴ Grupo SPRI Taldea, Basque Government.

⁴⁵ Regional Innovation Scoreboard https://ec.europa.eu/growth/industry/innovation/facts-figures/regional_en

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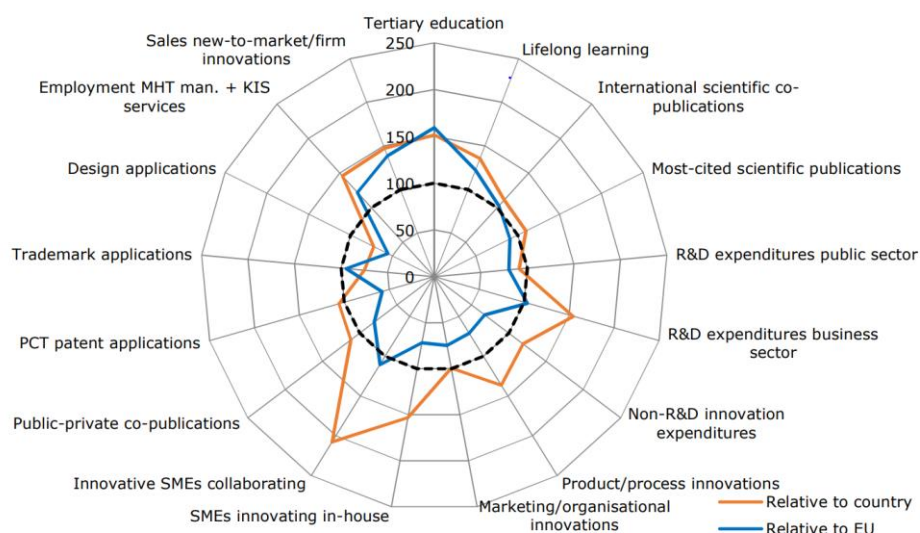


Figure 18. Basque Country Regional Innovation Scoreboard profile, relative to Spain and to the EU

Source: Regional Innovation Scoreboard 2019

Cooperation is also a driver of innovation, creating the Basque model of innovation – a model that can be characterized as ‘collective entrepreneurship’ in the sense that innovation is conceived by large swaths of public and private sector actors as a collaborative social endeavour rather than the product of entrepreneurial individuals⁴⁶.

The Basque Science, Technology and Innovation Network² (RVCTI) is the most important group of Science and Technology agents working together, developing specialised, world-class, market-oriented research that contributes to the creation of wealth and welfare in the Basque Country.

The network consists of 120 accredited Agents: Singular Agents, Centres for Basic Research and Excellence (BERC), the Research Structures of the Universities, Cooperative Research Centres (CIC), Multifaceted Technology Centres, Sectorial Technology Centres, Agents for the Spread of Science, Technology and Innovation, Supply/Demand Intermediation Agents, Corporate R&D Units, Health R&D Organizations and Health Research Institutes.

Therefore, in a summarised analysis of the innovation and cooperation trends, Basque is a region than can be characterised for having strong business leadership and capabilities, demonstrated experience in Public-private collaboration, and capacity to develop business collaboration models and structures.

Additionally, it possesses a highly developed network of agents and infrastructures, on top of the already highlighted specialised human capital (tertiary education and especially in ICT).

Nevertheless, as pointed out in the SWOT analysis carried out in 2010 by the Basque Government⁴⁷ there are some weaknesses in the Basque Innovation system, that will become a priority and growth opportunity in the following years, such as: Technological system that should

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improve its results of exploitation of intellectual property, creation of companies, presence in the international market and transfer of technology to SMEs; an Innovation system that is not open enough to the outside, as well as a need to increase innovation based in a quadruple helix type of collaboration.

Policies that inform the types of cooperation used

Euskadi 2020 Science, Technology and Innovation Plan (PCTI) is a smart specialization strategy for Euskadi to create lasting competitive advantages, through investment in R & D & I, in the areas identified as priority. Led by the Basque Government, the plan seeks to improve the efficiency of the Science, Technology and Innovation System, facilitating the generation of new capabilities in the scientific and technological areas from which to obtain greater economic and social returns.

Research and Innovation Smart Specialization Strategy (RIS3 Euskadi) or Smart Specialization Strategy. RIS3 Euskadi identifies three priority areas: advanced manufacturing, energy, biosciences / health; and four territories of opportunity: food, urban habitat, ecosystems and creative and cultural industries

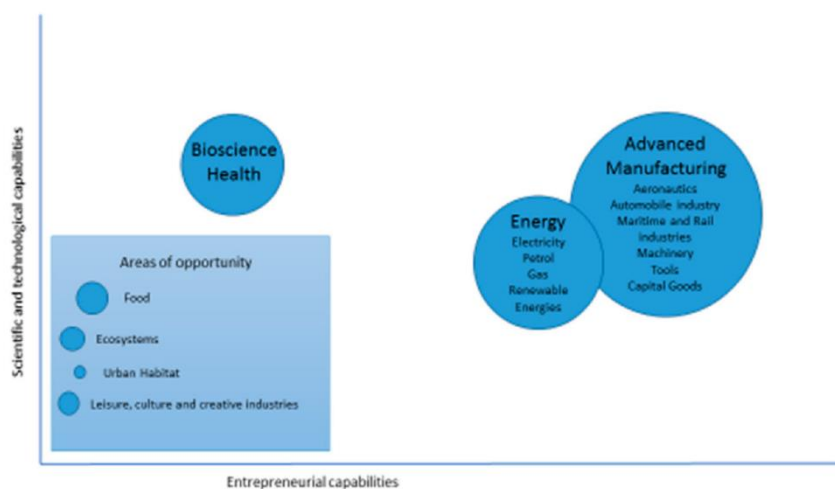


Figure 19. RIS3 EUSKADI TOP PRIORITIES.

These niches of opportunity pose high growth and diversification potential towards a high technological level and are related to sectors in which Euskadi has a strong specialization and capabilities.

Bio Basque 2010 Strategy Basque Country was the first Autonomous Community that designed a specific strategy for the development of biosciences. This strategy, called Bio Basque 2010, responds to the need to diversify our industrial fabric and take advantage of new opportunities derived from knowledge-based society and innovation. Bio Basque 2010 was launched in 2002, with a global approach and structured actions on three axes: knowledge generation, business development, and bio cluster dynamization.

EVIC- Innovation and Cooperation Strategy for the agri-food sector and the rural and coastal environment The objective is to develop innovative initiatives in collaboration throughout the value chain of the agri-food sector and in the rural and coastal world, so that a style and culture based on cooperation, curiosity and experimentation are gradually built for the generation of value. EVIC seeks to increase the number of agri-food companies that carry out innovation, guarantee greater transparency of R & D & I and facilitate smaller firms and producers to develop innovation dynamics in cooperation.

Technologies, tools and methods supporting cooperation and innovation

Cooperative Research Centres

One of the agents that are part of the Basque Science, Technology and Innovation Network (RVCTI) are the Cooperative Research Centres (CIC), created to optimize the scientific-technological capabilities of the Basque Country. They are dedicated to generating new knowledge as well as technology transfer, high level training and commercial exploitation of the results of their research. The CIC network consists of seven centres

Innobasque

The Basque Agency of Innovation is a private non-profit association created to coordinate and promote innovation in Euskadi in all its fields, to promote entrepreneurship and creativity⁴⁸.

Innobasque is formed by the agents of the Basque Science, Technology and Innovation Network, private companies, Basque public institutions, institutional representatives of entrepreneurs and Basque workers and organizations of all kinds related to innovation.

The operating model is based on activities that promote the values and attitudes associated with innovation in Basque society, on actions that disseminate abroad the image of the innovative Euskadi, advanced R&D center, as well as activities that generate innovation dynamics in Basque companies and organizations.

Clusters

The cluster system started off more than two decades ago in the Basque Country. It consists in the gathering of SMEs, agencies and universities sharing their interest in a given strategic sector. All partners in a Basque cluster work cooperatively, since they believe competitiveness cannot be improved nor demands for internationalisation, innovation or sustainability met by working in isolation. Furthermore, clusters are location-based partnerships.

Clusters get support from a network of Strategic Sector Observatories, an idea from the Department of Industry, Innovation, Trade and Tourism of the Basque Government for identifying the knowledge needs of Basque companies, facilitating access to strategic information, offering supervision or prospective mechanisms, and empowering priority clusters as key elements in the innovation system.

At present, Basque businesses come together in more than 25 sector partnerships and 14 clusters⁴⁹.

Digital Innovation Hub

The Basque Digital Innovation Hub is a connected network of advanced manufacturing assets and services. Infrastructure for training, research, testing and validation are available to companies. The hub supports operational ability to offer specific knowledge and services to companies in the fields of Additive Manufacturing, Flexible Robotics, and Cybersecurity.

Hazinnova

Hazinnova is a new service for SMEs to innovate in a simple, fast and free way in new ways of organizing work or in new methods of marketing their products and services.

⁴⁸ <https://www.innobasque.eus/microsite/innovacion-en-euskadi/>

⁴⁹ <https://www.clustercollaboration.eu/cluster-networks/basque-clusters>

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A network of 40 agents - integrated by local development agencies, clusters, chambers of commerce and business associations - is available to the company to accompany it throughout the process, without incurring any cost and with a minimal administrative burden.

2.2.5.2 Case study: Project EIT Food School Network

The Problem

What we put into our bodies is key in determining how healthy we are. Being overweight and obese affects our health, and drastically increases the risk of developing cardiovascular disease, cancer and diabetes. With over 50% of European citizens reportedly overweight, and this being set to rise over the coming years, we desperately need to start having a healthier relationship with our food.

The World Health Organisation estimates that over 60% of children who are overweight before puberty will be overweight in early adulthood, so if we are going to improve our eating habits and change our behaviour, then it's important to tackle this issue early on. An EIT Food project is doing just that - the Food Schools Network linked EIT Food to existing national school programmes across Europe and developed a portfolio of approaches within educational settings which could be used to improve children's relationships with food. This, ultimately promote the exchange of ideas and information, ensuring effective translation of findings.

The integrated cross collaboration is crucial for the success of the project and to ensure the holistic approach needed to address the challenge of healthy eating. This collaboration started to be developed between project consortium members: A Basque technological center, a cooperative industry, and two Universities. The 4 Helix cooperation model was formed by designing a series of co-creation activities and innovative tools with the children, who are key targets of intervention in the project but also fully engaged as participants in the design and implementation of the project. The project also depends on the engagement of a broader set of key stakeholders, including pupils, parents, teachers and canteen staff in schools as well as the Department of Education, Department of Health, Public Health Agency and other similar bodies.

This 4 Helix approach of innovation has demonstrated high quality results and is fully supported by EIT Food in the majority of their designed programs.

The Policies

The project EIT Food School Network was framed by the following policies:

European level

There has been great momentum at a European level where there has been strong movement towards more comprehensive and impactful health, food and sustainability policies. One manifestation of this is the creation of the organisation EIT Food, part of EIT (European Institute of Innovation and Technology) , and Europe's leading food innovation initiative. EIT Food is working to make the food system more sustainable, healthy and trusted by consumers in Europe.

The EIT Food mission is achieved through 6 main strategic objectives:

1. Overcome low consumer trust - supporting European citizens in the transition towards a smart food system that is inclusive and reassuring
2. Create consumer-valued food for healthier nutrition - enabling individuals to make informed and affordable personal nutrition choices
3. Build a consumer-centric connected food system - developing a digital food supply network with consumers and industry as equal partners

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4. Enhance sustainability through resource stewardship - developing solutions to transform the traditional 'produce-use-dispose' model into a circular bio-economy
5. Educate to engage, innovate and advance - providing 'food system' skills for students, entrepreneurs and professionals through advanced training programmes
6. Catalyse food entrepreneurship and innovation - fostering innovation at all stages of business creation

EIT Food school network, is aligned with EIT Food mission, and supports especially their first two strategic objectives.

Additionally, there are several European public policies especially on Nutrition and Health for childhood that have been successfully implemented during the last years and have served as a starting point to frame the project. EU [Action Plan on Childhood Obesity 2014–2020](#)⁵⁰; and [JANPA – Joint Action on Nutrition and Physical Activity 2015](#)⁵¹, both created by the European Commission or the [European Childhood Obesity Surveillance Initiative](#) (COSI)⁵² network created by WHO Europe.

National level

NAOS Strategy (Strategy for Nutrition, Physical Activity and Obesity Prevention)⁵³: health strategy that, in line with the policies set by international health agencies (World Health Organization, European Union), aims to reverse the trend of obesity prevalence by promoting healthy eating and the practice of physical activity and, thereby, to substantially reduce the high rates of morbidity and mortality attributable to noncommunicable diseases. The Strategy was launched in 2005 and later consolidated and leveraged by the Law 17/2011 (5th July) of food safety and nutrition.

Regional level

Health Policies for Euskadi 2013 – 2020: The Health Plan is the fundamental tool to improve the health of Basque citizens, continue increasing their quality of life, reduce inequalities and promote organizational improvements. The improvement of health is an objective shared by the different institutions, so that, through their political action, whatever the field may be, they can influence health and, ultimately, contribute to increasing the well-being of citizens. It is the concept of "Health in All Policies".

Childhood Obesity Prevention Strategy in Euskadi- SANO: The Euskadi Childhood Obesity Prevention Strategy, with the motto SANO, is a tool that will allow addressing one of the main public health challenges of this century by adopting measures focused mainly on promoting physical activity and healthy eating. The plan aims to improve the capacities of children and young people to live in a healthy way and minimize the risks of unhealthy behaviours with the collaboration of the different agents that interact in their environment. To this end, it proposes

⁵⁰ EU Action Plan on Childhood Obesity 2014-2020

https://ec.europa.eu/health/sites/health/files/nutrition_physical_activity/docs/childhoodobesity_actionplan_2014_2020_en.pdf

⁵¹ Joint Action on Nutrition and Physical Activity <http://www.janpa.eu/about/project.asp>

⁵² COSI Network <http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/activities/who-european-childhood-obesity-surveillance-initiative-cosi>

⁵³ NAOS Strategy:

www.aecosan.msssi.gob.es/AECOSAN/web/nutricion/seccion/estrategia_naos.htm


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measures in five areas of action: family, school, health centres, private sector and community environment.


Teams and competencies

The project was implemented under a 4H approach, as shown below by the collaboration of:


1. Technology centre

<p>AZTI</p> 	<p>AZTI is one of the main research centers in the Basque country and the coordinator of the project. They have experience stretching back over 30 years, working in applied research and technology development with 400 companies per year, including 36 European projects running at present. Azti is leading the development of sensory methodology to determinate the nutritional and hedonic perception of children about meals in school canteens. The workplan included engagement with key stakeholders including pupils, schools, food services companies and chefs and department of Education that collaborate with the planned activities. The Consumer and Sensory research group of AZTI contributed by reinforcing the scientific knowledge in the area of child behaviour relating to nutrition. In addition, AZTI collaborates with different hospitals and biomedical research centers (BIOCRUCES, CIC-BIOGUNE, UPV, Biophysics) to develop clinical studies with the objective of characterizing childhood obesity and to be able to design specific food products and personalized nutritional strategies for its prevention.</p>
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2. Universities

<p>Queen's University Belfast</p> 	<p>The Institute for Global Food Security (IGFS) is part of Queen's University, Belfast, specialising in the key areas of the integrity of global food supply, farms of the future and nutritional challenges for the 21st Century. IGFS plays a major role in delivering safe, sustainable and authentic food to the world's growing population, and has become globally recognised for its excellence in research and education. QUB has a strong track record of school-based research. Dr McKinley and Professor Woodside are experienced Public Health Nutritionists based in the School of Medicine, Dentistry and Biomedical Science at QUB. They have experience in designing bespoke nutrition and lifestyle interventions for a number of population groups, including schoolchildren, using a co-creation approach, and also in conducting feasibility, pilot and full randomised controlled trials. They have experience in both qualitative and quantitative research methods, working on this objective with Professor Paul Connolly and colleagues in the Centre for Evidence and Social Innovation at QUB.</p>
<p>University of Helsinki</p>	<p>University of Helsinki (UH), established in 1640, is the largest institution of academic education in Finland, and an international scientific community of 40,000 students and researchers. UH operates in four campuses in Helsinki and in nine other localities in Finland. UH's vision for 2025 is encapsulated in the slogan "Global impact in interaction". The University of</p>

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 <p>UNIVERSITY OF HELSINKI</p>	<p>Helsinki is among the top 1% of the world's research universities, ranked 3rd among the Nordic countries. Scientific quality is manifested for instance by over 75 ERC grants, 50% of the Clarivate Highly Cited Researchers in Finland, and over 100 European projects running annually (2018). University of Helsinki is leading the preschool initiative, the development and piloting a new innovative tool focusing on children's health behaviour and stress response regulation.</p>
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3. Cooperative Company

<p>GRUPO AN</p> 	<p>AN S.Coop is a second-degree Spanish cooperative formed by 160 agricultural cooperatives and 31,000 farmers and livestock owners. GRUPO AN will collaborate in the validation of sensory methodology to determinate the nutritional and hedonic perception of children about meals in school canteens. In addition Grupo AN is participating in the School communication Strategy through the Grupo AN monthly magazine that is distributed among its partners. The magazine has a great visibility and public outreach capacity, especially at national level, thanks to its wide presence in most of the Spanish territory. 15,000 copies of the magazine are distributed monthly. Grupo AN has experience in introducing healthy habits in the schools. Grupo AN introduces local and seasonal fruits and vegetables in the schools to replace the industrial pastries and sweets that children take to be consumed in the schoolyard. This program teaches children to eat fruit pieces with skin and additionally they learn about the qualities of fruits and vegetables.</p>
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4. Public authorities: The consortium is currently linking with the Department of Education, Department of Health, Public Health Agency in Spain, Finland and Ireland.

5. Local community: Every activity in the project it has the active involvement of children but also other pupils, parents, teachers and canteen staff in the participating schools.

Project timeline

Initially, the project lasts for two years (2018 and 2019), but the idea is to continue in 2020 with the dissemination of the activities designed in 2019, and to intensify the involvement and participation of important stakeholders so that the results are secured, and new synergies and collaborations are achieved.

Management and coordination of activities 01-Jan-2018 to 31-Dec-2019

Leader: AZTI

Pre-school activities 01-Jan-2018 to 31-Dec-2019

Development of a new innovative tool focusing on children's health behaviour and stress response regulation. The tool includes components for both children (game component) and early educators (practical advice for positive modelling and creating an enabling environment). The tool focuses on two main themes: healthy food acceptance and promotion of delayed gratification. In this task collaborate with earlier strong European preschool initiatives and the Helsinki Innovation Service. Leader: University of Helsinki.

Primary school activities

01-Jan-2018 to 31-Dec-2019

Development sensory methodology to determinate the nutritional and hedonic perception of children about meals in school canteens. In a first step, an innovative tool was developed (as a game). In a second step, to improve the children's health behaviour, activities as show cooking were planned with schoolchildren. Leader: AZTI.

Secondary schools' activities

01-Jan-2018 to 31-Dec-2019

Explore approaches to positively influence food choice and reduce food wastage in secondary schools. A knowledge co-creation approach is being used to generate a range of ideas that might have a positive influence on food choice and reduce food wastage in secondary schools (11+ years). This process consists of a number of workshops and smaller group discussions. Leader: Queen's University Belfast.

Schools Communication Plan

01-Jan-2018 to 31-Dec-2019

The findings of the work packages outlined in the programme are communicated to key stakeholders within each jurisdiction via both, established and newly developed networks. Leader: Queen's University Belfast.

Funds and/or resources

EIT Food School Network has a total budget of more than 700.000 euros to implement this project during 2018 and 2019. A new proposal is being reviewed for its continuation in 2020. EIT Food has funded 100% of the project. EIT Food funds come from private (partners fee, other initiatives) and public (EIT, as part of H2020) sources

In terms of human resources, The School Network has a total of 9 FTE full dedicated to this project during 2018 and 2019.

Tools, methods and strategies of cooperation

The following tools were used to facilitate cooperation in the project:

- Frequent meetings between the organisations involved in the project. At least four meetings per year took place with the involvement of all partners. Additional meetings were held in the first stages of the project;
- Identification of the already existing programs, projects and tools in the consortium for creation of synergies and knowledge transfer (instead starting from scratch) As examples could be the Identification of population profiles (children) with specific nutritional, sensory and emotional MedAID (Mediterranean Aquaculture Integrated Development) for developing healthy eating habits in children regarding fish product's needs (Projects from Azti), DAGIS & KENFIN (Edura)) New pedagogical tool for monitoring children's health and stress response (Projects from Helsinki University) Qualitative work to assess parents' attitudes to infant and child feeding, and children portion sizes. PhD examining innovative ways of achieving long term behaviour change (Projects from Queens University of Belfast). Fruits in schools. Introduction of healthy eating habits in schools (Project from Grupo AN)
- Co-creation activities to engage a wide range of stakeholders and develop an EIT Food School Network that will ensure refined practice is developed and shared. This co-creation activities are specifically related to "Your fork to farm" and "The zero-waste agenda"

Milestones and outcomes

The expected outputs coming from the project are defined and impact will be measured after finalisation:

Output 1- A new pedagogical tool that is expected to improve children's health behavior and stress response regulation skills both of which may ultimately lead to increased wellbeing and learning abilities. This new tool will be shared across Europe.

Output 2 - New methodology/ tool to determinate the nutritional and hedonic perception of children about the food in schools canteens.

Output 3 - Novel approaches with teenagers at School Novel approaches to engaging with teenagers about positive influence on food choice and reducing food waste in secondary schools

Output 4 -The project supported international research mobility by providing young researchers with possibilities to visit a leading international research center in the same area.

Output 5 - Developed stakeholder network with key stakeholders including pupils, parents, teachers and canteen staff in schools as well as the Department of Education, Department of Health, Public Health Agency and other similar bodies in other jurisdictions.

Successes, challenges and lessons

In summary, the project is resulting in a in the following successes and lessons, having overcome also a set of challenges.

Key project successes:

The most successful learning outcome for the consortia until now has been to again realise the importance of healthy eating in a fun and entertaining way.

The Project coordinator, AZTI, has been working on activities for primary school children which are focused around an easy-to-use app: ¿Cómo como yo? which translates as 'How do I eat?'. This fun, interactive web-based app has been developed to assess food perception, by asking children about healthy products, preferences, consumption and their willingness to try new products. Valuable information gained from this is being shared across the network and used to further develop future activities and interventions.

An important part of the feedback about the app that has been recently trialed in primary schools was that children found it attractive and funny, and they also showed interest in obtaining dietary advice and learning more.

Key project challenges/limitations:

During 2018, one partner led a single task for an age group parallelly. These initiatives were based on three activities, with accompanying communication strategy: to explore methods and develop networks to positively influence food choice, to study the nutritional understanding and hedonic perception of school meals and to develop and to pilot new innovative tool focusing on children's health behaviour and stress response regulation. The biggest challenge described from the partnership was connecting the activities initially programmed and tested in a specific country and coordinating them with other actions of national programs.

This parallel work showed definitely improvement possibilities related to further consolidation of the network and more cooperation between partners, involving them in other partners activities. Another challenge founded has been the communication to stakeholders, reducing the opportunity of having an impactful visibility to outside.

Future cooperation and innovation

Lessons learnt and results that have been successfully resulted from this project will contribute to further promote and strengthen the cooperation dynamics between different partners in the organisation and outside.

Due to the cross country nature of EIT Food, it is crucial to understand intrinsic differences between partners and cultures across regions and countries to be able to adapt the program to the different outcomes across country. At the same time coordination and harmonisation are important for knowledge transfer purposes and to be able to apply previous learnings from this and other projects into the main goal, improve children nutritional education in Europe.

In 2019 EIT Food School Network activities were not only deployed in Spain, Ireland and Finland, but additionally are starting to be deployed also in Poland and UK, thanks to the incorporation to the consortium of Warsaw and Reading University.

In the future, there is a real opportunity to continue building in the already extense EIT Food network to advance the Food School Network objectives by supporting outreach activities in all European countries.

2.2.6 Terres de Sources (France)

2.2.6.1 Introduction and context of case study

Regional trends in cooperation and innovation

In western France, about 50 collaborative experiences on the “healthy food and lifestyles” theme have been identified. Among them, 6 different types of collaboration are recurrent and succeeded in including all 4 helixes:

- collaborative projects
- collaborative events
- design labs
- innovation territories (Living lab)
- territorial food project (PAT)
- academic chairs

Initiatives led by institutionals

Among the initiatives led by institutionals, the innovation territory project Terres de Sources, led by a water syndicate, succeeds in gathering the 4 helixes in a major project dedicated to improve the quality of drinking water in Brittany.

Valorial cluster is used to organize collaborative events called “Valorial Project” to make the 4 helixes work together and generate innovative projects; an event focused on “pregnant and breastfeeding mother’s nutrition” was organised in July 2018.

Another notable pilot experience, in the Loire country, is “Programme Malin” which aims to support the poorest French families with young children in adopting healthy eating habits from the earliest age by giving them nutritional advices and financial help.

" Together, let's educate people about food "⁵⁴ is a training program including 3 seminars designed to lead teachers to set up projects focused on food education with young people.

Initiatives led by industries

Concerning the initiatives led by industry, a collaborative project named "Allaitement", led by Valorex, has the objective to measure the impact of a healthier diet on maternal milk, through the use of digital tools

Bleu, blanc, Coeur is a food brand, created in 2000, that relies on high quality animal feeding that allows humans to eat a healthier food. It has been recognized by the health and agriculture ministry as a "general interest approach"⁵⁵.

Initiatives led by academics

Academics are also initiators of collaborative experiences, often together with industry: Nutrichic⁵⁶ is a collaborative project whose aim is to improve the quality of food in order to have a better quality of life in residential facilities for dependent elderly people.

Initiatives led by consumers

Consumers are more and more at the root of collaborative food experiences: in local participating food shop, Breizhicoop, consumer associations work to create a healthy food network in disadvantaged neighbourhoods (Food quality for everyone); also Henaff (a local brand) engages with a consumer community who interacts with its brand to develop it.

Policies that inform the types of cooperation used

In 15 years, from 2000 to 2015, the French public authorities have more than doubled financial support for innovation. In 2014, 9800 M€ were dedicated to innovation, including 87% financed directly by the French state, and the food sector benefited from 5% of this support.

⁵⁴ Together, let's educate people about food: <http://www.paysdelaloire.prse.fr/ensemble-eduquons-a-l-alimentation-a328.html>

⁵⁵ General interest approach of Bleu Blanc Coeur : <https://www.bleu-blanc-coeur.org/c/78/Les-reconnaissances>

⁵⁶ Nutrichic: https://actu.fr/bretagne/quimper_29232/finistere-nutrichic-bien-manger-vivre-mieux-dans-ehpad_22663168.html

TABLEAU ET GRAPHIQUE N° 1 - LES AIDES À L'INNOVATION EN FRANCE

Par sources de financement, en 2014^(a)



Figure 20. French innovation aids by source of funding

National policies

- “Future Investment Program” (PIA)⁵⁷ has been set up in 2010 to sustain the development of economy, including innovation, with a budget of €57 billion.
- The Food national program (PNA)⁵⁸ is devoted to develop the public food policy. Although, the first goal is food safety, this policy also implements programs (in particular in the collective catering sector) to encourage local selling, seasonal products, as well as labelled products (including organic farming), which inevitably leads to cooperation between the different actors.
- The National health and nutrition program (PNNS)⁵⁹ was created in 2001 to improve French people’s health by focusing on nutrition. This programme operates at several levels: industry, consumers, research, in order to achieve its objectives (for instance, the decrease of salt consumption, the encouragement to consume at least 5 fruits and vegetables per day) using television publicity campaigns.

Regional policies

At a regional level, the French state has commissioned the different regions to build their “Regional scheme for economic development, innovation and internationalisation” (SRDEII)⁶⁰, reflecting the regional strategic orientations, together with key stakeholders. In Brittany, the result of this collaborative work is the “Glaz economy” that combines agrifood strength, maritime forces, and the silver economy. As far as Normandy is concerned, the priority will be given to entrepreneurship. In Pays de la Loire, the objective is to develop the economy into the future to develop local employment.

⁵⁷ PIA: <https://www.gouvernement.fr/le-programme-d-investissements-d-avenir>

⁵⁸ PNA: <https://agriculture.gouv.fr/programme-national-pour-l-alimentation-le-ministere-de-l-agriculture-lance-lappel-projets-2016-2017>

⁵⁹ PNNS: <https://solidarites-sante.gouv.fr/prevention-en-sante/preserver-sa-sante/le-programme-national-nutrition-sante/article/programme-national-nutrition-sante-pnns-professionnels>

⁶⁰ Brittany SRDEII: https://www.bretagne.bzh/upload/docs/application/pdf/2013-12/srdeii_final.pdf

Technologies, tools and methods supporting cooperation and innovation

Tools to favour cooperation and innovation

Tools have been set up by public policies to favour cooperation and innovation: in the third part of the PIA program (2018-2022), a call for proposal named “Innovation territories” (TI) has been set up. Its purpose is to boost sectors already well established in certain territories. Their objective is to suggest new models responding to challenges such as energy, ecology, digital, demographic and social transition, with special attention to projects that will strengthen the link between consumers and companies to guide their innovation. Another tool is the “Structural research and development projects for competitiveness” (PSPC), also funded by the PIA, with the goal to select projects that will have structuring effects on a particular sector as well as a strong economic impact. This partnership tool promotes the collaboration between farmers, private companies and public research actors to stimulate open innovation. Methods to favour cooperation and innovation

Collaborative methods to favour cooperation and innovation

Large French companies such as Neovia have developed a Design lab to highlight and adopt new open and collaborative methods of working; the Design lab allows them to propose and test products, solutions, and innovate economic models which are valorised by clients and developed to ensure new designs are economically viable before production.

Fleury Michon⁶¹, major French food group, has opened on his side, a dedicated digital hub to focus on the internal sharing of interactions and generated contents, including consumers’ opinions. For them, it is a way to reconnect to consumers after being focused on selling to supermarkets for decades.

Technologies to favour cooperation and innovation

Regarding technologies that support cooperation and innovation, more and more companies organize their internal monitoring and manage their projects thanks to collaborative platforms. Gladys⁶² is an integrated collaborative platform that allows contributors to make use of different collaborative tools on a unique dashboard to share ideas, manage tasks and communicate together.

Another example of technology, in the context of Breizhalim⁶³ regional responsible supply platform for collective catering, is a digital sourcing space made to facilitate the dynamic and permanent matching of supply and demand, to promote local and quality food in public collective catering.

2.2.6.2 Case study: Terres de Sources

“TERRES DE SOURCES”, the accelerator of farm and food transition in the Rennes watershed.

The Problem

In Brittany, which is a major territory of intensive agricultural production in France, the quality of water is impacted by the phytosanitary products that are being used to optimize the crop and farm

⁶¹ Fleury Michon Hub: <https://hubinstitute.com/2018/07/c-level-collection-1>

⁶² Gladys: <https://outilscollaboratifs.com/2016/09/gladys-le-collaboratif-tout-en-un-la-portee-de-tous/>

⁶³Breizhalim: [http://www.bretagne.synagri.com/ca1/PJ.nsf/TECHPJPARCLEF/29506/\\$File/BreizhAlim-demarche_Flyer3volets-V5-2017.pdf?OpenElement](http://www.bretagne.synagri.com/ca1/PJ.nsf/TECHPJPARCLEF/29506/$File/BreizhAlim-demarche_Flyer3volets-V5-2017.pdf?OpenElement)

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yields. The project leader, a syndicate called “Collective of the Rennes basin’s waters” aims to protect water resources, to produce and to distribute drinking water and quality food products in the Rennes city watershed. The main actors of the project have found an innovative legal method for the farms located upstream of drinking water extractions to win public contracts; in their efforts to reduce the use of phytosanitary products, they respond to the consumers wish of quality and accessible local food products. The chosen case study illustrates the 5 helixes involved (as we’ll see later on, more than 4 helixes are working together in that project) and illustrates the real impact on the societal and economic ecosystem in Brittany.

The Policies

In the specific field of water, the European framework directive, also called “DCE”, was adopted by the European Parliament and Council in October 2000. This directive has the objectives, with a 3-steps planning approach, to reduce the pollution of water, promote its sustainable use, protect the environment, improve the aquatic ecosystems conditions and mitigate the effects of flood and drought. It is a key document because it brings performance obligations to each European member state, which are being transmitted to the operating actors whose actions have an influence on the quality of water, including the food producers.

This directive is an additional tool to complement existing measures implemented through the Common Agricultural Policy, including the eco-conditionality of aids (1st pillar settled in 2003) and agri-environmental measures (2nd pillar). These measures are an opportunity to encourage the producers to adopt better practices to promote their products to consumers.

In addition to this European context, national policies have helped the project to progress. Winner of a national call for expressions named “High Ambition Innovation Territories” from the “Future Investment Program” (PIA) that is managed by the French General Investment Commission (CGI), the project has received 300K€ in grants in 2018 to ensure the robustness of its business model. It is currently the subject of a submission to the “Innovation Territories” call for proposal, for which results will be published in September 2019.

The ambition of this call is to facilitate the emergence of large innovation projects in the fields of wood, tourism, agriculture and mobility, with the ambition to transform territories (for example digital/ecological/societal transformation), by establishing a long-term public-private partnership. The action promotes the involvement of every actor in a given territory (consumer, company, institutional, public research) in order to have a successful open innovation scheme.

Teams and competencies

There are 83 actors involved in the project. The main 4H actors are:

1. Among the 11 institutional structures implicated in that project, the “Collective of the Rennes basin’s waters” syndicate, leader of the project, has been operating for 20 years an ambitious policy of protection of the drinking water. Five main funders, public or professional, also contribute to the development of this project.
2. A community of about 35 representative organizations (consumer’s representatives, environment associations, distribution actors, education actors), engaged in disseminating an ambitious policy of education in favour of a responsible food chain in the territory, have been engaged since the project was established.
3. The whole evaluation of the project is being managed by a multi-disciplinary scientific committee, composed of 9 scientific bodies (CNRS, INRA, IRSTEA, Rennes universities...), who analyses sociological, legal, economic, agronomical and geographical impacts of the project.

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4. This long-term work has led to a strong partnership with 40 producers who, reducing the use of sanitary products, get the guarantee to be able to sell their products at a good price, to public collectivities and individual consumers, under the “Terres de sources” brand. More producers will be involved if the project wins the current call.
5. The industries, the fifth helix of the project, will also contribute to develop the brand “Terres de Source” by using the farmer’s production to supply the different networks. For the moment, 17 industries participate in the project.

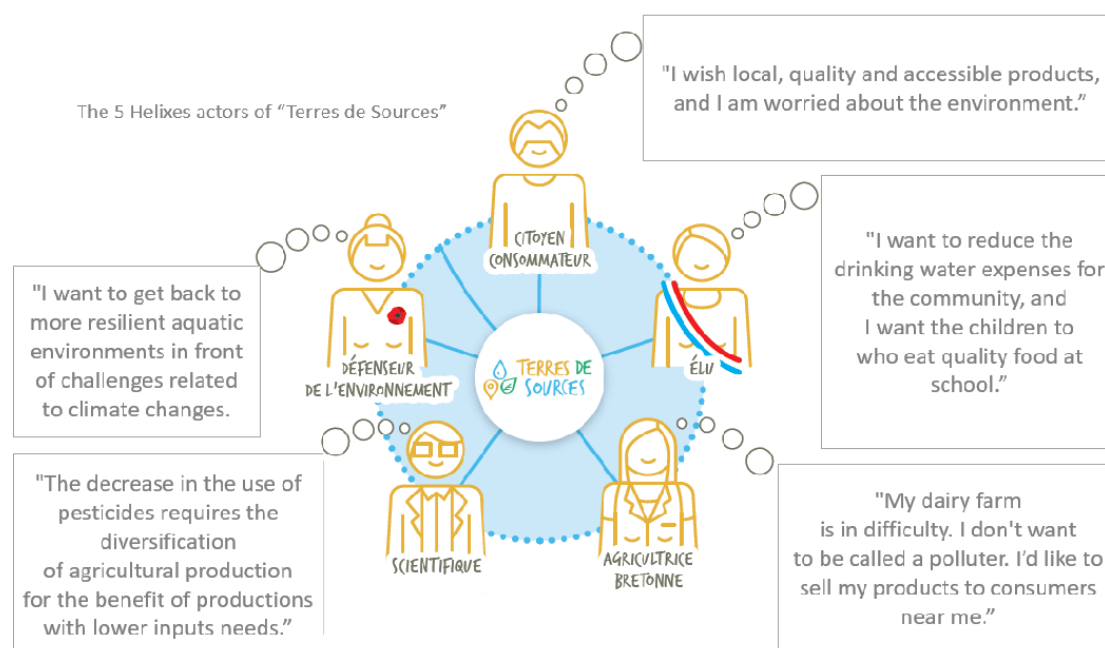


Figure 21. The 5 helixes actors of “Terres de Sources”

Project timeline

“Terres de Sources” started in 2015 with the ambition to organize a reliable local market that would engage the economic actors.

The first period from 2015 to 2019 was a successful pilot experience, and future actions are already planned to extend the project if it wins the call to which it has been submitted.

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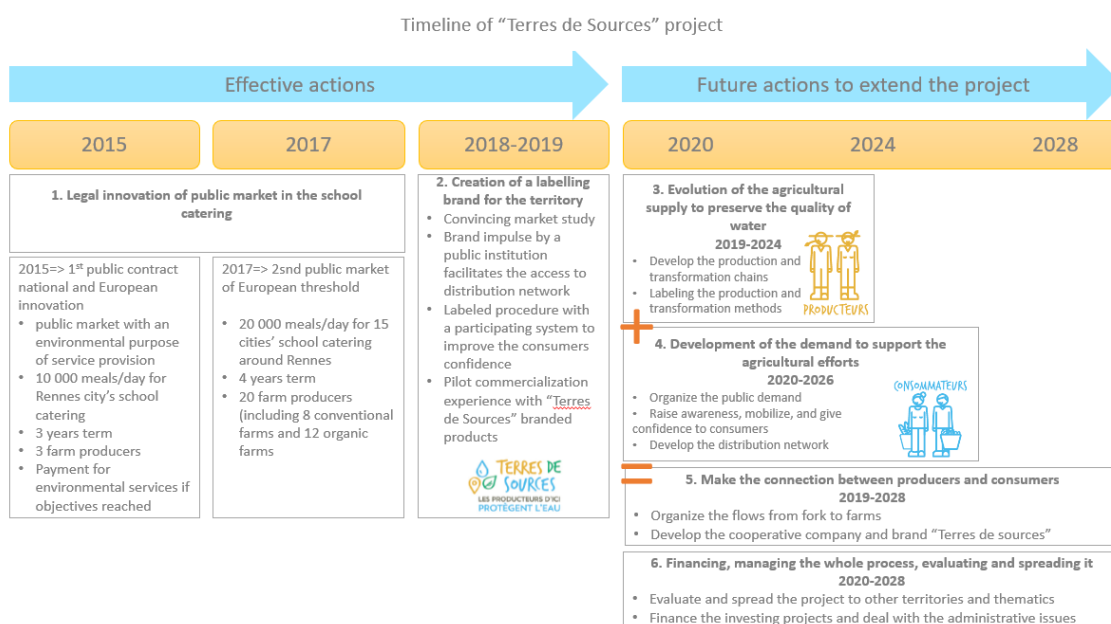


Figure 22. Timeline of “Terres de Sources” project

Funds and/or resources

The project has received 300K€ in grants in 2018 from the PIA to ensure its development and would receive 21M€ more (14M€ in investment actions and 7M€ in subsidies), out of 80M€ total budget, if it wins the current call. The remaining 60M€ will be mainly funded by the private sector who wishes to invest money in the project.

The first 300K€ were devoted to employ specialised teams to challenge and strengthen the project construction.

Regarding the human resources, more than 190 people from 83 organisations, consumers, buyers and producers, are contributing to the whole mechanism but also benefiting from it, which favours their prospects and efficiency.

Tools, methods, strategies of cooperation

A strategy with ambition to organise the local market has been built to give confidence and support to the economic actors.

A cooperative company “SCIC Terres de sources”, composed of 6 groups (employees, funders, producers, industries, institutional bodies, and consumers) will soon bring together different networks of producers, environmental and consumers associations to work together.

A consortium of 3 start-ups (Tout Près d'Ici /Applifarm / Landfiles) has been formed to develop a digital tool to enhance the connection between the consumers and the producers.

Moreover, a legal innovation method had been built to overcome constraints on public contract and make it possible to buy local production.

Another useful tool is the creation of a purchasing group, made of 15 municipalities around Rennes city, to motivate the collective catering to integrate the process, with a need of about 20M. meals per day.

Concerning the financial aspects, a participating platform (Gwenneg) is used to mobilise private funds to support the project.

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Milestones and outcomes

This project represents a breakthrough in water protection policies by trying to have an influence on demand (consumption), in a complementary way to the action on offer. At the moment, 40 producers, searching to be paid at the right price, have entered the project. They have contributed to deliver part of the 10 000 meals/day for Rennes city's school catering from 2015 to 2018, and part of the 20 000 meals/day for 15 city's school catering around Rennes, that is to say an equivalent turnover of 200M€. The creation of "Terres de sources" labelling brand has led to the commercialization of 6 farm's products in 8 regional supermarkets as a pilot experience.

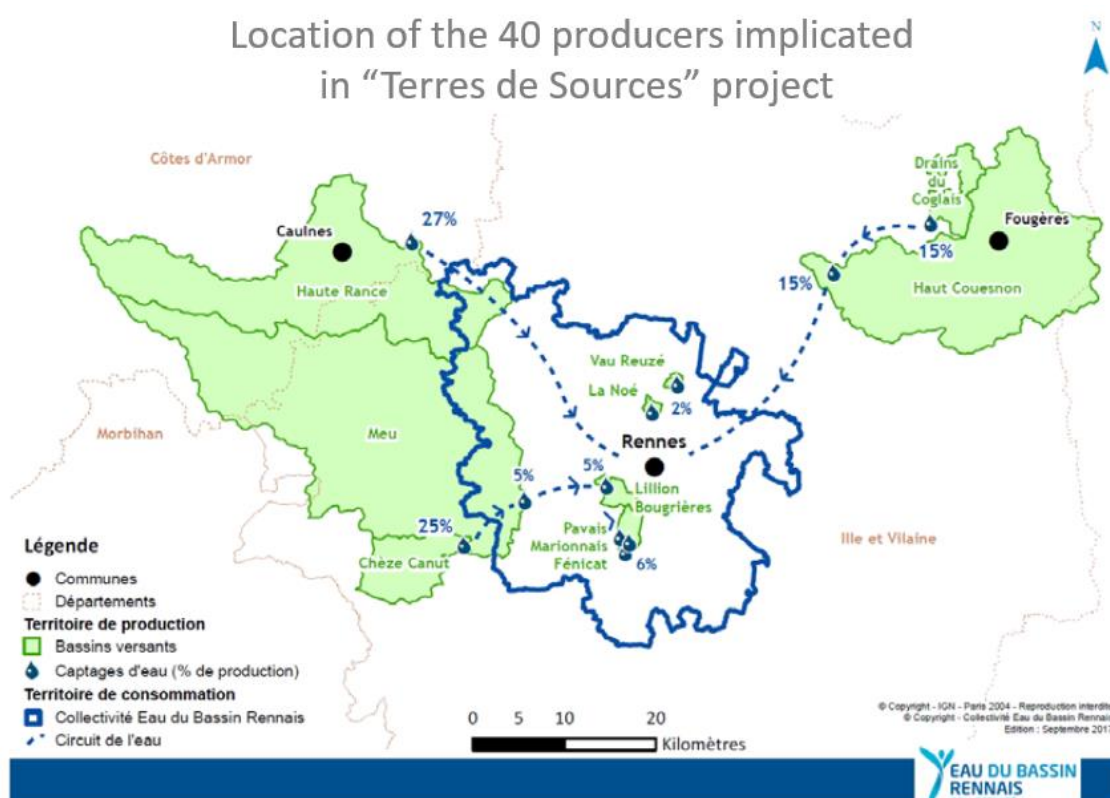


Figure 23. Location of the 40 producers implicated in "Terres de Sources" project



Figure 24. What has been done in "Terres de Sources" project

Successes, challenges, and lessons

Key successes

One of the key successes of this project is to have found a legal way to connect public markets to the only farms located upstream of drinking water catchment, in order to work together with local actors and to ensure the economic success of the entire approach.

Another point is to have been able to bring together the links in the food chain, from the lands to our tables, in the same project. Historically, these people had their own unique objectives and were not used to working together (for instance, environment associations and producers).

Other key success is to ensure that the actor's involvement leads to a real benefit for themselves, while helping others.

Another key success is the acknowledgement of the project by external actors.

And last but not least, acting on the 4 following levels is a success of this project: protection of the environment, a fair remuneration of producers, upgrading the local economy, a healthier food and quality food.

Key challenges/limitations

Terres de Sources will have much more impact if it wins the Innovation Territory call it has submitted to, and whose results will be known in September 2019.

There are not so many farmers involved yet, even if the ambition is to convince and label 25% of the farm's territory (that is to say about 750 by 2028).

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“Terres de Sources” brand will have to reach a 25% notoriety rate in order to generate enough products sales from the 750 farms potentially eligible to the project.

So as to improve the quality of water in nitrates and pesticides, respectively with a decrease of 50% and 75%, it will be necessary to wait until 2035, given the 10 years inertia of the medium.

The creation of the cooperative society SCIC, with numerous actors and organizations, is a key challenge to ensure the future of the project. It will have to define the adequate governance to make the project live and grow up so as to get to its ambitious goals.

The ambition by 2028 is to spread the project’s business model to a minimum of 4 other territories: two in Brittany, and two at a national French level.

Key lessons learned

- For the project manager, the term “global project” was an important guide to guarantee its development: indeed, the different actors could easily work on opposing goals, but when the global project was submitted, by highlighting the benefits for the territory, everyone agreed on the necessity of working together, with different but complementary objectives. **Working on “territory projects”, and not only on isolated issues, would be a more efficient way to achieve its goals.**
- Another lesson learned is that **economic reasons are a good way to motivate people to work together**: even if actors are in competition with each other, making them work on the economic plan and creating a business together is a way to bring them closer together. There is no real and strong project without an economic achievement. This kind of approach allows us to reinforce the links between economy, environment and social actors.
- One of the main difficulties to deal with was **how to delimit the applicable territory of the project**:
 - at a geographical level (competitiveness between an actor inside the chosen territory, and another one outside, but who both sell their products in the same geographical area)
 - how to balance offer and demand actors to generate the needed quantity of products.
 - is that necessary to create specific production channels applied to territory? And should we export our local products to other territories?

Future cooperation and innovation

- **Mass distribution actors should be implicated and be part of the consortium of partners from the beginning of the project.** Pioneers would be necessary to raise awareness among consumers and open the dialogue between them.
- **The links to create between territories**, in order to extend the project geographically speaking, is a key challenge: the project only makes sense if it is extended. The local agro-industries, already invested in the process, could also get involved in other territories (coopér, bigard, poulets de janzé).
- Inside each organization are innovative people able to take people on board and motivate their organization to integrate the project. Although, **detecting agro-industries that share the same values and being able to support the project financially will be part of the next steps to go further in this ambitious project.**

Bibliography:

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Video explaining the project: http://www.eaudubassinrennais-collectivite.fr/protection-des-ressources/91-terres-de-sources/332-la-marque-de-territoire-terres-de-sources.html?cat_id=91

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*La Tribune : <https://www.latribune.fr/regions/smart-cities/l-ambition-de-terres-de-sources-ameliorer-la-qualite-de-l-eau-en-changeant-le-mode-de-production-agricole-799311.html>

*Le Monde : https://www.lemonde.fr/planete/article/2019/01/17/rennes-organise-sa-revolution-agricole_5410288_3244.html

2.2.7 Harvesting Tomorrow's Skills (Northern Ireland)

2.2.7.1 Introduction and context of case study

A well-trained workforce is a fundamental requirement for companies in the Food and Drinks sector to maximise their efficiency and effectiveness to achieve sustained growth.

The Northern Ireland (NI) Food and Drinks industry continues to face an on-going skills challenge. The lack of a holistic approach means that the needs of this technically challenging and growing sector were not being addressed.

A significant element of the NI agri-food sector has been dependent upon labour sourced from the EU. Post Brexit there is some uncertainty in relation to the position of current workers and in respect of how local businesses might secure the necessary employees in the future. Immigration from the EU has helped improve the skill base of our local companies and helped ensure that our companies can operate cost effectively. The planned growth in the local sector will continue to require more people. NI companies with operations in the EU will also have seen their relative salary costs increase due to the depreciation of sterling.

The wider community in Northern Ireland often has a poor perception of the industry and lacks understanding about agriculture and food. This impacts adversely upon the industry in various ways, for example, in its ability to attract high calibre young people into the workforce.

Key Challenges on Skills highlighted were:

- A poor perception of the industry, lacks understanding of agriculture and food production, lack of awareness of career options, and difficulty in recruiting graduates, particularly those with scientific and technical skills. We must position ourselves as an attractive career option – from semi-skilled to technical to business management, with opportunities for graduate talent.
- Management and leadership training must be enhanced and industry must increase its uptake of the support on offer.

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- There is a need for business skills in the industry, both at primary and processing levels – cost analysis, commercial viability, and application of technical skills.
- A lack of marketing skills and failure to appreciate the need to meet or exceed customer expectations, throughout the supply chain.
- The need to better harness the fresh talent at Further Education Colleges, Universities and CAFRE through apprenticeship opportunities, both on-farm, in the factory and skilled occupations such as the bakery sector.

Harvesting Tomorrows Skills

A Collaborative Network



Figure 25. HTS Network members

Employment Trends and the profile of the Economically inactive

The project was conceived against a backdrop of key economic trends that indicated that the employment market within Northern Ireland was heading for a crunch point. The Production output of the large manufacturing food companies would be restricted or reduced due to the lack of available skilled and general workers. The unemployment rate had been falling and the latest figures put the current level at around 3%.

The research indicated that there was only 60,000 economically active people seeking employment and a high percentage of this group had no qualifications. Combined this and producing a perfect storm of a decreasing pool of available employee's, was reverse migration of EU workers and the uncertainty around Brexit.

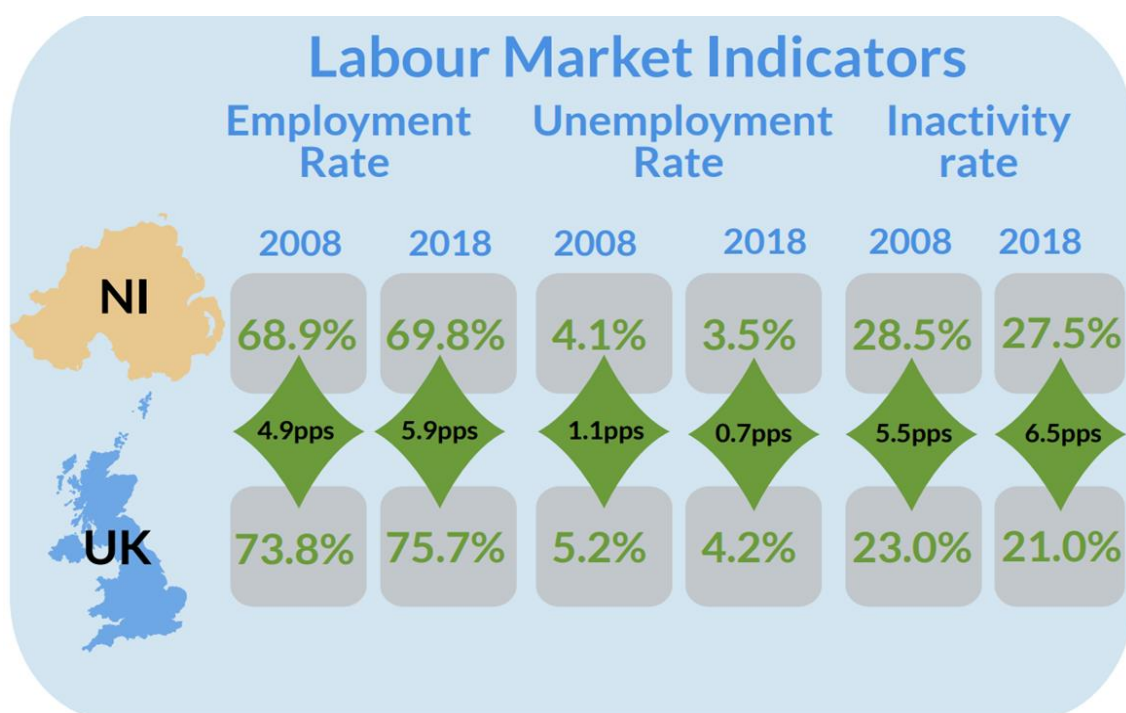


Figure 26. Labour Market Indicators

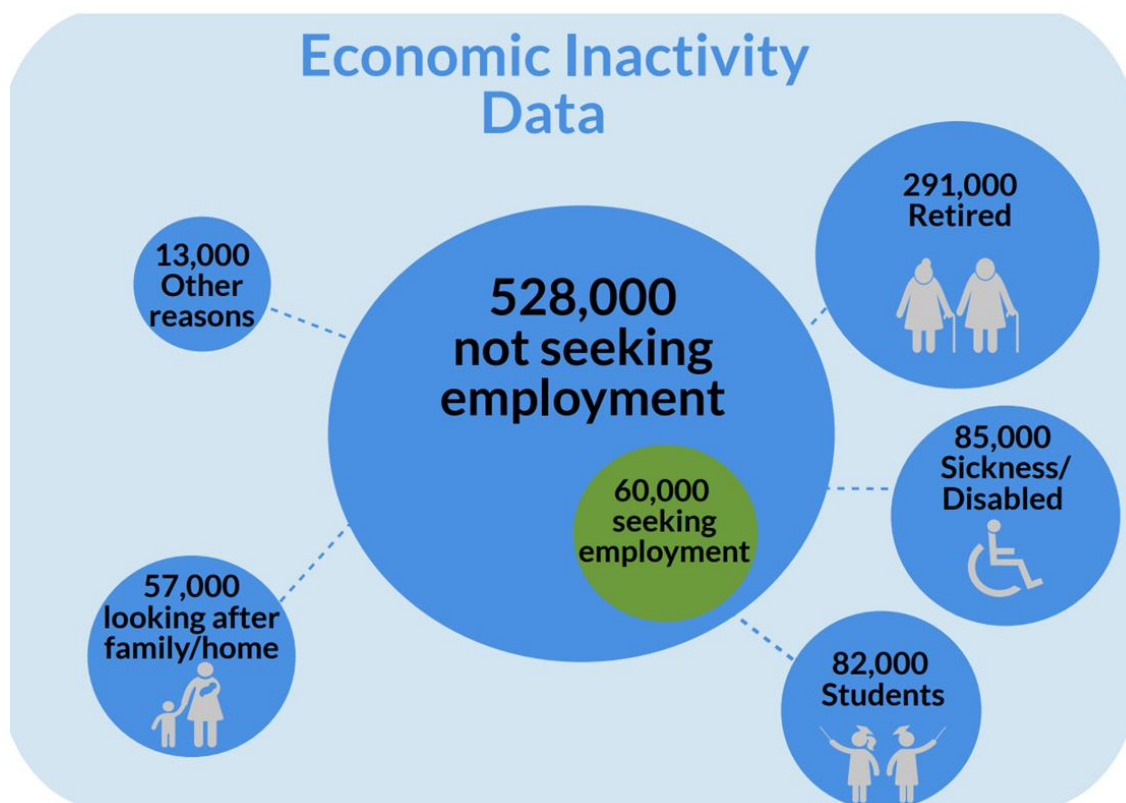


Figure 27. Economic Inactivity Data

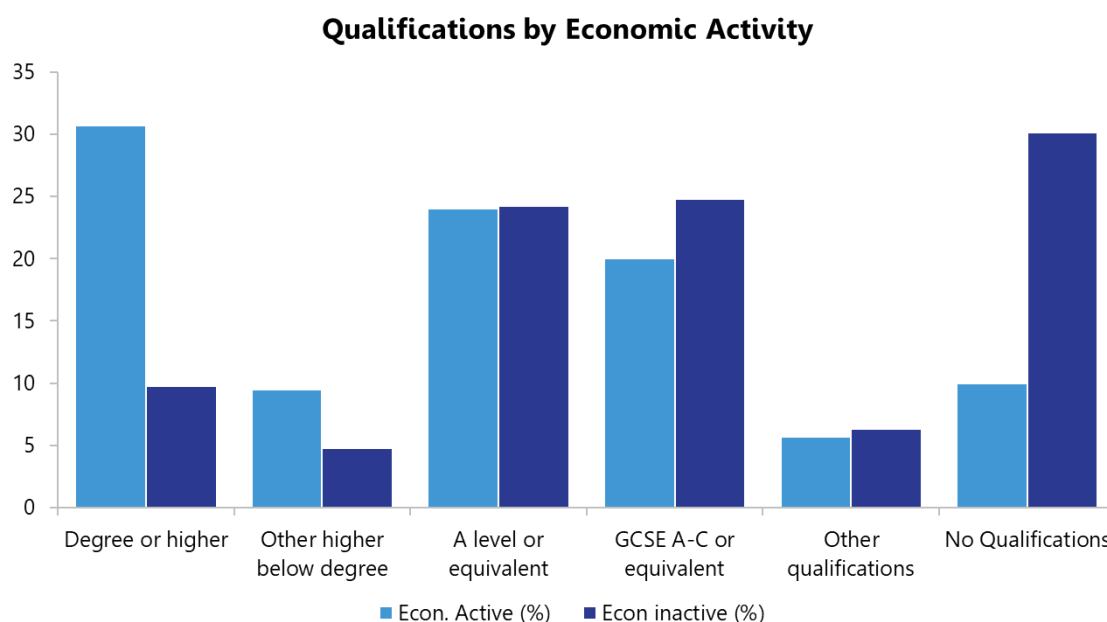


Figure 28. Qualifications by Economic Activity

Technologies, tools and methods supporting cooperation and innovation

Harvesting Tomorrows Skills (HTS) provided a platform that brought companies together to address common issues and difficulties. Sharing information, services, and access within a

D4.1 Analysis of current trends and best practices on H4 cooperation for innovation and growth in the AA

collaborative network of companies who were in direct commercial competition within the local and export retail markets.

Bringing the companies together in a collaborative network to tackle common issues was beneficial and challenging. Ensuring the companies engaged in a meaningful fashion was crucial in capturing accurate data and feedback. Organising workshops, HR Forums and joint actions, the network became pivotal in the coordinated alliance in this area.

HTS fully embraced technology as a conduit to communicate with its target audience.

- Created a Sector specific Logo
- Created a Sector specific Web page
- Created a sector specific twitter account
- Created a webpage that provides up to date live information not a static never changing out of date online portal
- Sent out information directly to Industry journalists and bloggers.
- Created an HTS branded reference document with training contacts and info graphics
- Developing the image and recognition of Harvesting Tomorrows Skills as a stand-alone network
- Promoted the benefits of further education and upskilling to the sector
- Provided a brief synopsis of the further education options available

The network held 8 workshops and Forums, over the term of the project. Providing training on export strategy, research, business planning and implementation including up-skilling support and Apprenticeships.

Fostering greater collaboration, the network set out to work closely with the 6 regional Further Education Colleges. Driving forward the training support available within each regional area. Providing direct contact between the colleges and Food companies in the college region. Facilitating College BDM's meeting directly with network members to provide a business or "Assessment clinics".

Investigations and research were carried out to establish the level of industry representation that was included in the school curriculum.

A total of 144 school visits took place along with 15 Career days. Over 4100 school children enjoyed an in class room presentation and 22 ambassadors were recruited and trained to provide representation of the industry directly into the class room.

The Project – Harvesting Tomorrows Skills

The project created to address these issues was called Harvesting Tomorrow Skills (HTS). The shape of the collaboration was dictated by the funding authority from which the resource for the activity came from. This was a regional Northern Ireland Government body called Invest NI. They funded the activity of the network from a Collaborative network programme which encouraged stakeholders from a connecting group to work together to address a common problem. Network collaboration was adopted to provide greater visibility of the current approach from across the companies.

Two Key strands of the project were, the uptake levels of training provisions currently available through the regional colleges and the publicity and the promotion of the sector.

The regional colleges have been tasked to work directly with companies from across Northern Ireland. Providing business support in customised training, workforce development, higher level

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Apprenticeships and networking and partnership opportunities. Unfortunately, the uptake in this provision was being underutilised with the net result being a lack of supply of skilled applicants into the employment pipeline.

The policy of the network was to facilitate and encourage greater collaboration across the Industry sector -- making the main actors within the sector work together in addressing common problems and setting common goals; and creating a mechanism that required a collective approach and interdependent actions.


HTS created a structure that built relationships and alliances across a range of private and public providers in service of the network's goals:

- Systematically bringing together a range of stakeholders working in the area of career development: Agri Food manufactures, Local Government, Education providers and recruitment agencies.
- Sharing information, services, and access to a collaborative network. HTS provided a platform that brought companies together to address common issues and difficulties. In organising workshops, HR Forums and joint actions, the network became pivotal in the coordinated alliance in this area.
- Establishing a single recognised voice that could speak for the sector across the issue of Career development and skills requirements
- Creating awareness of the Food and drink sectors needs and the importance of the industry to the local economy.
- Helping the extended education and recruitment sector understand the requirements of the companies in order to maintain and increase the current levels of employment.

Over the term of the project the Network carried out research and held 8 workshops. Providing training across a range of issues and focusing on new methods of employee engagement, specifically online recruitment and worker wellbeing.

In addition, they worked closely with the 6 regional Further education colleges to drive forward the Training support available within each regional area including, Knowledge Transfer partnerships, Assured skills programmes and an Academy programme. Building new pipelines and direct contact between the colleges and Food companies in the college region. Assisting in the delivery of recommendations 33 and 34 from the **Going for Growth** [1] Strategy, which was an extensive consultation with the agri-food industry and other stakeholders in 2016. Going for Growth was an extensive report that included more than 100 recommendations aimed at accelerating the growth of food and drink processing in Northern Ireland to 2020 and beyond. Recommendations 33 and 34 set a commitment by the Industry to “commit to provide placements for industry trainee” and “industry will commit to provide training to career staff on Agri- Food training opportunities”

Table 8. Project targets

	
30 Objective as set out in the Letter of Offer	
Ref : 1717/130141065	
1	Create a Terms of Reference
2	Complete Qtr. Reports
3	Create a network Charter
4	Draft a Report on the network becoming self-sustaining
5	Promote ongoing engagement across the sector
6	Grow the network
7	Provide ongoing communications
8	Create an online portal
9	Attend Government (DfE) related skills meetings
10	Publish a contact booklet
11	Research on current training available
12	Hold 4 Workshops
13	Link Large and small HR departments
14	Engage with 25 HR departments
15	Complete actions 33-34 from the going for Going for growth action Plan
16	Provide Management training
17	Provide owner training
18	Research the current Support Package available
19	Pilot a Level 2 Food Apprenticeship
20	Provide Export Training workshop
21	Create a knowledge transfer network
22	Create a Skilled employee Pipeline

23	Research School Curriculum amendments to help promote the sector
24	Report on Secondary School Agri Food Course Material
25	Promote Career Attractiveness of the sector
26	Research the appeal of other employment sectors
27	Research and report on local Recruitment Fairs
28	Research the "Bring it on" project in IT recruitment.
29	Recruit and manage industry Ambassadors
30	Provide Ambassador training

Teams and Competencies

The membership of the Harvesting Tomorrows Skills network was drawn from a range of stakeholders in the Agri Career development sector including:

- HTS Food and Drink network, who facilitated the collaboration
- Industry Food manufactures, including employment providers and the core beneficiaries
- Education Schools, Further and Higher education bodies providing an employee pipeline and training
- Training providers, including private companies supplying training and upskilling services to industry
- Career teachers linking industry with potential employees, ambassadors for the sector engagement and a platform for the transfer of knowledge
- Recruitment companies providing feedback on the Industry image and processes from employee research, and an employee pipeline dynamic
- Academics providing research on the economic background to the industry and the trends in career path choices
- Regional local council authorities providing a platform where as representatives of the sector HTS could promote and represent the current thinking of the sector through the experience of the HTS members.

The input from the further education college representatives was very useful in informing the progression of the project. The Facilitator also held meetings with HTS members to conduct a skills audit, and discuss directly the type of support required, and what was currently available to the companies. The colleges in turn promoted Academies across several employment types, Credit Control, financial administration, Product input and stock reconciliation.

There was a recognition that the industry needs to explore new options to promote and engage with potential employees by creating information and identifying their target base; how they might promote the information and make it easier for pupils, parents or career teachers to access the information. The need to embrace new technology to provide a more modern and engaging sales pitch regarding applicants was also recognised.

Project Timeline

The Project Timeline began in March 2017 and ran to June 2019. The activity across this period set out in the graphic below included workshops, Survey's, direct research through interviews, online promotion and pipeline development.

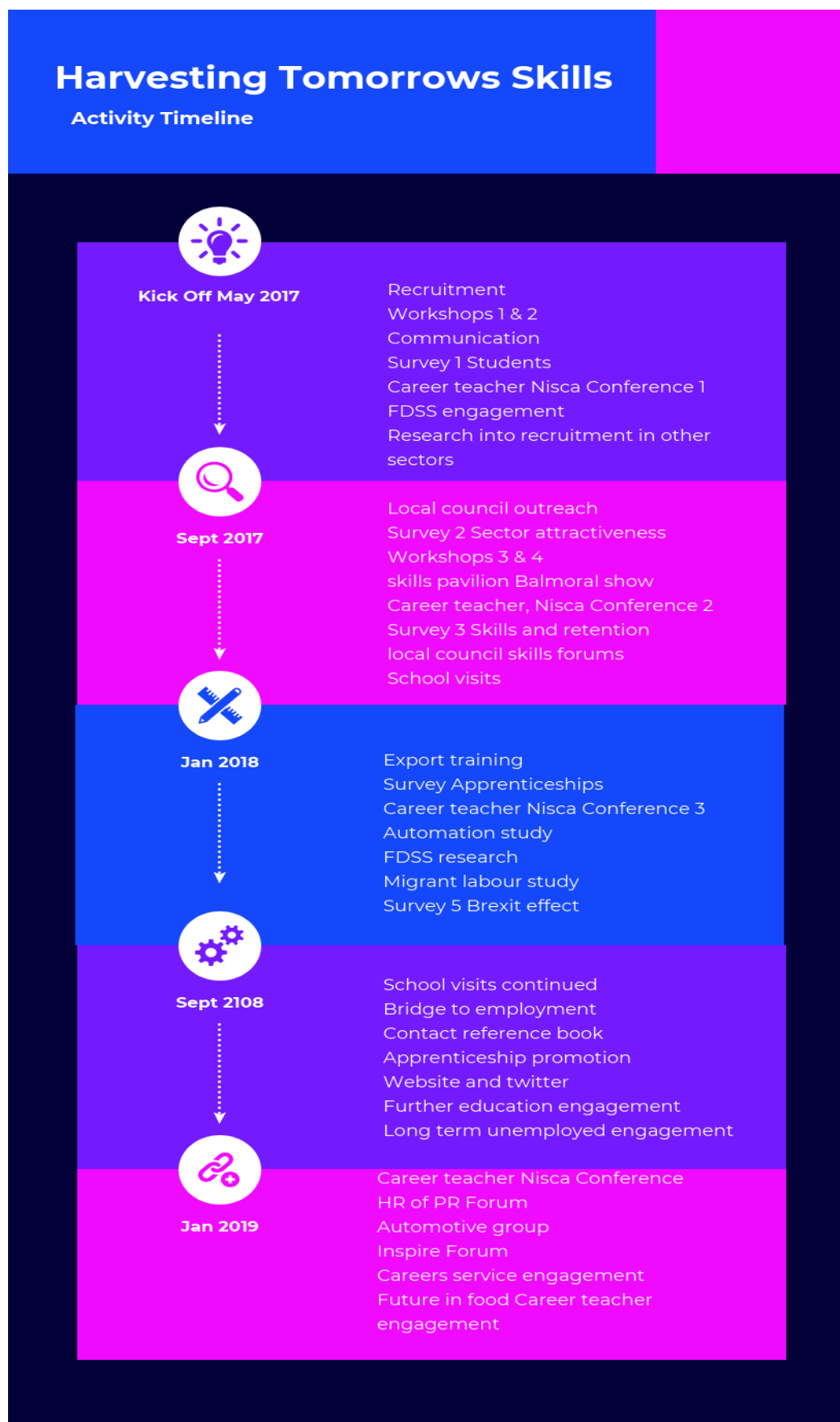


Figure 29. Project activity timeline

Focus on key phases of the project

Tasty Careers (2) - A key activity of the project was to promote and facilitate School visits and career attractiveness outreach. The network recognised that to ensure a strong talent pool they must dispel the myths and promote the benefits of the sector and the positive career opportunities it presents. Starting at school-age and extending to those already working in the sector who can be upskilled and retrained and therefore adding more value through career progression. Food and Drink sector skills was recruited to lead this aspect of the project by adopting the tasty careers process and using it as the basis of the school engagement activity.

Surveys - During the lifetime of the project HTS engaged with a wide range of companies and Stakeholders. Some of the feedback and research was captured in form of a survey carried out either directly face to face or online via Survey Monkey.



It was recognised they needed to create a greater understanding of how to sell the sector and all it has to offer. Pushing for greater promotion of the opportunities and strengths of the sector via the new media. Using a more engaging message and making the sector become the employer of choice will help the food and drink sector achieve its full potential.

HR Forums

A series of HR forums were organised to facilitate a more structured collaboration to better achieve the common goals. The topics and subject matter of the forums were designed to address problems and inform the Network of potential solutions that have been effectively achieved by working alone.

1. PR of HR Learning of the new ways to engage with potential employees
2. Inspire wellbeing Exploring ways to retain staff
3. Futures in Food – linking employers with School career teachers

The bespoke PR of HR event brought together a range of private and public sector experts from HR and marketing who provided the very latest advice and insights into staff recruitment and retention. The speakers included Andy Jarvis, Eximo Marketing, Jordan Buchanan, Economist, Ulster University and Sharron Russell Director for Work & Wellbeing in the Department for Communities.

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The discussions explored how to establish closer links within the region across the stakeholders. Which mechanisms could be adopted to share UpToDate information on the Job types available, the current or expected level of employment opportunities, rates of pay, and promotional material.

Pipeline development - on 29th May 2019 the HTS team ran the first ever 'Futures in Food' forum and held at CAFRE, Loughry Campus, Cookstown.

This collaborative event was in response to the high demand from the agri-food and drink industry to attract more school-leavers into food-related careers and close the existing the ever-widening 'skills gap'. 29 Agri-food and drink companies from range of food sectors across Northern Ireland attended the forum with the sole aim of building a pipeline of employees from the local higher education schools. Promoting the fact that Agri Food is ranked in the top three STEM industries for future careers and opportunities in Northern Ireland, the purpose of the afternoon was to give CEIAG teachers and key-influencers a valuable insight into Northern Ireland's agri-food and drink sector.

HTS working in partnership with NISCA, both CAFRE and NIFDA presented an opportunity to connect directly with the region's largest manufacturer with a view to offering support to the schools. The forum gave an insight into a diverse range of career paths with companies offering opportunities for school-leavers.

The key purpose was to facilitate 'face-to-face' conversations between teachers and agri-food industry representatives, and to give teachers an insight into sector specific career progression opportunities along with academic and apprenticeship options available for school-leavers.

The event was attended by over 200 career teachers and Career advisors.

Funds and resources

There was a budget of £169,400 provided by the regional government department Invest NI. The funding was from their **Collaborative Growth** (3) Programme which allowed for,

- Facilitation costs including, Consultant, meeting room, research and network support activities.
- Office costs
- Travel for research
- Marketing and communication

All of the funds were used in support of the network objectives and not to support normal company activity.

The network companies had to match fund 25% of the funding total. This was achieved through time allocated to the network by company employees. The rate payable for the employee was based on actual figures supplied by the network companies on salary payments. This was a very time-consuming process to manage, but it did have the benefit of ensuring there was engagement from across the industry.

Tools, Methods, strategies of Cooperation

Workshops provided an open forum where all of the issues faced by the sector could be openly discussed by companies working in the same sector and in many cases in direct competition with each other. The issues were the same and the solutions tried had also been the same. It was discussed how they would not only be in competition with each other but also with other sectors and for higher qualified employees the competition would also be with the market forces within Schools and the FE and HE colleges. Working in direct competition with each other to enrol pupils. This is as a result of financial necessity as each pupil is a source of income for the university. This

was recognised as an inherent part of the education system which, while noted, could not be influenced or challenged by the network.

HTS Outputs

- Creating a 3 level Hybrid approach – (1) Retraining, (2) Career promotion, and (3) Sector partnerships
- Strategic contact with Careers teachers
- Promotion of up-skilling training available within regions
- Investigation on how to better utilise online promotion and engagement
- Investigation the issues around economically inactive
- Increase the promotion of the sector within Schools

Online promotion

HTS sought to improve employment opportunities within the sector by creating an online presence through a webpage portal and the social network Twitter. This was directed at the new way potential employees research and find jobs. Research has found that 20% of employees saw their job advertised on their employer's website. An online presence would allow the sector make potential employees fully informed about the sectors they are interested in working in. What new opportunities might be on the horizon?

Online networking is the most accessible platform for engaging with larger groups. It was felt that actively engaging with potential contacts and sharing information would promote positive relationships and encourage people to be responsive when they are seeking help or information. By developing an online and social networking presence would enable access the professional community and give access to tools that would facilitate networking.

Contact booklet

As part of the process to inform and link both the regional education bodies and the Industry. It was decided to print a booklet with Information on the current training available within the local education system. Information on all courses available including, Food specific training, Up Skilling and apprenticeships. The booklet would also be divided into information on Further and Higher Education, Undergraduate, Postgraduate along with the Open University related courses.

Accessible information was seen as crucial in developing a pipeline of skilled employees from students to existing workers. The aim of the HTS booklet was to address and support three key objectives of the network:

1. Creating awareness of the network across the industry and the general public
2. Developing a pipeline and a flow of information between education and industry
3. Starting to build the pipeline infrastructure through which greater communication, education and collaboration could flow.

It was recognised that the outputs and impact of these actions would also include,

- Invaluable good quality printed handouts for disseminating information
- An HTS branded reference document
- The Provision of contemporary training contacts, with infographics including information
- Developing the image and recognition of Harvesting Tomorrows Skills as a stand-alone network
- Creating awareness of the support available
- Clarifies the myths from the facts about accessing training
- Selling the benefits of further education and upskilling

- Provides a brief synopsis of the further education options available

HTS Outputs



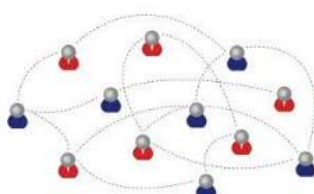
145 Collaborative Meetings

145 collaborative meetings and activities were carried out by the network. A regular series of engagement providing feedback, research, knowledge transfer and solutions.



78 Network members

The network continued to grow across the two period to include 78 members. Ranging from small micro businesses to large international companies.



248 Stakeholders

One of the key successes of the network was the reach that was built across industry, education and government developing a extensive network working together across a wide geographical area.



144 School visits

144 Schools and thousands of pupils benefited from direct presentations on the opportunities within the sector., Including face to face engagement at careers fairs.



8 Workshops

Workshops and Forums providing key discussions across a range of topics and a range of stakeholders. New ideas and the latest strategies were discussed to address the evolving issues.

Figure 30. HTS outputs

Research

Research was also commissioned into two key areas of concern.

1. Link between Schools and Industry

2. The process in making a career decision

This involved a major piece of research into careers decision making which culminated in the publication of a report into the issue. The research covered local and international activities and a review of the most relevant career decision making models and their recommendations. The result of the research was to confirm and highlight the need to engage on a strategic and regular basis with schools in educating the pupils on the careers available. The variety of the career choice and the sustainability of the sector to provide a lifelong job.

Milestones

- There was a total of 145 Collaborative meetings including:
- 6 Steering group meetings
- 36 Network meetings
- 28 Meetings with the Further Education colleges
- 25 Meetings with Local councils
- 23 Meetings with Career Stakeholders service providers
- 19 Meetings with Government departments
- 5 Workshops
- 3 HR forums
- 78 HR personnel departments directly engaged & Collaborating across the network
- 248 stakeholders within the network
- 144 School Visits including career days and in class presentations
- Training Route map publication produced
- Online Job promotion and collaboration
- Automation and robotics workshop
- Joint actions with FE colleges Inc Bridge to Employment - Financial Academy
- Sector feedback on, Apprenticeships, Migrant labour, Skills Gaps
- Identified, collated and disseminate information on the current training available for the food manufacturing and processing sector within NI
- Assisted in the delivery of placements for industry trainees and training to careers staff i.e. company careers people
- Created awareness and an understanding, by the education and careers advisory sector, of skills requirements and opportunities within the Agri-food sector
- Provided 144 School Career Visits during the two years.
- Provided feedback and submissions to Government education review
- Disseminate online information to recruitment companies and adult training providers and career changers

The network worked closely with the HR departments in both large and small companies. The universal issue facing them irrespective of size was insufficient time or personnel. This was the key barrier that impacted on the network. Arranging meetings or adopting activities would become problematic due to time constraints. HR department must provide a wide range of services to the company, training, discipline, induction and absence. The result being that recruitment and career promotion are not given enough time and resource to engage effectively and build the key pipeline relationships that are essential.

Success challenges and lessons

Successes

- A mechanism for Collaboration has been created
- Creating a new employee pipeline between the Industry HR departments and the Careers teachers. Facilitating face to face meetings and direct presentations by Industry ambassadors.

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- Coordination of the sector engagement with local councils, Schools and Career bodies
- Increasing visibility of the sector outside of normal recruitment channels
- Developing a bridge for the economically inactive to return to work in a phased process.
- Promoting and educating employers to Increase the wellbeing of staff. This was achieved through a series of workshops. At these workshops examples of good practices were studied and the impacts on performance and recruitment were measured.

Challenges / Limitations

Increased competition within the NI market, insufficient potential employees, and uncertainty by EU workers over the last two years have Increased pressure on general recruitment. This is in addition to the existing pressure from a reducing employee pipeline and the impact of that on the availability of skilled workers. Historically low levels of unemployment (2.9% currently) and a lack of engagement by the local population has resulted in the recruitment departments having to push harder to grow or even maintain the employee numbers.

- Time poor HR departments
- Increased pressure on general recruitment
- Increased competition within the NI market
- Insufficient potential employees
- Uncertainty around Brexit in relation to the future availability of EU workers and the law as it will relate to settled status
- Lack of engagement by the local population
- Competition with southern Ireland

Lessons learned

- The industry recognise that coordination is key to success
- Access to the support needs to be improved
- More effective communication of the assistance is required
- Only the larger companies have capacity to engage effectively
- Failure to effectively recruit is reducing output

Future cooperation

Maintain Collaboration

Maintaining and develop collaborative Strategies to mitigate against Skills and recruitment challenges that will result from any new political arrangements. Recognising the many components to the problem will require a coordinated approach if success is to be realised.

Outward collaboration will also be vital by coordinating sector engagement with local councils, Schools and Career bodies. The pipeline development that has been initiated between Schools, Careers & the Government Department for Communities needs to be maintained through live contemporary emails and direct contact. Greater interaction with the education sector namely the Further Education colleges who provide an employee pipelines and also further training and up skilling.

Promotion of support available

Promotion of the support available from Government and Further Education bodies needs to be improved, with more effective communication of the assistance available and how to access the support. Including a mechanism that recognises that only the larger companies have the capacity to engage effectively with the network and smaller companies need greater direct engagement and support to promote the Agri food sector as a career option. Providing ambassadors for school visits, online promotional campaigns, school career days and funded training opportunities.

Employee Pipeline

Building on the Futures in Food event by continuing to develop a pipeline between Education and Industry. Supplying information on current employment opportunities. The Future in Food and regular NISCA engagement shows the requirement for knowledge from Careers advisors on the needs of their local Industry. Career teachers can then advise on live employment opportunities in the areas of interest to the pupils. Creating an annual event with follow up and regular contacts to Improve and update Career stakeholders with advice and regular feedback up the supply chain.

New strategies

The Network must continue to challenge the thinking of the sector and provide feedback on potential new approaches to recruitment and staff retention.

New employee pipeline development by increasing visibility of the sector outside of normal recruitment channels is needed.

In addition to direct recruitment campaigns employers should engage with regional councils feeding into local actions being undertaken in support of Industry career promotion.

Another key goal is to explore a strategic engagement with the economically inactive. Looking at developing support for return to work or a Bridge to full employment programme for inactive and part time workers.

The Retention of employees is a key cost-effective way of maintaining staff levels. Reducing recruitment costs and employee down time. The HR forum ran by HTS in May 2019 set out the latest thinking on the “Increased wellbeing” and promotion on “strategies to retain” staff. Providing education and training on the new area of focus of staff retention.

In the new competitive employment market place, companies in the sector must become an “Employer of choice” through, better people management, career development, or by offering transport and flexible hours. Working to create an employee friendly environment and experience. Selling not just the job but the employer as a company people want to be employed by.

Driving apprenticeships, academies and investing in their workforce are important goals. Helping to provide the image of an employer who looks after their employee’s and thinks of them as a vital component of their business.

Sector marketing & engagement (online) is a key new route to the recruitment market. The HR of PR forum in Oct 2018 highlighted the need for business to use social media engagement as a vehicle to inform and engage with potential employees. Creating greater awareness of the company/sector as a significant local employer and the place to develop a career. It is no longer practical to use old media in a new media world.

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2.2.8 Reinova Project

In Preparation

3 Summary of key ideas, conclusions and recommendations

The current deliverable focused on understanding Healthy Food Innovation in the AA region, key types of cooperation used across regions, including specific trends, methods, policies, and practices that inform types of cooperation used. Each partner reported on a specific case where actors cooperated successfully, with a variety of different project goals, including specific healthy food innovations; addressing obesity through complex healthy eating and physical activity interventions; the protection of water resources and production and distribution of high quality food products; recruitment and capacity building for future healthy food innovators; and the delivery of innovation supports to small companies to foster competitiveness in the agrifood sector.

A consolidated analysis and synthesis of the cases identified a range of key project successes, challenges to cooperation, methods and strategies of cooperation, key learning experiences, and recommendations for moving forward.

Key Successes

A number of similarities can be seen in the key successes that were achieved across case studies. For example, many companies succeeded in developing and improving their product, expanding their services, and using collaborations to improve final outputs. In regards to product development, two companies were able to launch new healthy food products and one team was successful in developing an app that fosters healthy eating patterns. Teams also reported success with expanding their companies and the services provided. For instance, one company went from supplying a local farmer's market to supplying international retailers; another increased their visibility by developing a new communication pipeline between education and industry sectors; and an additional group found a way to connect public markets and local farms, which brought together the links in the food chain and improved sustainability. In relation to collaboration and coordination processes, teams were able to develop concepts quickly within very short timeframes; employ successful methodologies that improved service implementation for the companies; get fair remuneration for local producers and upgrade the local economy; and incorporate recommendations from lessons learned into a strategic framework to make long-term intervention sustainable.

Key Challenges

While some of the challenges that were outlined across cases studies and groups varied considerably, a common set of challenges focused on issues of collaboration, coordination, and communication. These included challenges with finding and securing the engagement of suitable collaborators. In addition to challenges in forming collaborations, coordinating activities with actors across multiple domains, tailoring approaches to best suit the needs across levels of collaborator competency, promoting effective communication between stakeholders, and disseminating results and successes and raising awareness of projects at a national level. Another key issue commonly identified in the broad field of healthy food innovation related to the challenge of recruiting the next generation of skilled workers and building and sustaining capacity in the sector. Reasons for this included increased pressure on general recruitment; insufficient potential employees; and time poor HR departments. The lack of initiatives and incentives available was also highlighted as being problematic and resulted in issues such as lack of engagement from the local population; challenges with building critical mass and cooperation in the network; and an inability to compete competitively with other regions recruitment policies. Also, engineering

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high levels of engagement and uptake are not always effectively planned for effectively in healthy food innovation projects, and meeting regulatory and legislative requirements were also highlighted among the case studies.

Tools, Methods, and Strategies of Cooperation

There were many similarities in the tools, methods and strategies of cooperation used across projects. For instance, networking and collaboration strategies were commonly used to advance goals, develop research agreements and business plans, and host idea generation and innovation workshops. Providing training opportunities was also a common way for SME's to embed tools, methods, and strategies for cooperation within their company. Some examples of this included companies providing support for training, upskilling and apprenticeships; organising campaigns at cross-national, national and regional levels to promote products; and raising awareness of training opportunities available in each region. Public outreach events were also frequently used as a method of raising awareness about products/services, gaining feedback from consumers for market validation purposes, and developing the image of the company. While the research methods employed across case studies were diverse and often varied due to the available resources and timeframe of the project, the focus on the potential consumer and target market remained constant. Similarly, while the skills of the workforces and the resources that companies had access to varied, there were similarities in the way that SME's advanced their knowledge base. It was common, for instance, for SME's to utilise existing supply chains and collaborate with a knowledge-provider to develop a profile of key requirements for product development.

Key Learning Experiences	Moving Forward
<p>Coordination with different experts is central to success but can be difficult due to the fact that collaborations with outside groups can result in long delays to a project's expected timeframe.</p>	<ul style="list-style-type: none"> ➤ <i>Consider issues that may arise due to collaborating with outside groups at the start of a project.</i> ➤ <i>Develop a formal plan that outlines difficulties that may occur (e.g. reaching expected milestones on time, lapses in communication, finance issues) and identify actions (e.g. factor extra time in to project timeframe, have a clear communication channel to ensure check-ins are adhered to, provide economic incentives to motivate stakeholders to work together) that could be put in place to address them.</i>

<p>It is necessary to obtain consumer feedback at the start of the project so that you can:</p> <ul style="list-style-type: none"> • Develop clarity about product suitability • Gain insight into what priorities and concerns need to be taken into consideration from the outset of product development • Learn how to effectively market your product 	<ul style="list-style-type: none"> ➤ <i>Be clear about the priorities and concerns of your potential consumers from the outset - don't make assumptions about what customers care about.</i> ➤ <i>Thoroughly validate your product through well-organised focus groups and open engagement with local community groups and businesses.</i> ➤ <i>Research, in advance, how to appropriately target your desired consumers. When marketing your product consider the intended audience and advertise via appropriate channels.</i>
<p>Increased awareness and understanding of the fact that micro and smaller companies have less time, competences and human resources available than larger organisations and that supports need to be adapted accordingly to support smaller companies.</p>	<ul style="list-style-type: none"> ➤ <i>Assess the level of supports and tools that will be required for each individual company in advance of a project as this will help the project progress more efficiently in the long run.</i>
<p>There is great benefit in questioning the ethos of a project at its inception; that is, whether the concept is intrinsically desirable or not.</p>	<ul style="list-style-type: none"> ➤ <i>Do background research on experts in the area and map out a structured route to engaging with them at the start of your project. Having access to a wide range of knowledge and expertise will bring additional knowledge into projects, maximise efficiency and focus of resources, and help innovation teams achieve more successful outcomes.</i>
<p>Working with companies in different sectors is key for the success of a project.</p>	<ul style="list-style-type: none"> ➤ <i>Create and maintain positive working relationships with collaborators in sectors outside of yours as this not only provides potential for 'focussed networking' in advance of opportunities for future cooperative projects but can provide reassurance to other stakeholders in the field that you will be a valuable contributor.</i>

4 Conclusions and Recommendations

European regions are striving to improve the competitiveness of regional industry by designing and implementing innovation cooperation policies and measures focused on sustaining population health. The current project focuses in particular on healthy food innovations and exchanging experiences and learning from each other on how to formulate better cooperative policies and practices supporting innovation. Innovation practices can vary across projects and regions and it has been noted that system fragmentation may reduce dynamic change capabilities that limits the optimal efficiency of innovation systems. In this context, it is important to align regional resources to work in joint strategic directions. Joint learning in relation to innovation policies and practices and specific methods supporting innovation cooperation add real value in the context of budgetary constraints where local and regional authorities are seeking best value for money. Highlighting specific cases where cooperation practices have proved successful is instructive and limits the risks and costs of trial and error in future innovation projects.

While the synthesis of key learning experiences and strategies for moving forward documented in deliverable are valuable, the transfer of good practices within and across regions is challenging, even if many projects share similar objectives. Factors that explain the difficulties encountered during the transfer, according to Heydebreck, Gabrielsson, and Dahlöf (2014)⁶⁴, include the absorption capacity of regional policymakers, insufficient policymaker involvement in the projects, and potential conflict between the innovativeness of a practice, its proven success, and transferability. They note how often it is the simpler and less innovative practices that are transferred between regions, whereas highly successful practices with proven impact will often develop in a specific context over a long period of time with an associated infrastructure and associated capability set that makes quick transfer less feasible. Adopting new innovation cooperation practices that are transferred from one case or region to another requires: a clear definition of the practice; capacity building for key stakeholders that are to be involved in the process; sufficient funding available and anticipation of key resource needs; commitment to the new practice across all partners in 4H cooperation; sufficient political stability in the overall 4H partner context and an adequately supportive regulatory situation supporting the new practice; advance analysis to ascertain if companies will welcome the new practice, and judgement as regards the fit between the new practice and the local habits and routines of companies and public bodies.

While inter-regional learning and cooperation is valuable, effective transfer involves deep understanding of the local context and an understanding of the region's characteristics, including both the barriers to the adoption of specific cooperation practices and the key 'enabling' conditions, in terms of stakeholder characteristics and capabilities and organisational arrangements. Flexibility of policies and flexibility on the part of the stakeholders are key enabling factors for successful policy implementation. Dynamic and flexible organisational arrangements and processes that facilitate the diffusion of knowledge throughout the learning system is essential for successful innovation. Networked mutual learning and close interaction are important, but in order to sustain dynamic flexibility and be sustainable without collapsing the capacity or overburdening the system, cooperative innovation systems need to possess substantial resources and critical mass and have well developed links with external systems from which they can access complementary know-how and competencies. It is evident from working with AHFES partners that capacity constraints are an issue across the system. This suggests

⁶⁴ Heydebreck, P. Gabrielsson, N., & Dahlöf, C.A. (2014). Innovation Systems. INTERREG IVC Analysis report, INNO.

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responses that work both to increase resources and critical mass and strategic efforts to focus on quality over quantity in the overall innovation ecosystem. Having said that, many innovations are destined to fail and thus a focus on quantity is also important to allow for requisite variety and requisite failure in the overall innovation learning system, as much learning comes through variety and failure in the innovation process.

Across the AA region, it is clear that national level policymakers are promoting innovation and investing in innovation. While innovation failures need to be embraced, policymakers need to be guided by impact and return on investment. However, the stance of policymakers cannot simply be one of investment and evaluation, they need to engage more directly in innovation testing and in system building measures. This is increasingly recognised and policymakers increasingly have more open and engaged workings with other 4H partners. At the same time, all 4H innovation partnerships and the associated political culture of cooperation for innovation is something that needs constant attention and effortful engagement within innovation regions. It can never be taken for granted that an open culture of engagement will be sustained. Regional level policymakers and innovation cluster leaders should adopt a mentoring role towards innovation system members. A broader vision focused on internationalisation and specialisation of regional innovation focus is also needed, along with an ongoing acknowledgment and updating of mental models in relation to the broader context and local issues influencing innovation.

Furthermore, research institutes and universities need to continue to embrace innovation in the healthy food sector, and interact with businesses and provide incentive mechanisms, including financial, intellectual, methodological, and practical supports for SMEs in their region. SMEs have a unique opportunity in the context of new networks of cooperative learning in the AA region. To leverage these opportunities, they need to both embrace and feedback to policy-makers and scientists, informing them clearly as regards their key needs and their understanding of consumer needs and perceived market opportunities. This will be central to WP5 in the current AHFES project. Policymakers, academics, and SMEs need to establish a positive and open culture of exchange and support, recognising one another's unique contributions. All partners need to feedback and communicate openly and welcome the challenges associated with successful innovation. In this context, no one partner can exclusively push their culture upon other partners; they must instead remain open to change and learn from one another.

The inclusion of citizens and consumers in the 4H partnership also implies that consumers are seen primarily as citizens and not consumers or customers. In this way, their needs are viewed as part of collective societal needs and in this way they can be included with good intentions and maximum creativity throughout design, evaluation, and implementation phases in innovation projects. Ultimately, all partners in the 4H innovation systems need to perceive themselves and co-actors and co-creators, and act as equals in the move to greater health and wellbeing and sustainability for all. In this way, the cooperation dynamic for the innovation of healthy food and lifestyles will flourish as part of a sustained hopeful, productive, vigorous culture of learning that seeks to advance greater societal well-being and prosperity. This, in turn, will make European companies more competitive, productive, and sustainable, thus improving the wellbeing of European citizens.