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*L'Europe s'engage
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structurels et d'investissement



Regional **research** **and innovation** strategy

Smart Specialisation Strategy (S3)

**Brittany
2021-2027**



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FOREWORD

Brittany, a land of explorers and innovation, has a thirst for knowledge. It has proved in the past that it was the crucible of major inventions that forged its fields of excellence, and it will continue to invent the world of tomorrow. With its wealth of human skills, working for economic development and the major transitions underway, Brittany has a horizon, the Breizh COP.

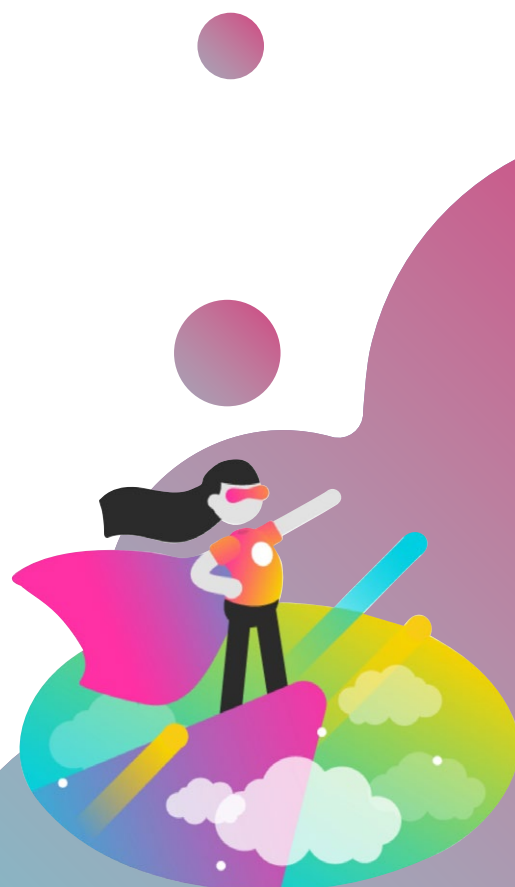
The S3 2021-2027 is a research and innovation strategy designed to confirm and highlight our assets and opportunities and to accompany Brittany's economic and social transformations, against the backdrop of post-Brexit European structuring and in the global context of the COVID-19 health crisis, the associated unprecedented economic crisis and the acceleration of social, digital and ecological transitions. The effects of these crises will indeed intersect with the effects of the structural changes underway, linked to the major transitions we are facing. Our immediate challenge will therefore be determining how to combine measures to face the emergency situation, which calls for support of activities, with the strengthening of action to facilitate the indispensable transitions, while including the imperative of solidarity. The aim is to design products/processes and services involved in major transitions without opposing high-tech and low-tech, because Brittany will need both. Finally, this crisis also calls into question our economic sovereignty and our capacity, at European, national and regional level, to produce the goods and services necessary for our daily lives. Brittany is playing and must continue to play its rightful role in contributing to the implementation of European policies and to a renewed European sovereignty, whether in the fields of food, digital technology, industry and energy or health.

The S3 2021-2027 is also a very operational strategy for organising a collective approach based on flexible and reconfigurable informal governance, aimed at bringing together players from training, research, innovation and economic development with shared roadmaps and a fluid and easily understandable structure of ecosystems for all. The cooperation of all for the benefit of the territory is an asset, particularly in the current period.

Brittany has strong ambitions. We aim to position ourselves in the first third of regions within the European Research and Innovation Area, to be identified throughout Europe as a natural partner region in our areas of excellence (sea, food, digital technology, etc.) and a leader in our cutting-edge segments (renewable marine energies, cybersecurity, photonics, etc.). The visibility and attractiveness of Brittany as a whole also depend on its strong positioning in terms of training, research and innovation.

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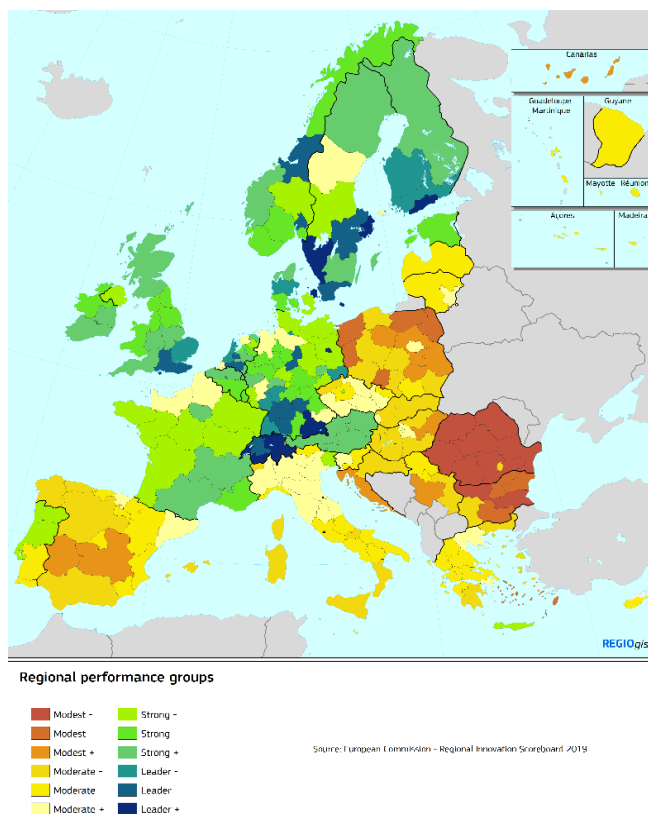
THE S3, A POWERFUL TRANSFORMATION TOOL FOR A SHARED REGIONAL AMBITION



1. THE S3, A POWERFUL TRANSFORMATION TOOL FOR A SHARED REGIONAL AMBITION

1.1 AN INNOVATIVE, EUROPEAN REGION IN CONTROL OF ITS OWN ECONOMIC FUTURE

Brittany's economy is nourished, enriched and increasingly driven by a high-value education, research and innovation system. Very early on, in the 1970s, with the aim of catching up on its historical shortfalls, Brittany banked on brainpower, higher education, research and innovation as key drivers of its future development. Brittany, more than many other regions, affirming this focus decade after decade, has invested in this ecosystem to make it an asset and a comparative advantage on a national and European scale. This approach has resulted in a commitment by private and public players that is sustainable, widespread and coherent. This historic undertaking has now been partly achieved.



With performance in line with the average for other French regions, and in the first third of European regions in terms of innovation (ranked “Strong” on the regional innovation scoreboard 2019), Brittany has more than made up for its development shortfalls. Its Higher Education Research and Innovation Ecosystem (ESRI) has won recognition for its excellence and has become part of the European landscape. Moreover, instead of just participating in the development of the Breton economy, it guides this development by opening up innovative perspectives.

However, faced with the challenges of global competitiveness, the ecological, economic and social transformations of the coming years, the profound changes our societies are undergoing, and the demands of a very exceptional economic situation, we observe with lucidity and determination just how far we still need to go in order to rise to the rank of “leader” regions. This encourages us to confirm the direction of our strategy of economic development, higher education, research and innovation and to strongly affirm our will to accelerate its implementation and deepen its deployment on our territory.

Our objectives, which reflect our strengths and weaknesses, are the following:

- Reinforcing our strengths and increasing our excellence by focusing our investment on highly leveraged priorities;
- Consolidating the visibility of our ecosystem, completing its full integration into the European landscape, strengthening its internationalisation, and positioning it as a recognised contributor to national and European performance;
- Strengthening the coherence and link between the development of research and innovation, economic development in companies and upskilling through training (initial, continuing, professional, etc.), in order to decompartmentalise worlds that all too often continue to ignore each other;
- Ensuring stronger economic enhancement of our research activity, in its fields of excellence, reinforcing innovation in our traditional sectors in order to anticipate the changes needed, and anticipating the emergence of new markets, in connection with new consumer behaviour, by relying on our know-how and skills;
- More than ever, making ESRI a driving force guiding and propelling economic development, by turning it into a tool for not only wealth creation but also economic and social transformation with a view to anticipating the necessary changes underway and guaranteeing the success of the transitions underway;
- Putting this strategy at the heart of the collective project for the sustainable development of the territory in order to boost its popularity; developing the pride of the actors, of the Bretons themselves in their ecosystem and its successes; and strengthening the attachment of our fellow citizens to intelligence, science and knowledge;
- Retaining equal opportunities as a cross-cutting objective of this S3 so as not to forget the social issue essential to sustainable development. Access to knowledge, the dissemination of scientific culture to all, and overcoming glass ceilings linked to gender, social or geographical origins are all challenges that we must take up.

1.1.a THE REGIONAL AMBITION

This strategy focused on the development of the ESRI is itself part of a shared vision of Brittany's future, its place in the world, what it can contribute to and expect from France and Europe, and its input with regard to current global challenges. Brittany has expressed and shared this ambition within the framework of the Breizh COP, in response to the three major challenges of climate and ecology, territorial balance and social cohesion.

Accordingly, the Breizh COP has retained three essential values:

- **Sobriety.** There is a need to focus on climate and biodiversity issues, promoting all production types and modes and any organisational structure that can reduce our carbon footprint and save resources, whatever they may be;
- **Proximity** means any production and any production type or system that promotes the objectives of sovereignty, reshoring of activities, closeness between areas of production and consumption, allowing ways of working and living that are better attuned to the geographical realities experienced by our fellow citizens;
- **Solidarity** means modes of organisation and production that promote social cohesion, social dialogue and the quality of employment in companies. The regional will to accelerate the transitions brought about by the Breizh COP must subsequently lead us to better align our public policies with the values and major principles that structure it.

The Breizh COP thus expresses Brittany's ambition to participate in sustainable development that situates the challenge of wealth creation and production within the complexity of environmental and social issues.

Far from opposing them, however, it turns these questions and the answers that will be provided to the challenges of the environment and social equity into the pillars of tomorrow's economic performance.

Accordingly, it places innovation and brainpower at the top of the list of priorities to be cultivated in Brittany, drawing on our fertile ground, our excellence and our taste for knowledge to provide the answers expected by society to the challenges that sometimes threaten it. As a result, higher education, research and innovation are no longer simply public policies among others; rather, they become major priority levers for building a better future, "a world to live in", to quote the slogan of the Breizh COP. The aim pursued by the Breizh COP also draws strength from its voluntarism and its positive, optimistic vision.

Far from adopting a "wait-and-see" attitude and expecting outside assistance, the Breizh COP is positioning Brittany as a contributor to the major challenges facing France and Europe:

- **A contributor to local responses to global challenges.** Not because Brittany alone has the solutions to questions that call for universal answers, but because it is convinced that nothing will be achieved without local investment and the commitment of local players.
- **A contributor to issues of European sovereignty,** which the recent COVID-19 crisis has only served to highlight. Through its Breizh COP and S3, Brittany and the players in its economy affirm their willingness to participate in the development and enhancement of sovereignty, particularly on a European scale, in several key areas in which they have major assets:
 - **Maritime:** In a context of keen geopolitical tensions in all coastal and marine areas, compounded by the Brexit challenge in the very short term, in a context where the sea appears to offer infinite possibilities in terms of innovation, but also taking into account the fragility of these environments and the major ecological challenges, Brittany, with its 2,700 km of coastline, has a great deal to offer in terms of maritime excellence, its own identity and its weight in the maritime economy. It intends to make its full contribution, within the framework of its sea and coast strategy, to the challenges of national and European maritime sovereignty, around fisheries and food production, marine biotechnologies, marine renewable energies, knowledge and observation of natural environments, and the development of the ships and maritime transport of the future.
 - **Food:** In a context of threats to international trade, reshoring, strong market tensions, health threats, natural disasters and tensions over water due to climate change, Brittany intends to make its full contribution to the challenge of food sovereignty, as part of its "Eating well for all" strategy. The aim is to speed up changes in our food production system in order to win back domestic markets and strengthen its ability to meet new consumer expectations, environmental challenges, quality requirements and the challenges of energy and protein autonomy.
 - **Energy:** In a context of accelerated global warming that threatens to escape human control, the obligation to reduce greenhouse gas emissions and develop new energy sources and new ways of managing resources, and given its specific nature as an energy peninsula, Brittany intends to contribute to meeting the national and European challenge of energy sovereignty. It plans to do so by drawing on its specific characteristics and excellence in the fields of marine energy, agriculture (through the role of biomass in particular) and digital technology, notably enabling new methods of smart management, based on its specific geographical features.
 - **Digital technology:** In view of the digital domain's repercussions for all areas of economic and social life and even its impact on collective and individual behaviour, Brittany, with its know-how and excellence, intends to do its part to take up the challenge of French and European digital sovereignty. This challenge enables us to face the threats linked to the uncontrolled development of digital technology, both on our personal lives and on the exercise of civil liberties, as well as the challenges of power, posed by the question of data possession and

management, as well as key technologies. Brittany intends to do so by drawing on its know-how in electronics, cybersecurity, photonics, image processing and networks.

- **Health industries:** At a time when Europe and France are going to redefine strategies in the field of health, at its level, Brittany, drawing on its expertise, can contribute to the production of health therapies or equipment, be it personal protective equipment (such as masks), new molecules for (bio)therapies (marine biotechnologies...), or innovative tools for the benefit of health for all (e-health, medical devices, etc.).

1.1.b THE S3, A MAJOR TOOL OF THIS REGIONAL AMBITION

More than a technical document, the new version of the S3 is a global strategic approach:

- The outcome of an extensive co-construction effort, it makes it possible to share a diagnosis, a vision, priorities and strategic orientations, and to make and implement choices;
- It gives this ambition all the necessary visibility to unite the players and enhance Brittany's influence on a national and European scale;
- It is a tool for decompartmentalisation, a framework for unitary action for economic development policies, support for ESRI and henceforth for training policies;
- It is a powerful tool for steering action on two levels. Steering in the sense of monitoring, which should make it possible to track funding, concentrate investment on the best leverage effects and strengthen the efficiency of our policies. Steering in the sense of strategic orientation, which should make it possible to accelerate the necessary transformations of the ecosystem and our economy;
- Finally, it is a uniting tool around which all the players must come together, driven by renewed, clear, efficient and participative governance. It will enable the coherence of the action to be articulated around strong and long-term orientations with the necessary flexibility allowing reactivity and due consideration of the real situation.

The Regional Council plays a key role in S3 implementation because of its competencies in the areas of business support, initial and continuing vocational training, etc. The Regional Council is responsible for the implementation of the programme. This work will be carried out as an extension of its Schéma régional de développement économique, d'innovation et d'internationalisation (SRDEII) (Regional Economic Development, Innovation and Internationalisation Scheme), of its contract for a regional plan for the development of vocational training and guidance (CPRDFOP) and in line with the commitments made under the Breizh COP, for which the Regional Council has, since 2020, given new directions within its own public policies, through six priority commitments:



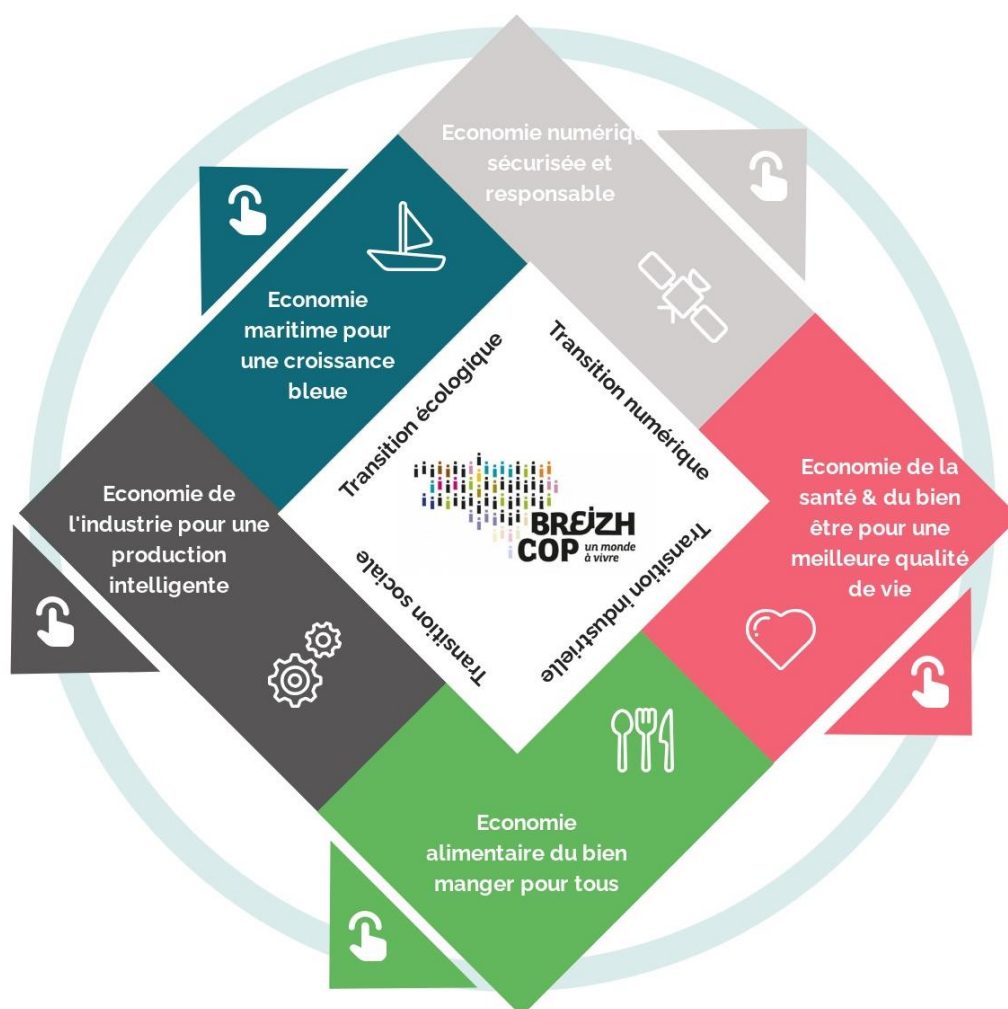
Following on from that of the Breizh COP, the participatory and collaborative process of constructing this S3 carried out throughout the year 2020¹ has made it possible to identify **a cross-cutting accompanying axis for economic transition, and five strategic innovation areas (SIAs):**

- **The maritime economy for blue growth;**
- **The food economy of eating well for all;**
- **The secure and responsible digital economy;**
- **The health and wellness economy for a better quality of life;**
- **The industry economy for smart production.**

The cross-cutting axis is designed to respond to the challenges of the transitions facing the economy:

- **Digital and industrial transition;**
- **Ecological and environmental transition;**
- **Social and civic transition.**

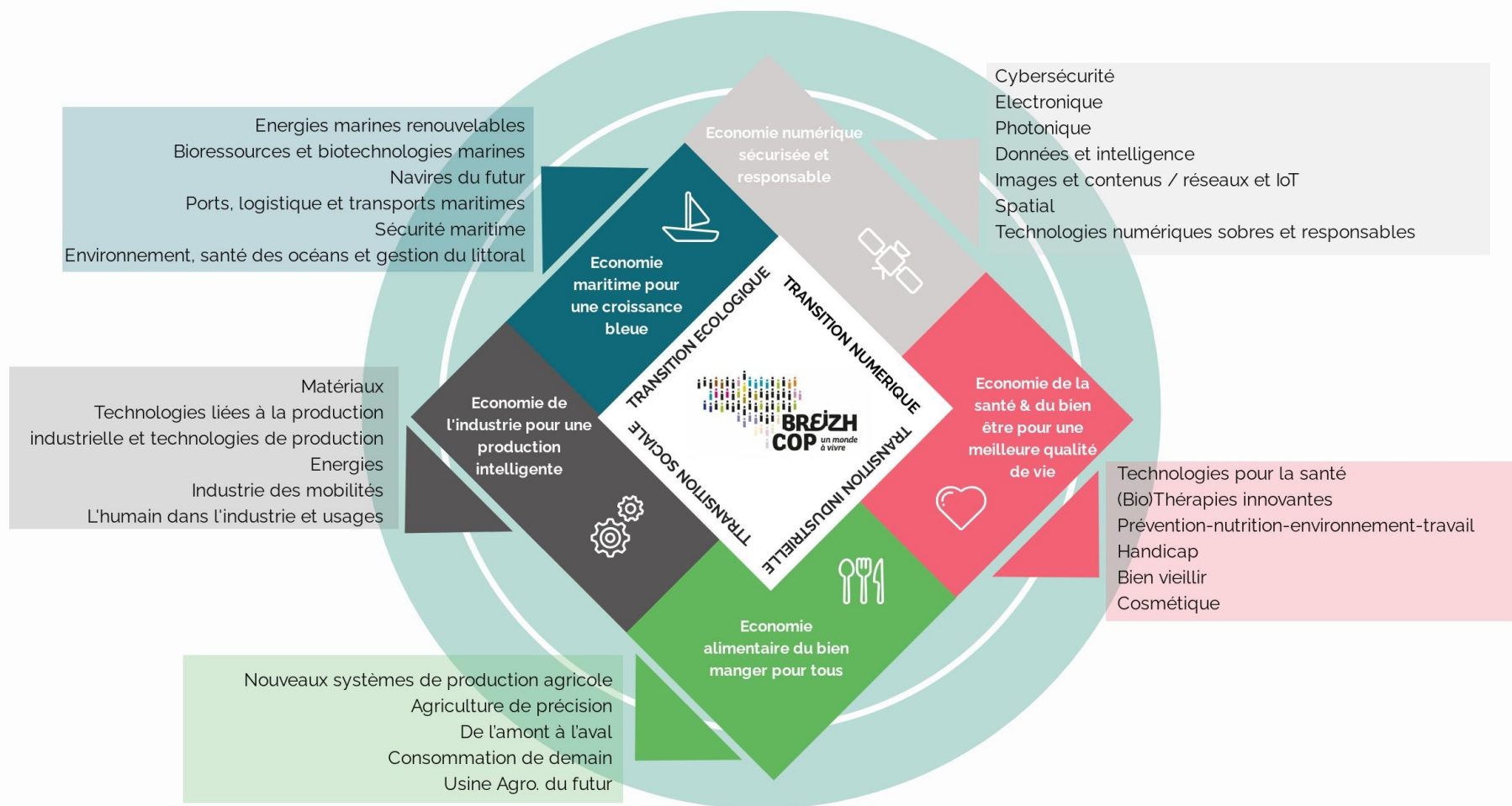
Stratégie de recherche et d'innovation bretonne (S3)



¹ The process of evaluating the S3 2014-2020 and overhauling the S3 2021-2027 is presented in Annex 3.

The overall vision of S3 2021-2027, in particular within each Strategic Innovation Domain (SID), specifies the thematic levers on which Brittany wishes to position itself in the European research and innovation area, eleven of which will be the subject of in-depth work by European inter-regional cooperation frameworks (see below).

Schéma de la stratégie de recherche et d'innovation bretonne (S3)



1.2 AN S3 IN SYNERGY WITH NATIONAL POLICIES

The good articulation between the regional strategy and the national strategic frameworks for innovation will ensure coherence between interventions at the three levels: regional, national and European. In addition to a convergence of resources on regional specialisation themes, it will make public policies more transparent for all stakeholders.

In this respect, the S3 takes into consideration

- MESRI policies and in particular the site policy, which aims to ensure that universities and schools implement, around the two main organisations (Ille et Vilaine & Côtes d'Armor on the one hand with UNIR, and Finistère & Morbihan on the other hand with AUB), a common policy of support for innovation, whether it concerns interactions with the private sector or entrepreneurship of researchers and students. This site policy articulates the need for a metropolitan polarisation with the challenges of networking of actors present throughout the site's territory;
- Priorities to support innovation, in particular PIAs (3 and 4), such as the 2025 Productive Pact or the "major challenges" of the national innovation council;
- More broadly, the priorities stemming from other public policies with an innovation component and resonating in the region's strategic innovation areas (agriculture, sea, ecological and social transition, etc.).

This necessary coherence of action at the various levels is rendered more essential by the context of the national recovery plan, which itself mobilises all the tools mentioned above. In particular, strong convergence exists between most of the key markets identified by the "Productive Pact" of the Ministry of the Economy, Finance and Recovery and the levers of this S3.



1.3 A RESOLUTELY EUROPEAN S3

Since 2014, smart specialisation strategies (S3s) are being developed in all European regions with the aim of strengthening the innovation capacities of the European Union.

Brittany is already positioned in the major European programmes, in particular Horizon 2020. More than 200 participations by companies/associations (for nearly €60M of European aid) and more than 250 participations by academic players (for more than €130M of European aid) are to be highlighted over the 2014-March 2020 period.

Breton actors contribute to the European project. They are part of the regional ecosystems on which the European Union must rely to meet societal challenges, respond to European needs, develop its industrial strategy and carry out in-depth transformations. By leveraging the momentum gained during the 2014-2020 period, Breton ecosystems will further deepen their European mobilisation. Some of them will be able to follow an excellence-based approach, while others will participate in the partnership dynamic of knowledge creation and innovative technologies. Collaborative work between regional ecosystems drives the dissemination of good practices and the pooling of skills and resources with a view to accelerating the achievement of European objectives. By working on subjects that are promising for the future or necessary for product development in the medium/long term, Breton stakeholders contribute to the economic resilience of the region and the European Union. By cultivating academic excellence, Brittany is part of long-term societal and economic development.

To amplify this dynamic, Brittany's S3 (2021-2027) will have a twofold objective to adapt as best possible to the potential of ecosystems:

- **Improving the recognition and presence of Brittany in European RDI programmes**, enabling Breton actors to become more European and thus consolidate their level of excellence. Inclusion in the European research and innovation landscape has become a must. Although the mobilisation of all European tools (Horizon Europe, Digital Europe, Green Deal) has become a prerequisite for the development of regional projects, Brittany is not waiting and intends to contribute resolutely to national and European objectives;
- **Increasing Brittany's attractiveness, influence and European visibility in the priority themes of the S3 through the structuring and strengthening of European interregional cooperation.** Attractiveness, visibility and the sharing of good practices require the consolidation and positioning of Brittany in European structuring partnerships. This entails forging long-term strategic links with other European territories in our priority areas, in support of cooperation tools (public-private partnerships, S3 platforms, CTE programmes, I3, etc.).

1.3.a A BRITTANY RECOGNISED IN THE EUROPEAN RDI SPACE

The participation of research units and companies in European Research, Development and Innovation (RDI) programmes constitutes a major challenge for Brittany. In addition to the additional credits obtained for research and innovation, these programmes enable Breton actors to cooperate with high-level European partners and better understand the specificities of companies and markets in Member States or neighbouring European countries, in an internationalisation approach.

Consistent with the national action plan in this area,² Brittany has set itself the goal of **improving the visibility, recognition and participation rate of Breton companies and research units within European funding programmes on S3 priorities** and wishes to achieve this via the following:

- **Raising awareness:** developing the culture of European projects via outreach and the participation of researchers from the public and private sectors in Brittany in project evaluation and in national and European discussion forums;
- **Enhancing** competencies: enhancing regional competencies with European added value and, conversely, enriching Breton ecosystems with the findings of European research;
- **Encouraging** actors in strategic innovation fields to participate in projects and dynamics on a European and international scale, and mobilising all available tools and sources of funding;
- **Assisting:** structuring a service offer at the regional level allowing mutual targeting, monitoring and support of companies with high innovation potential (“Europe Growth” approach) and reinforcing the support offer of the Breton academic community proposed by the 2PE by focusing in particular on building long-term support based on European programmes for training and research, the pooling of tools, communication, etc. to be carried out within the framework of the Noé Bretagne support network (see below);
- **Investing:** cooperating on investments and research infrastructures;
- **Opening up:** renewing and diversifying partners in European projects, including between European regions, in a post-Brexit context;
- **Contributing** to European challenges: participating in European value chains and the data economy, developing a strategic approach to European industrial ecosystems, and strengthening reflection on the supply of raw materials.

This regional dynamic is fully consistent with the **National Action Plan to improve French participation in European research and innovation funding schemes (PAPFE)**, in particular its second axis “Restructuring support at national, regional and local level”. The organisation in Brittany within the framework of the Noé Bretagne Network dovetails with two of the actions targeted by the PAPFE:

- Adapting the regional level of support, leveraging the good practices identified and introducing incentives;
- Ensuring the consistency and site appropriateness of the organisation of support based on proximity and pooling, facilitating public-private relations.

From an operational point of view, in 2018 Brittany refounded its network of regional partners supporting European research and innovation programmes, Noé Bretagne. This network brings together more than 30 structures working to develop and back European research and innovation projects in the public and private sectors, in an approach based on informal exchanges and skills. All of the region’s universities and research bodies, engineering schools, technology parks, competitiveness clusters, technical and technological centres, chambers of commerce and industry, etc. participate in the network, under the coordination of the Brittany Region (including the Brittany Europe Permanent Delegation).

² <https://www.enseignementsup-recherche.gouv.fr/cid152062/le-plan-d-action-national-d-amelioration-de-la-participation-francaise-aux-dispositifs-europeens-de-financement-de-la-recherche-et-de-l-innovation.html>

The objectives of the Noé Bretagne network are:



- Supporting the European development of research and innovation in Brittany, as part of S3 implementation;
- Optimising the impact and quality of the activities carried out by its members in terms of the development and support of European research and innovation projects in Brittany, through coordination and the exchange of good practices;
- Contributing to S3 follow-up through the observation of the dynamics in the different domains;
- Contributing to monitoring and reflections on future programming.

Led by the Brittany Region, Noé Bretagne is jointly run by the Platform for European Projects (2PE) - Brittany, a pooled regional structure that supports and promotes the participation of the Breton academic community in European framework programmes, and the regional innovation and economic development agency (Bretagne Développement Innovation). Noé Bretagne also relies on the Europe Enterprise Network (EEN), which specialises in providing information on European funding, regulations and support for partnerships between companies. Noé Bretagne and its members depend on each other's networks to serve Brittany's European ambition, as well as on the results of interregional cooperation projects.

In support of this ambition for greater European recognition and attractiveness, the Brittany Region is implementing the 2020-2025 BIENVENÜE project, a part of the MSCA-COFUND programme of Horizon 2020, which aims to host 75 international researchers and post-doctoral researchers in Brittany research units, in line with the axes of the S3. This project, built with the 2PE, will make it possible to attract high-level skills to Brittany that will be able to irrigate its ecosystem.

1.3.b A BRITTANY MOBILISED FOR INTER-REGIONAL EUROPEAN COOPERATION

At a time of global innovation challenges, interregional cooperation is of strategic interest to bring regional priorities to the European level and accelerate Brittany's positioning in core or emerging sectors. In this way, Brittany contributes to Europe's progress on subjects in which it has expertise, and the other European regions enrich it with their ideas. This win-win dynamic enables Europe to increase its economic, environmental and social clout on a global scale.

Initially, in view of the dynamics of interregional cooperation built up over the previous period, eleven thematic levers were identified within the Strategic Innovation Areas (SIAs) as priorities for deepening and increasing the positioning, attractiveness and visibility of Brittany in Europe, on the basis of this interregional cooperation, and for developing their ecosystem on a European scale: **bioresources and marine biotechnologies, marine renewable energies, ocean health environment and coastal management, energies, agro-food factory of the future, precision agriculture, space, cybersecurity, photonics, innovative (bio)therapies and health technologies.**

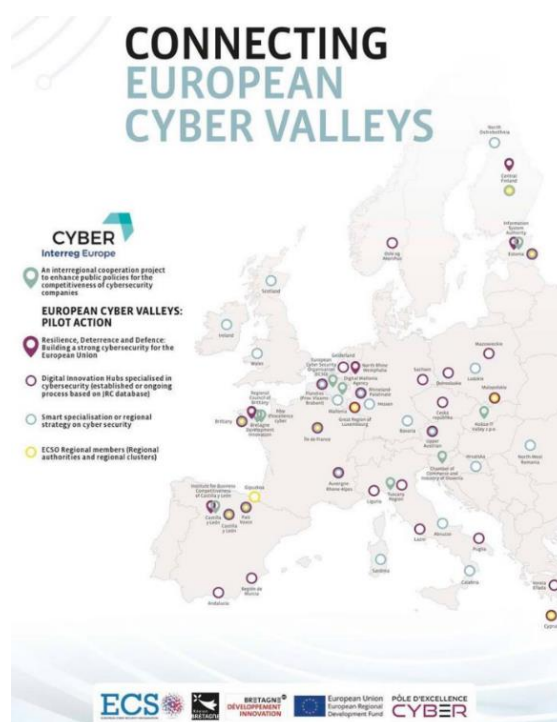
These specific thematic levers have been identified on the basis of a criteria grid, partly consolidated by the members of the Noé network. Accordingly, this tool spells out Brittany's presence within public-private partnerships, "S3 platforms", cooperation programmes, etc. and will make it possible to justify changes throughout the life of the strategy.

During the next programming period, the Region wishes to take advantage of this interregional cooperation to:

- **Deepen** relations with our European partners (Tuscany, Castile and Leon, Estonia, Wallonia, Bavaria, etc.);
- **Forge** ties between European regions and their innovation ecosystems;
- **Create** new complementarities between regions and real European value chains in the sectors of the future;
- **Increase** the innovative capacities of companies and hence regional exports in the medium term.

This approach of strengthening interregional cooperation is in line with future programming, such as the cluster dynamics of Horizon Europe or the implementation of the “Interregional Innovation Investment - I3” programme.

By way of example, the work carried out within the framework of the INTERREG Europe CYBER³ programme is a good example of the cross-fertilisation of competencies on a European scale, making it possible to link all the European regions involved in the structuring of cybersecurity, the “cyber valleys”:

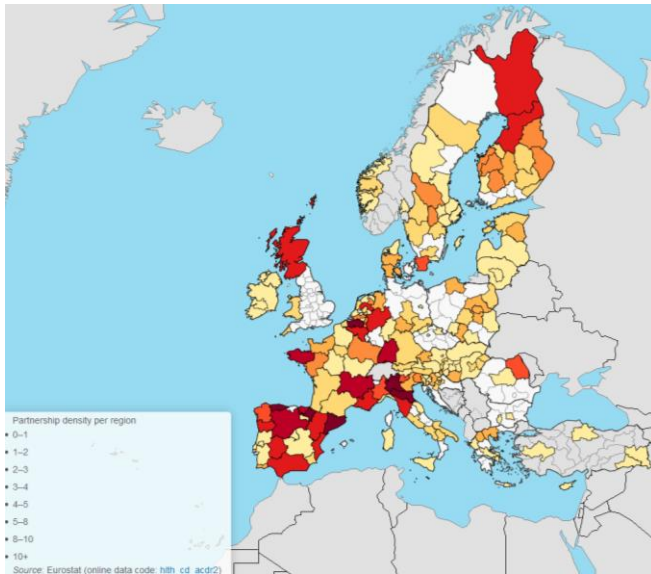


Brittany uses several channels to share its strategic priorities within the European bodies and with its future cooperation partners in other regions. The Brittany Europe Permanent Delegation to the European Union, which represents the interests of the regional territory in Brussels, will help to facilitate relations between Breton and European players, to inform them and to identify European funding and partnership opportunities. In a complementary fashion, the involvement of the Region and Breton actors in the various forms of networking (S3 platforms, public-private partnerships, networks of regions, universities, clusters, groups of experts, European federations, etc.) will contribute to the strategic European positioning of priority levers in the short and medium term. In order to enhance Brittany’s transparency and visibility, actions will be carried out within each lever: development of common European priorities, better sharing of information on these networks, and collective initiatives to raise the voice of Brittany and hear those of other regions for interregional cooperation in a win-win mode.

³ <https://www.oceancofund.eu/> ; <https://www.interregeurope.eu/cyber/>

BRETON INVOLVEMENT

Over the 2014-2020 period, Brittany has been proactive in this area. Thanks to the INTERREG programmes and the thematic platforms for European cooperation (“S3 platforms”), it has forged partnerships with European regions positioned on common strategic priorities (cybersecurity, new technologies for agriculture and agri-foodstuffs, health, renewable marine energies, smartgrids, etc.) to exchange good practices and carry out joint actions. In particular, it has chosen to invest in new financial instruments for European cooperation, including the ERANET facility built with European partner regions (Ocean Energy, ICT-AgriFood), which has made it possible to co-finance RDI projects conducted by Breton companies and laboratories in the fields of digital technology in the agri-food industry or renewable marine energy (RME).



Density of partnerships on European thematic platforms

Note: The darker the colour, the deeper the region's involvement with the thematic platforms.

Source: EU, S3 Platforms

To derive maximum benefit from European cooperation, a real continuum between innovation and the internationalisation of companies will also be sought. European cooperation should also help to increase regional export capacities, by improving knowledge of the partner regions' markets and offering opportunities to Breton companies. Actions will be undertaken to achieve these objectives, such as the cross-referencing of databases or joint participation in supporting the setting up of European projects by the companies concerned.

1.4 STRUCTURED, LIVING GOVERNANCE

More than a scheme or a document of intentions, the Breton S3 is intended to be an ambitious and operational approach to transforming our economy and accelerating transitions. The challenge requires widespread mobilisation and participation by all. The S3 is thus intended to be the strategy of all the players concerned, not just that of the Regional Council or of public players alone. Its success depends entirely on the broadest possible ownership, with everyone sharing its objectives and committing to its own responsibilities and resources. As such, the S3 is therefore a tool for collective mobilisation, steering and ensuring the coherence of actions. Accordingly, the relevance of its governance is a prerequisite, not a detail.

The proposed system is based on a few simple and robust principles:

- **Simplicity**, as the steering system must be understandable and economical in terms of both entities and mobilisation venues;
- **Pragmatism**, as the proposed system should live, constantly adapt and be reactive and opportunistic, while maintaining long-term orientations;
- **Accountability**, as the system should clearly define the role of each person and their responsibilities to the collective rather than their individual rights;
- **Transparency and participation**, as the system should allow everyone to be widely informed about orientations, decisions, their motivation and follow-up, as well as to express their point of view;
- **Commitment**, as the proposed system should encourage the commitment and mobilisation of everyone everywhere.

1.4.a GOVERNANCE BODIES

The Regional Council of Brittany assumes full political responsibility for the development, adoption, implementation and monitoring of the S3, both with the European Union and with each of the players involved. It does so in a spirit of partnership and co-construction with all actors in the ecosystem and relies in particular on the Regional Consultative Committee for Research and Technological Development (CCRRDT) as a forum for reflection and debate on these issues.

The Regional Consultative Committee for Research and Technological Development (CCRRDT) represents the “Agora” of the S3 and brings together not only players from higher education, research, innovation and training but also companies, local authorities active in the ESRI field, the CESER and employers’ and employees’ trade unions. It should be noted that the local authorities active in the ESRI field will be stakeholders in the S3 governance process, specifically in its technical and operational aspects, within the framework of the public services for business support (SPAÉ) or meetings of the Higher Education, Research and Innovation Group. In addition, CREFOP, which is responsible for training, is also consulted regularly throughout the entire period.

A consultative body, the CCRRDT is involved in the processes of implementation, decision-making and monitoring of the S3 by the steering committee. In particular, it is informed and called upon to give an opinion on the entire S3 implementation process. It may also submit proposals to the steering committee or question it on any difficulties that may arise. It meets once or twice a year.

The S3 steering committee (COPIL) for the “executive” direction of the S3 is carried out by a restricted body of around fifteen members. It ensures the steering and regular monitoring of the implementation of the strategy, organises the widest possible mobilisation of stakeholders, ensures the smooth running of governance, leads the community of stakeholders, and proposes the necessary adaptations to the strategy. The COPIL meets at least twice a year. Under the authority of the President of the Region, it is co-chaired by

the Regional Council's Vice-Presidents for Higher Education/Research and for the Economy/Innovation, and involves the regional government departments (Regional Delegation for Research and Technology-DRRT / Secretary General for Regional Affairs-SGAR). Its secretariat is provided by the services of the Region. The COFIL brings together representatives of research, innovation and the Breton economy: three representatives appointed from among higher education and research players in Brittany (one from each AUB and UNIR site as well as the MSHB), two representatives of innovation players in Brittany (the President of the seven Technopoles, the President representing the Competitiveness Clusters, etc.) and two representatives of Breton industrial sectors. Brittany Développement Innovation (BDI) and the Platform for European Projects (2PE), which provide the tools for observation and coordination, particularly at European level, will be associated with this COFIL.

The COFIL is also mandated in particular to guide and monitor the implementation of strategic objective 1 "A smarter Europe" of the ERDF/ESF+ 2021-2027 operational programme, and is informed of the implementation of the ESRI strand of the CPER 2021-2027, in order to ensure that they are fully consistent with the S3.

1.4.b THE SECTORAL R&I COLLECTIVES

Each of the five Strategic Innovation Areas is organised around an SIA research and innovation collective, led by the Region. The domain's R&I collective makes it possible to consolidate, update and share the S3 roadmap, coordinate the actors of the ecosystem around its objectives, and adjust the priorities of coordination, structuring projects, etc. Thus, five research and innovation collectives (linked to each SIA), are coordinated by SIA referents in the Region. At least once a year, they bring together ecosystem stakeholders in order to share the results of the past year and the prospects for the coming year with regard to the challenges, strategic objectives and action plans defined and the financial resources mobilised (regional, national and European).

Each thematic lever is facilitated by a referent of the ecosystem tasked with mobilising all actors in the field. The lever facilitators promote a participative and constructive dynamic, are responsible for monitoring the work using specific tools,⁴ and guarantee the proper feedback of information with a view to reporting on the elements to the collective in the field. These thematic lever facilitators report on the shared nature of the objectives and action plans.

An R&I collective serving transition: the actors of the cross-cutting axis (digital and industrial transition, ecological and environmental transition and social and civic transition) also meet at least once a year to share the review of actions, update priorities and assess developments, in particular the levers identified (digitalisation of the economy, circular economy and adaptation to climate change, social innovation). This also entails ensuring a link with the SIA collectives, in order to measure ownership of the Breizh COP orientations within each sectoral collective. The collective is made up of benchmark organisations in the field of transitions and cross-cutting actors also present in the SIAs to ensure the proper dissemination of transitions within the fields. Lead facilitators from all the collectives collaborate and share assessments and perspectives. Each of the themes of the cross-cutting axis is coordinated by referents from the Regional Council, in conjunction with partners like Brittany Développement Innovation (BDI), the CCI innovation network, or the House of Human Sciences in Brittany (MSHB) for social innovation.

⁴ See Part 4.3

1.4.c CONTINUOUS DEVELOPMENT METHODS FOR AN “AGILE” S3

For the operational implementation of the S3 over the period 2021-2027, the choice of priorities defined in 2020 must be open to constant re-examination. The Regional Council and the partners of the S3 will thus be able to adjust in particular the thematic levers within the strategic areas of innovation, according to the evolution of the “differentiating” assets of the Breton economic sectors and the profound changes that the economy will undergo over this period. It is important to remain attentive to markets and economic, societal, environmental, technological and regulatory challenges in order to consolidate the competitiveness of certain emerging sectors of activity, support the dynamics of diversification or contribute to the emergence of new niches of activity. As the operational implementation of the strategy and its monitoring/evaluation system must allow for a continuous vision, the steering committee (COFIL), the operational body supervising the strategy, will be able to propose changes to the S3. It will do so on the basis of feedback from the monitoring/evaluation system, elements produced by the research, innovation and economic development ecosystems, and questions or proposals from the CCRRDT.

The criteria for introducing new levers will be specified within the framework of the governance bodies, but a thematic lever must at the very least present a Strengths/Weaknesses/Opportunities/Threats (SWOT) matrix, a structured research and innovation ecosystem, and the ability to structure actions in a regional and collective framework. In the same way, the precise criteria will have to be validated by governance, but a lever of interest for interregional cooperation at European level may be added to or removed from the S3 depending on the measured dynamics of European cooperation programmes in research and innovation and the changing priorities of each lever. Research and innovation partners, but also Breton local authorities, may propose to incorporate a cooperation lever according to changes in competencies and public policies and the cooperation likely to drive them (such as port competencies, for example).

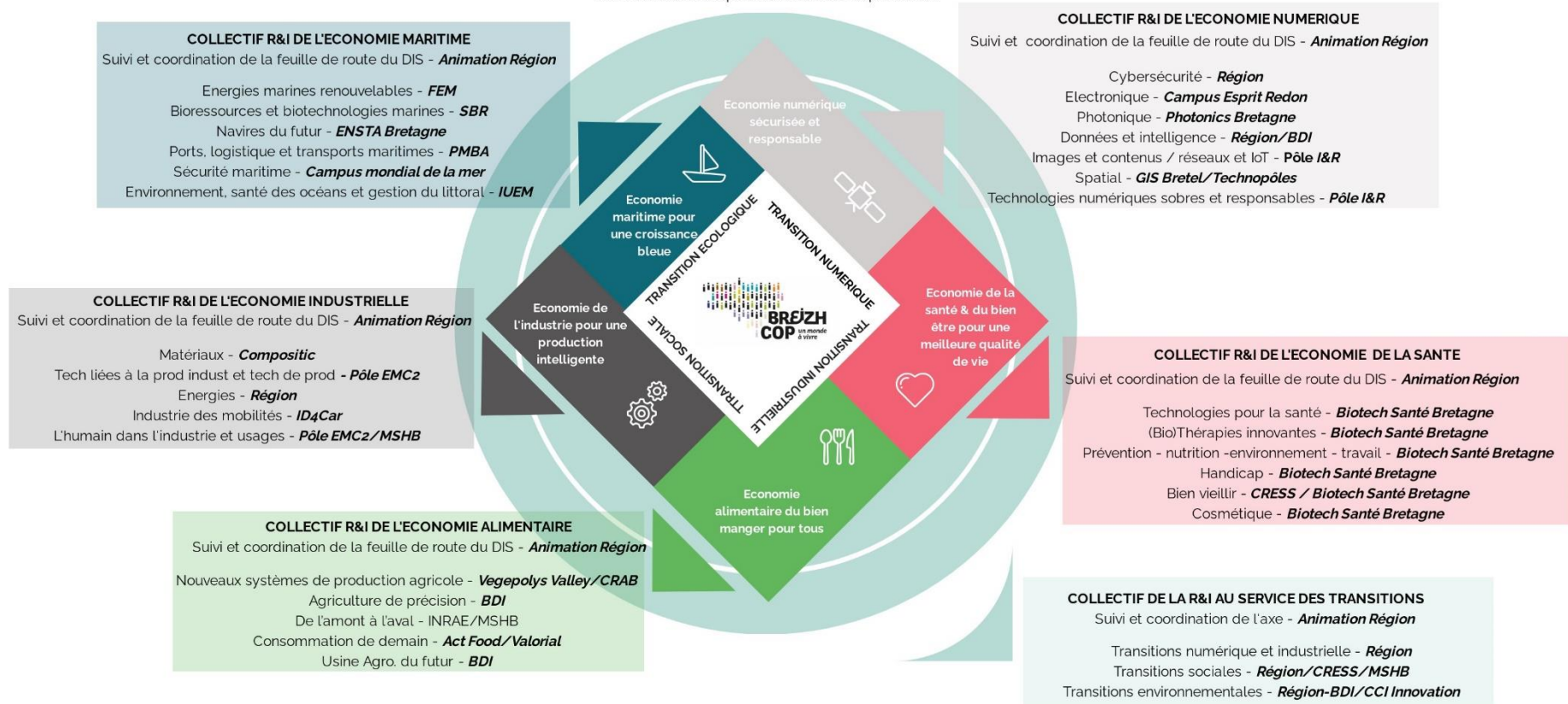
In fact, thematic levers that are neither coordinated nor monitored, or that are simply not the subject of shared action plans will be removed from the S3 structure.

Moreover, if a governance scheme is established to identify the organisation and referents of each lever called to facilitate the working groups, it should be stated that this scheme does not aim to freeze structures “in charge of”, but rather to identify leadership skills. This governance and facilitation scheme will therefore be re-examined throughout the implementation of the strategy.

SCHEMA DE GOUVERNANCE DE LA STRATEGIE REGIONALE DE R&I (S3)

CONSEIL REGIONAL DE BRETAGNE

Décide de la stratégie et vote les évolutions après la mobilisation des acteurs et consultation du CCRDRT
COPIL : instance opérationnelle de supervision



Pour chaque levier thématique, les animateurs identifiés sont responsables et comptables de la dynamique collective et opérationnelle du levier

Sont informés et donnent leur avis sur l'ensemble de la S3 1 à 2 fois par an

Comité consultatif régional pour la recherche et le développement technologique

2.

RESPONDING TO TRANSITION CHALLENGES WITH A CROSSCUTTING R&I APPROACH



2. RESPONDING TO TRANSITION CHALLENGES WITH A CROSS-CUTTING R&I APPROACH

The COVID-19 health crisis has confirmed the urgent need to transform our economy, organisations and production systems and many of our collective and individual behaviours. Echoing the CESER Brittany report “(Re)faire société” ((Re)making society) (March 2019), it has only confirmed this since the digital, ecological and energy transitions were already taking place and awareness of the changes underway or the challenges ahead had already been raised. However, the crisis has at times significantly advanced these transitions - the digital revolution comes to mind in particular - and has also made this necessity an urgent imperative that the S3 must fully integrate.

Although the urgency is clear, the complexity of each of the transition issues is no less great. Their primary characteristic is their cross-cutting and systemic dimension. As a result, their deployment does not lend itself solely to sectoral logics or to public policies implemented according to traditional frameworks. They call for innovative, cross-cutting responses, based on a global vision of the issues and on responses that integrate their complexity. This cross-cutting axis proposes a specific interpretation and dynamic for these subjects of transformation, which is articulated, in a matrix mode, with the thematic SIAs that have also been selected and coordinated.

As an extension of the Breizh COP, the S3 has three objectives in this cross-cutting axis:

- **Digital and industrial transition;**
- **Energy and ecological transition;**
- **Social and civic transition.**

The aim is to support the processes of research and innovation for the emergence of new activities and technologies, making it possible to promote a sober, local and solidarity-based economy.

Brittany has assets to accompany these transitions:

- A laboratory of sober development with its contribution to the food independence of France and Europe, while accelerating the development of high environmental quality production methods; its contribution to strengthening France’s maritime dimension and to the sustainable management of coastal and ocean resources; its contribution to developing solutions for France and Europe for a sustainable digital revolution based in particular on its digital expertise in cybersecurity;
- A laboratory for proximity development, with organisational methods that place their trust in the territories, in their capacity to develop their specific vocations and build innovative development models, promoting spaces for daily life, interdependence and solidarity and enabling everyone to live where they want;
- Finally, a laboratory for solidarity and social cohesion, because Brittany is a “world to live in” as expressed by the Breizh COP, a territory where a human community lives, sharing values, history, culture and a common destiny, with an ongoing concern to ensure equal opportunities.

The S3 is therefore based on this dual input, through this cross-cutting approach to the challenges of transitions and the vertical approaches of the Strategic Innovation Areas. If these two inputs can be addressed independently, the success of the exercise will depend on constant crossovers between these thematic vertical approaches and the cross-cutting challenges of the transformations. The aim will be to ensure that the full range of transition-related issues are appropriately addressed in the implementation of thematic SIAs and, conversely, to measure the extent to which the implementation of SIA objectives contributes to progress on cross-cutting transition objectives. The human and social sciences are called upon to play a key role in mobilising this cross-cutting axis. In turn, the implementation of this cross-cutting axis will require the implementation of actions and projects that meet one or more of the objectives of the digital, industrial, ecological, energy, social and civic transitions. These different projects may be based on generic tools or systems or more specific approaches.

2.1 DIGITAL AND INDUSTRIAL TRANSITION

The effects of the digital revolution are major, global, and of a power and speed that we do not yet fully measure. It impacts the entire economy through technological, social, organisational and legal innovations. Digital technology is transforming the daily lives and habits of users, creating new needs and new opportunities for growth, and new ways of organising that provide effective responses to old issues. Brittany’s ambition is to promote the digital transition of its economy in order to leverage the promises it brings and the changes it enables while protecting itself from the risks and far-reaching deconstruction it may cause. The digital economy crosses value chains to strengthen the positioning and performance of companies. All sectors are concerned without exception - agriculture, health, industry, etc. - and the digital economy is a key factor in this process. Robotisation, automation and digitalisation have become essential to industrial performance and help boost competitiveness in markets where competition is keen. In turn, this competitiveness and capacity to create value generate direct and indirect benefits in terms of jobs for the territories.

Strategic objective 1	Organising and supporting the digitalisation of socio-economic players, in particular the dissemination and adaptation of digital technologies in companies.
Strategic objective 2	Incorporating dimensions of ethics, respect for individual liberties and ecological responsibility into digitalisation projects
Strategic objective 3	Accompanying the changes in Breton industry, in particular for organisational, digital and energy aspects

2.1.a FOR DIGITAL INNOVATION SERVING ECONOMIC TRANSFORMATION

Brittany needs investment in the development of technologies, particularly in digital R&D and the strengthening of the digital industrial fabric.⁵ It is also a question of investing in the dissemination of these technologies, by promoting their adaptation and use in all areas of strategic innovation and, more generally, in the economy as a whole. This adaptation and dissemination of digital technologies everywhere and for everyone can be supported by the digital ecosystems represented by the technopoles/French Tech and the networks of third parties (canteens, fablabs, etc.).

Beyond the challenges of research/innovation, and as underscored by the CESER in its report “Digital and companies in Brittany, urgency and opportunities”, there is a more general need to draw up a plan for accelerating the digitalisation of the economy and supporting the digital transition of companies. These orientations, reinforced by the lessons of the 2020 crisis, will be supported, taking into account challenges linked to the modernisation of local production facilities, the transformation of value chains and the emergence of new economic models inspired by digital platforms, and the upskilling of companies and their employees. To accompany this digitalisation of the economy and the transition of economic players, it will be necessary to include actions to promote digital professions and jobs in the regional “Employment-Skills-Training-Oriented” performance contracts and assess the skills and expertise, job outlooks and the value chains of organisations. Finally, projects for the development and transformation of activities (agriculture, commerce, industry, training, etc.) will have to systematically incorporate this digital transition dynamic by taking into account issues relating to acceptability and uses.

Among the tools for disseminating digital innovations to sectors, the Region has designed a system for innovative digital SMEs, based on the technopoles/French Tech, which should be continued and amplified, in order to experiment with uses, measure them, and accelerate the development of Breton innovations.

EXPERIMENTING WITH DIGITAL INNOVATIONS

Digital technology is no longer just an economic sector but is at the crossroads of all branches. To encourage the collaboration of Breton digital SMEs with other sectors, the Brittany Region has launched a call for projects “experimenting with digital innovations” (1 to 2 editions per year). It relies on the Breton science and technology parks to help applicants set up their projects.

Objective: helping a Breton digital SME to adapt its innovative solution to a new market or launch it on the market for the first time. Innovative digital products and services will have to be tested in one or more priority branches identified in the regional economic development strategy.

To implement its strategy, Brittany must rely on an ecosystem to support the digital transition that is built, visible and transparent for the economy. In support of European (Digital Europe) and national policies, the Region is involved in the creation of a European Digital Innovation Hub (E-DIH), drawing on its engineering strengths (Images & Networks cluster, Brittany Development Innovation, INRIA, IRT b<>com, Cyber centre of excellence, Technopoles, CCI Innovation network, etc.). These European Digital Innovation Poles will be able

⁵ See Strategic innovation area “The secure, responsible digital economy”

to play a central role in stimulating the large-scale adoption of cybersecurity, artificial intelligence and high-performance computing, as well as other digital technologies for industry or public sector organisations.

TOWARDS AN ECOSYSTEM-BASED SUPPORT STRUCTURE FOR THE DIGITALISATION OF SOCIO-ECONOMIC ACTORS: THE BRITTANY DIH

The Digital Innovation Hubs (DIHs) will be included in the “Digital Europe” programme proposed by the European Commission, which aims to invest in the growing digital challenges by representing them in the territories. The DIHs are intended to be organised as “one-stop-shops” to help businesses respond dynamically to these challenges and become more competitive on a territorial scale with a European influence. By providing access to technical expertise and experimentation as well as the possibility to “test before investing”, the DIHs help companies to improve their business / production processes, products or services by using digital technologies. They further provide innovation services, such as advice on financing, training and the development of skills needed for a successful digital transformation. Environmental issues are also taken into account, such as energy consumption and low carbon emissions. As a result, the DIHs will be local tools with a reach beyond their borders. In line with Brittany’s objectives, and as recommended by the CESER (in its report entitled “Digital technology and enterprises in Brittany: Urgent needs and opportunities”), the DIHs aim to better organise support and thus facilitate this digital transition, which represents a key factor in economic development.

The “DIH Brittany” project is intended to:

- Support initiatives that develop training in digital professions and for the digital transition of companies at all levels of education;
- Develop the digital expertise of companies and public services;
- Enhance the creation of digital applications and services and the associated competitive business models;
- Promote European cooperation between digital competence hubs in order to develop and interconnect the various digital competences and thus spread Breton digital know-how in Europe;
- Facilitate the transfer of expertise between regions, in particular by networking SMEs.

2.1.b TOWARDS ETHICAL, RESPONSIBLE AND COMMITTED DIGITALISATION

While the Brittany Region supports the digitalisation of businesses to encourage the creation of activity and jobs in the region, it intends to promote a responsible, open and transparent digital environment that respects the principles of public life and individual freedoms and is capable of providing answers to today’s major social, societal, economic and environmental challenges. Indeed, the digitalisation of the economy is not without risks: respect for privacy and fundamental freedoms, system security, data transparency and environmental protection are all issues that economic players must address. It is important to determine whether the digital technology being promoted is likely to respond to current changes and transitions or

whether, on the contrary, it will aggravate them. While the digital revolution offers immense opportunities, it must be coordinated as well as possible with other transitions, in particular the ecological transition: digital technology is both a lever to encourage transition and a tool whose energy footprint must be controlled (see the “Sober and responsible digital technologies” lever) by aiming to meet the “right need” and the development of low tech.

The Brittany Region thus intends to promote digital technology that can provide answers to today’s major social, societal, economic and environmental problems. The aim is to encourage digital technology that is more ethical, respectful of individual freedoms and ecologically responsible, i.e. a model that is economical in terms of energy and rare earths, facilitating ecological transition rather than increasing emissions and depleting resources.

THE “RESPONSIBLE DIGITAL” LABEL

The “Responsible Digital” label enables the adoption of a regional digital development policy capable of prescribing, in its innovation programmes and projects, in its response regulations, objectives in terms of ecological impact and of encouraging dissemination in digital service incubators, and first and foremost within the Ti kub,⁶ of reference systems for evaluating innovations with an ecological impact by financing training programmes for these tools. This label also makes it possible to unite public agents around the reduction of the environmental impact of digital technology and thus help to give meaning to their profession and involvement in responsible projects.

DIGITAL ETHICS LABORATORY PROJECT

The emergence of a transdisciplinary digital ethics laboratory over the period 2021-2027 in connection with research and innovation ecosystems will aim to address digital ethics issues in a forward-looking manner. The goal is to anticipate the challenges of the society of tomorrow and provide tools for the operational implementation of the Breizh COP roadmaps (energy transition, territorial transformation, environmental responsibility, etc.).

2.1.c FOR AN AGILE, RESPONSIBLE AND ATTRACTIVE BRETON INDUSTRY

Brittany’s primary ambition for the regional economic development strategy for the 2014-2020 period was its industrial and productive vocation. Brittany’s vocation is to reaffirm this productive and industrial role, all the more so in the context of the COVID-19 crisis. This period will require, on the one hand, maintaining production and the associated jobs, and on the other hand, seizing opportunities to (re)shore in Brittany industrial activities that are essential to the European economy. In this context and that of major social, digital and ecological transitions, the adaptation challenges for Breton industry are numerous.

Innovation will be needed to accompany the necessary changes in Brittany’s industrial sectors. In this respect, the Region will be able to rely on a European and national dynamic of industrial renewal and on its own forces, mobilised within the Strategic Innovation Domain “Industry Economy for Smart Production”, and

⁶ Digital services incubator, opened by the Region

more broadly with all the regional industrial players. In particular, the regional collective Breizh Fab and its 2020-2022 action plan, which is part of the 10,000-accompaniment Future Investment Programme, will play an essential role in ensuring a successful industrial transition in Brittany, in terms of organisation, digital technology, energy and other aspects.

BREIZH FAB

Brittany's economic development partners (State, Region, industrialists) have affirmed their common desire to support its historical industrial fabric through the "Breton Industrial Plan 2020" signed in March 2018 and the territorial approach entitled "Breizh Fab". A veritable accelerator for Breton industry, the Breizh Fab dynamic is reflected in a set of measures designed to help Breton industrial companies catch up with the technological, organisational and environmental changes underway and take up the challenge of modernisation and innovation. This territorial approach should enable them to take this step to become stronger and more competitive collectively. In particular, the challenges of the Industry of the Future enable support for companies' efforts to modernise, integrate digital technology and boost production.



With the backing of ERDF funds, the calls for projects 2020 Industry of the Future "SMEs & ETI innovation" on the one hand, and "Process and digitalisation of industry" on the other hand, are positioned more particularly on the issues of industrial transition 4.0 against the backdrop of the 2018 launch of the regional collective action Breizh Fab. The challenges "Reshoring the economy: Internalising or subcontracting" and "Making my approach sustainable and responsible" were added in 2020.

Moreover, industrial transition will require the renewal and adaptation of skills within companies. The integration of innovation issues into initial, continuing and vocational training will be a decisive factor in Brittany's ability to guarantee the attractiveness of professions, the adaptation of skills and new uses for an agile, responsible and attractive Breton industry, both today and tomorrow.

2.2 ENERGY AND ECOLOGICAL TRANSITION

Committing the regional territory via a positive resilience-based approach to living in the context of adapting to climate change and optimising natural, food and energy resources offer real opportunities for the emergence of innovative sectors that create activities and jobs. At the level of academic and higher education actors, these objectives could be embodied, following a process of reflection, by the creation of a regional institute for transitions.

Strategic objective 1	Accompanying the transformation of economic sectors towards adaptation to climate change, for a more resilient territory
Strategic objective 2	Bringing out innovations with a positive impact and/or "low tech" and deploying the circular economy

2.2.a TOWARDS AN ECONOMY PREPARED FOR AND ADAPTED TO CLIMATE CHANGE

Climate change is underway on a global scale and our economy will be impacted by these developments: in Brittany, we are obviously thinking first and foremost of agriculture and agri-food, but its effects will have consequences on the economy as a whole, whether it be industry, maritime activities, digital technology, health, tourism, construction, etc. Brittany should therefore help to anticipate these developments and prepare its economy for these changes. The aim is to build an economy that is resilient to climate change.

Although the first consequences of climate change are already visible in Brittany, the major impacts are still to come, particularly on our economy. One challenge will be to detect, anticipate and support the environmental transitions that land and coastal ecosystems will undergo in the coming years. This implies a systemic approach to the land-sea continuum (including urbanised areas), in line with the objectives expressed on the "Environment, ocean health and coastal management" lever of the Maritime Economy for Blue Growth SIA. The approach integrates the links and solidarity between upstream and downstream, between city and countryside, between land and sea.

Improving the preservation and enhancement of natural resources (water, biodiversity), as well as the preservation of aquatic and terrestrial ecosystems, is becoming a major challenge for the economy, which must be organised in synergy and in support of these resources. Research and innovation in Brittany must be able to contribute to this objective. The preservation of aquatic and terrestrial ecosystems is a major challenge, and this dimension will be addressed both through research projects and through the impact of new products or services.

2.2.b FOR THE EMERGENCE OF POSITIVE IMPACT AND/OR "LOW-TECH" INNOVATIONS AND THE DEPLOYMENT OF THE CIRCULAR ECONOMY

Nature has billions of years of R&D and evolution to its credit. It operates in complexity and systematics. There is a need to explore the development of resource-saving innovations with a positive impact on the

environment and/or inspired by living things. The fields of application of innovations with a positive impact are vast, whether it be the circular economy, producing, capturing and optimising energy, collecting, storing and purifying water, working in cooperation, etc. The aim is to bring out and develop Breton innovations with a positive social and environmental impact and disseminate them with a view to facilitating the creation of new economic activities. This path will be explored and broken down into actions, particularly in support of those involved in the protection of natural areas and biodiversity, biomimicry and low tech in Brittany. For example, in conjunction with the “Low Tech Lab”, which aims to create a reference tool for low-tech innovations in Brittany, but also with all the forces involved in this dynamic of creating innovations centred on uses (Design lab, etc.), with a positive impact and/or low consumption of resources (Crisalide éco-activities, Summit4Good, etc.), an innovation ecosystem will enable the emergence of projects necessary to accelerate the ecological transition.

The circular economy is a change of perspective for the adoption of a more systemic vision with complementarity between sectors of activity. Moving from a linear to a circular mode of production is a major structural change. It requires the mobilisation of interdisciplinarity, collective intelligence processes, cooperation and innovation. The objective of “Zero waste” by 2040 and current tension over access to raw materials offer an important and ambitious opportunity to reexamine our real needs, to innovate in frugality, to observe and act with locally available resources and to contribute to the dynamics of the reterritorialisation of production. It represents a change in individual and collective awareness of our relationship to the use of natural resources and a response to growing consumer demand. **Research and innovation must contribute to the development of the circular economy, to:**

- Identify, on the basis of the identification of the resources available on a territory and of the needs, the possible missing structuring segments to create the virtuous loops;
- Support the emergence of new cooperative and innovative economic models, which have a positive impact on the organisation and contractual partnership relations with value sharing, for example within the framework of social and solidarity economy enterprises or the new status of "enterprise with a mission" created by the PACTE law;
- Consolidate the dynamics of financing innovation in the circular economy by relying on regional mechanisms, in particular the joint call for projects between the State, ADEME and the Region.

JOINT CALL FOR PROJECTS ADEME, REGION AND STATE (DREAL) TO DEVELOP THE CIRCULAR ECONOMY

These calls for projects, which offer a partnership window, are part of the regional roadmap for the circular economy adopted in June 2020. Trialled starting in the summer of 2020 (with a budget of over €1 million), the roadmap is aimed at economic players, to initiate circular dynamics in Brittany’s sectors (mobility, consumables, organic waste, buildings, etc.). Priority will be given to R&D projects involving Breton companies and research laboratories serving regional economic sectors.

2.3 SOCIAL AND CIVIC TRANSITION

Social development is one of the pillars of sustainable development. This dimension is essential to S3 in two ways. Firstly, in terms of innovation and economic development, it is essential to monitor and sometimes anticipate the expectations of society and citizens. Development guided solely by banking on technology

while ignoring the reality of markets, behaviour and societal changes would be doomed to failure. We know that insufficient consideration of non-technological innovations is a French weakness that needs to be corrected. Moreover, in the final analysis, innovation and development only make sense if they are geared to social progress, quality of life and wealth creation that benefits the greatest number of people. Therefore, ongoing dialogue between the economic world, the ESRI ecosystem, society and citizens is essential and the enrichment of technology by human and social sciences is a primary objective, as identified by the CESER in 2012 in its report “Social appropriation and debate on science and technology in Brittany”. This is all the more true as the major changes underway also represent strong threats to social cohesion, equal opportunities and the ability of everyone to find their place in society. If not mastered, digital, ecological and energy transitions could significantly impact the lives of many of our fellow citizens.

This dual social dimension will therefore be very present throughout the S3 to ensure, on the one hand, that technological or economic progress is also real social and human progress and, on the other hand, that the link with changes in society is a factor of innovation and value creation.

Strategic objective 1	Promoting the emergence and development of social innovations in the Breton economy
Strategic objective 2	Strengthening and renewing the dialogue between science and society

2.3.a FOR FERTILE SOCIAL INNOVATIONS SERVING CHANGE

In a rapidly changing context, social innovation offers a lever for finding solutions to the major ecological, economic, cultural and social challenges of tomorrow. In this respect, social innovation permeates all S3 strategic innovation areas, because it is above all a working method that involves citizens, businesses, associations, local authorities, social and solidarity economy players, research and innovation players, etc. Recognition of the term and its definition by the SSE law of July 2014, and the place of the regional strategy of the Social and Solidarity Economy (SRESS) in the SRDEII confirm that social innovation is viewed on the one hand as a means of meeting societal needs, and on the other hand as a way of improving organisational performance.

As a mirror image, support for social innovation in Brittany has grown in recent years, through the development of a rich ecosystem enriched by high-performance tools: reception and guidance facilities, project support via the CRESS, SSE clusters, innovation incubators (TAg BZH) and the regional group of expertise for ecological and climatic transitions, the establishment of specific funds (“Fonds Emergence”, managed by France Active Bretagne, the Region/State Social Innovation Fund managed by Bpifrance, the regional “Inno Eco Engaged” facility, etc.), support for experimentation, training, etc.).

Social innovation, including social experimentation, is one way of meeting the challenges of the Breizh COP. Short food circuits, interactions of art and technology in the public space, new forms of cultural expression, innovative services in rural or peripheral territories, new organisational modes for companies, new economic

models, etc.: innovative initiatives in Brittany are numerous, create jobs and meet the needs of both individuals and organisations. These initiatives are often supported by associations, local development actors, SSE entrepreneurship actors, as well as by a body of companies scattered all over Brittany. Accordingly, it is a matter of allowing the initiatives to flourish, but also of backing their development and promoting their success with particular vigilance at key moments in the innovative process: emergence and build-up or even spin-off. Here, it is decisive to raise the awareness and professionalisation of players, by mobilising the skills of the entire regional research and innovation ecosystem for this collective approach, with a coherent public policy for the promotion of social innovation, a lever for socio-economic success. The more innovation, in the broadest sense, is available to the greatest number, the greater its economic and social impact.

Within the S3 framework, actions aimed at encouraging the emergence and development of social innovations in the Breton economy will be particularly encouraged: transfers of experience and spin-offs of successful projects; decompartmentalisation of actors and cooperation leading to innovation; social and solidarity R&D approaches to meet societal, economic and environmental challenges.

2.3.b TOWARDS A RENEWED DIALOGUE BETWEEN SCIENCE AND SOCIETY

The changes that our contemporary societies are undergoing and the acceleration of transformations, as well as the sharp increase in the number of information sources and means of expression, require more than ever the ability to objectify facts and inform decisions on the basis of rational analysis and elements. The crisis has further reinforced this observation and this need. Science is more than ever necessary to accompany the transitions of our world and our territories. This observation is equally true for Brittany, and the ability to meet the challenges of the Breizh COP will be based in particular on the strengthening of dialogue between the world of research, society, citizens and the associative network. The regional group of expertise for ecological and climatic transitions will contribute in this respect.

In Brittany, the ecosystem has already been able to organise and structure itself, and can rely on cooperation between public higher education and research establishments and players in the so-called “third sector of research” (associations, local authorities, social and solidarity economy, groupings, etc.).

To enable a better dialogue between science and society, several levels of intervention can be identified:

- **Raising awareness of the sciences:** this field is more specifically geared to scientific mediation actions conducted by centres of scientific, technical and industrial culture. These actions must help to encourage individual and collective reflection on the place of science and technology in society, in view of the rapid changes in these fields, and enable the emergence of individual awareness, for the benefit of a collective future, by improving citizens’ knowledge of science and its challengers. These efforts will be a continuation of actions carried out since 2015 and in particular of the coordination between the actors implemented within the Brittany Culture and Science Cluster. Particular attention will have to be paid to the ability to target all audiences, in all Breton territories.
- **Facilitating access to the findings of public research:** the acceleration of the Open Science approach in recent years, both continent-wide (Amsterdam Call for Action on Open Science, 2016) and at the national level (National Plan for Open Science, 2018), requires rethinking the approach to research data management. This is indeed a major challenge, in terms of the reproducibility of the results of publicly funded research, but also in terms of the capacity to make new discoveries through massive

data processing and cross-referencing while ensuring the security of a certain volume of sensitive data. In addition to infrastructural efforts needed to guarantee the security, anonymisation and accessibility of public research data in ways that may be very different, educational work should ideally be carried out, in relation to both scientific communities and citizens, in synergy with national actions and the approaches of institutions and organisations in order to maximise impacts.

- **Promoting the development of participatory research:** in order to rebuild the link between the world of research and civil society organisations and citizens' groups, it seems essential, alongside the usual methods of funding research and innovation, to strengthen the capacity for developing participatory research projects, which are based on a co-construction of knowledge between researchers and citizens. There is also a need to link science and innovation to the territories, in conjunction with local elected representatives and citizens, and to disseminate locally the results of research, or scientific and technical culture. Another factor is the capacity to bring out new knowledge, produced and problematised differently. This has been a strong trend for several years and should be reinforced in Brittany, to fuel this science-society dialogue. Research-action will be a building block in the more global field of social innovation, for which Brittany and its rich associative network appears to offer fertile ground.

3.

BRITTANY'S STRATEGIC INNOVATION AREAS (SIAS)



3. BRITTANY'S STRATEGIC INNOVATION AREAS (SIAs)

Brittany's Strategic Innovation Areas (SIAs) are promising and innovative fields of activity for which Brittany enjoys "comparative advantages" on an international scale - proven or potential - and which will have a knock-on effect, a leverage effect, on the regional economy and/or society. The objective of job creation and economic impact is paramount. The five SIAs coherently reflect the sectoral development and innovation issues included in the sectoral strategies of the SRDEII (Regional Strategy for Economic Development, Innovation and Internationalisation). The products, processes, services, technologies, knowledge and know-how developed within their framework are a response to needs that most often cover several key sectors in Brittany or correspond to new activities and new growing societal needs. These are areas in which Brittany is already making or plans to make a major Research and Development and Innovation effort. It is therefore by combining territorial assets and market potential that a framework for reflection, argumentation and selection of strategic innovation areas has been built and shared in the broadest possible process.

3.1 THE MARITIME ECONOMY FOR BLUE GROWTH

3.1.a SIA IDENTITY SHEET⁷

Leviers thématiques retenus

Energies marines renouvelables
 Bioressources et biotechnologies marines
 Navires du futur
 Ports, logistique et transports maritimes
 Sécurité maritime
 Environnement, santé des océans et gestion du littoral



● 65 000 emplois hors tourisme
 ● 20 000 emplois dans la construction et réparation navale, nautisme et transport
 Soit 5% des emplois de la Région



Principales filières pour l'emploi maritime



RECHERCHE & ENSEIGNEMENT

ALIMENTAIRE CONSTRUCTION ET REPARATION NAVALE

DEFENSE NAUTISME

PORTS ET TRANSPORT MARITIME

4 lycées maritimes

13 ports de pêche

138 établissements de recherche

998 familles de brevets depuis 2000



17 430 publications scientifiques

3 stations biologiques marines

2 Instituts CARNOT MERS et ARTS



Leader des biotechs marines

Deuxième producteur européen de phycolloïdes d'algues

+ grandes surfaces cultivées en algues en Europe (>250ha)

⁷ Sources: SRDEII, December 2013, Thematic review of the Investing for the future programme (PIA) – Thematic reviews Ships - Edition 2020, Ademe, Study on the potential of renewable hydrogen in Brittany (2019), Promoting maritime « Made in France » (Objectif 2025 / axe 1), 2017, Armateurs de France Observatory of Maritime Economics in Brittany – 2018, The economic benefits of the nautical industry in Brittany, Brittany Development Innovation, 2016, The economics of competitive sailing in Brittany, Brittany Development Innovation, 2018, Observatory of Maritime Economics in Brittany. Key figures Brittany Bretagne 2019, CCI Bretagne, Future needs and recommendations, Metalworking Observatory, January 2016.

3.1.b SIA STRATEGIC ROAD MAP

Brittany has great ambitions for sea and coastline alike, and the sea offers a real opportunity for economic, social and environmental development for society. **Brittany has always been built with and by the sea.** Its relationship with the sea is mainly based on:

- ◆ Rich marine biodiversity and productive marine and coastal ecosystems;
- ◆ A long coastline offering numerous accesses to the sea, renowned landscapes and navigational basins;
- ◆ A very rich maritime heritage, both tangible and intangible;
- ◆ A prime position where the Atlantic and the English Channel meet;
- ◆ High-level skills and know-how in most maritime sectors;
- ◆ A dense network of R&D players in varied, complementary fields.

Brittany has an exceptional potential for marine resources, on which a major world-class marine science and technology research and development strike force has developed with public and private players in research, development and innovation. Breton players address all uses of the sea and know how to collaborate between academic excellence, the creation of numerous start-ups, an industrial fabric and design offices covering the entire value chain, and a highly mobilised network of associations. By relying on these exceptional skills, the region can leverage its potential in the following areas:

- ◆ Biological, fisheries and biotechnology: Brittany is one of the leading regions in the field of fishing, shellfish farming, marine biotechnologies and a pioneer in the cultivation of seaweed, but players still need to improve their synergies and join forces to increase the attractiveness and influence of Brittany's skills, as well as the Breton contribution to European policies for the management of marine resources.
- ◆ Energy: offshore wind power (both installed and floating), tidal turbine, tidal engine with a historic lead, wave power with the greatest metropolitan potential. Under these conditions, making a successful energy transition for and thanks to the world of the sea implies taking an interest in all the development and operation phases so that the deployment of marine renewable energies (MREs) is not "imported" from outside but rather implemented in relevant collaboration with predominantly European players.
- ◆ However, Breton ports are facing many environmental and digital transitions, some of which are already well underway. On an economic level, the fundamentals of our commercial port models were already shaken, as traffic volumes have been declining in recent years. The COVID-19 crisis has made the passenger transport sector more fragile than imaginable and has also called into question our globalised supply chains. In the face of these changes, many avenues for diversification and renewal of traffic and activities exist. In this context, ports, their infrastructures and associated economic activities must evolve. Ships too must evolve towards the "vessels of the future" and increase the capacity and industrial competitiveness of players in shipbuilding, the nautical industry and, more broadly, the maritime engineering sector, with a view to designing, producing, maintaining and repairing ships that are more efficient, safer and more respectful of the marine environment. To achieve this goal, there is a need to encourage research, innovation, development and technology transfer in the fields of digital technology, on-board intelligence, mechanics and energy.

The "Metallurgy" and "Fisheries and aquaculture products" performance contracts could be mobilised in response to the challenges in terms of employment and skills.

Strategic objective 1	Strengthening regional excellence in energy transition for and through the world of the sea
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Thematic levers

- Marine renewable energies
- Vessels of the future
- Ports, logistics and maritime transport

Strategic objective 2	Increasing innovation capacity in maritime safety of the seas and oceans and coastal management
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Thematic levers

- Maritime safety
- Ports, logistics and maritime transport
- Environment, ocean health and coastline management

Strategic objective 3	Developing marine biotechnologies and bioresources
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Thematic levers

- Marine bioresources and biotechnologies
- Environment, ocean health and coastline management

MARINE RENEWABLE ENERGIES

MAIN CHALLENGES FOR THE LEVER

Throughout the entire value chain, from design to marketing, the main challenges are:

- ◆ Setting up a rapidly competitive offshore floating wind energy sector with a maximum of local spin-offs in Brittany, by targeting key components with high added value and continuing to support wind turbines installed on facades;
- ◆ Continuing cost reduction demonstrations and demonstrating the relevance of tidal turbines for island communities and local power generation;
- ◆ Anticipating the deployment of wave energy recovery solutions;
- ◆ Developing tools for predicting, smoothing, transporting and storing the energy produced at sea in relation to the particularities of Brittany (high load factors, energy peninsula) and facilitating cross-fertilisation between sectors on subjects such as hydrogen or the naval industry;
- ◆ Evaluating and monitoring energy resources and MRE systems, optimising production and maintenance, conducting high added value operations;
- ◆ Developing joint activities and specifically using MREs: aquaculture, algoculture, shellfish farming, fishing, biodiversity monitoring, tourism, etc;
- ◆ Facilitating procedures for the examination of commercial and industrial files in compliance with administrative, legal and environmental protection rules;
- ◆ Training engineers, technicians, environmentalists, project managers and administrators.

BRETON DYNAMICS AND KEY ACTORS

A proven political ambition, a history of MRE initiatives that stretches over more than a decade within the Technopôle Brest-Iroise, the Pôle Mer Bretagne Atlantique, the shareholding or partnership in the Institut pour la Transition Énergétique (ITE) France Énergies Marines, as well as within “Bretagne Ocean Power”, an association supported by the Region that brings together all the players positioned on the development of marine energies in Brittany. All these actors (industrial clusters, technopoles, competitiveness clusters, consular network) have decided to work together under the same banner to ensure the efficiency of industrial projects, as well as through numerous bipartite cooperation arrangements. The Brittany Region has supported many projects and companies on the theme of MREs, encouraging public-private collaboration. The first tidal turbine demonstrators and one of the rare floating wind turbine pilot farms are being built in Brittany (after UK-Scotland, Portugal, Canary Islands, USA and in parallel with France-Méditerranée), representing a very strong asset due to the cooperation opportunities offered. This will be followed by one of the very first commercial floating wind farms in the world. It will bring together laboratory and in situ testing facilities, a national research infrastructure (Theorem Test Facilities for Hydrodynamics and Marine Renewable Energy/IFREMER), powerful calculation and numerical modelling facilities and academic skills in hydrodynamics and modelling of swell and currents, materials, composites, assemblies, behaviour of materials and structures at sea, marine fouling (IFREMER, ENSTA Bretagne, UBO, IRDL, FEM). 1,000 training courses covering 80 MRE-related trades are spread throughout Brittany. University training courses already in place could be beefed up.

DYNAMICS OF EUROPEAN COOPERATION

Collaboration with the British sector remains essential in this area. Geographical Europe is ahead of the rest of the world in MRE. Current or past European projects (MaRINET1&2, EQUIMAR, etc.) provide an instructive overview of European academic actors.

MARINE RENEWABLE ENERGIES

Launched in 2012 with the award of the first wind farm contracts, the MRE sector has been structured and integrated at the European level. Gradually, through the structuring of the regional ecosystem - Enterprise - Research - Training, some technologies have been industrialised in a few years' time. The European MERIFIC project (2011-2014) has enabled a technical-economic study to be carried out to identify potential areas for the installation of new fields. Since 2017, the ICE project has been testing technologies on Ouessant both to produce tidal energy (Sabella) and to manage energy consumption on the territory (installation of sensors and provision of informative objects and consumption management applications). In 2017, the Region also invested 1M€ in the European tool ERA-NET Ocean (Programme H2020 bringing together seven territories) to support three collaborative projects involving five regional actors - four companies and one research centre.

Since 2018, the Region has also been a partner of the “S3 platform” dedicated to MRE. In 2019, the INTERREG Channel TIGER project (2019-2022) offers two demonstration areas for tidal turbine technologies, one in the north and the other in the south of Brittany. Finally, between 2020 and 2023, the INTERREG North West MegaAwe project will aim to industrialise airborne wind turbine technologies.



Operational objectives

- *Ensuring that the Groix-Belle-Ile floating wind turbine pilot farm allows a maximum number of Breton players to take advantage of the entire value chain and that the South Brittany AO is one of the very first commercial floating wind turbine farms in the world, thanks to the responsiveness of its R&D studies;*
- *Guaranteeing the success of ongoing demonstrator projects in order to maximise feedback and trigger complementary R&D, and supporting the structuring of test sites and the deployment of demonstrators on pilot and test sites;*
- *Conducting several demonstrations on wave-engine sites already identified (Audierne, Esquibien, etc.) for a variety of solutions (onshore, nearshore, offshore);*
- *Backing developers of moderate-power devices (tidal turbines, etc.) for isolated consumers;*
- *Mastering the techniques of in situ measurement and observation, at the level of environmental parameters as well as the monitoring of machines in service;*
- *Establishing an economic observatory for continuous analysis of cost trends (development, installation, operation, maintenance, dismantling, etc.).*

EXPECTED OUTCOMES

A significant contribution of MRE to the Breton energy mix for a low-carbon territory requires societal appropriation, through the success of the previous objectives. The demonstration of a good environmental integration already discussed makes it possible to accentuate the perception of a very advantageous cost-benefit ratio. Energy is the most important resource, but MREs are renewable and locally abundant, and their exploitation generates sustainable jobs based on marine know-how, with a share of activities which cannot be automated or relocated. Based on the skills that will have been accumulated by resolving technical difficulties, building a shared knowledge base, and supporting the training effort for project managers (today) and technicians (tomorrow), the region should encourage the integration of several R&D and operational teams that speak to the worksites with a single voice.

MARINE BIORESOURCES AND BIOTECHNOLOGIES

MAIN CHALLENGES FOR THE LEVER

- ◆ Making the Breton sector competitive in the European and global context;
- ◆ Structuring, strengthening and promoting sustainable macro- and micro-algae, fisheries and aquaculture and maritime waste treatment sectors;
- ◆ Pursuing ecosystem-based management of coastal and deep-sea fisheries as well as fishing on foot, in the context of climate change.

BRETON DYNAMICS AND KEY ACTORS

Brittany has a particularly well-developed dedicated ecosystem:

Academic: IUEM (UBO, CNRS, IRD), IFREMER, MNHN, Dinard marine biology station (CRESCO), SBR, UBS, Agrocampus Ouest, UR1 and the Rennes Advanced National School of Chemistry (ENSCR);

Innovation-Transfer: World Maritime Campus, technopoles in particular Brest Iroise, Pôle Mer Bretagne Atlantique, CEVA, IDMer, Biotech Santé Bretagne, Biogenouest, Algae Clusters;

Industrials and SMEs: Saupiquet, Capitaine cook, MerAlliance, Roullier, Olmix, Algaia, Goemar-UPL, Man-Ros Therapeutics, Abyss Ingredients, Phosphotec, Polymar, Lessonia, CODIF-Intl, Biotechmarine, Agrimer, etc.;

Producers: Algolesko, France Haliotis, C-Weed Aquaculture, Wel-Sea and professional organisations: CRCs, CRPMPPR, Chambre Syndicale Algues et végétaux marins, Breizmer, etc.

DYNAMICS OF EUROPEAN COOPERATION

The sustainable exploitation of marine bioresources and the marine biotechnology sector are European priorities both at the level of the European Commission, Horizon Europe and the “Oceans” Mission Board, but also of the JPI Ocean, the Marine Board, Euromarine. Consortium-style initiatives and a coalition around algae aquaculture are being set up in the context of the Green Deal and are strongly lobbying DG Mare and DG Research.



Operational objectives

- *Developing and strengthening infrastructures and pilot platforms for the control of life cycles and the domestication of marine species;*
- *Developing innovative systems that limit environmental impacts and allow species selectivity;*
- *Supporting demonstrator-type projects and RDI programmes for the knowledge and development of marine bioresources;*
- *Funding R&D projects for the development of innovative technologies for integrated multi-trophic aquaculture towards zero waste and alternative nutrient sources (insects, microalgae, algae);*
- *Accompanying the digitalisation of seafood distribution;*
- *Producing a report (position paper) on Brittany’ strategy and strengths in the field of marine bioresources and marine biotechnologies (health, nutrition-health, cosmetics, agri-agro, etc.), and ensuring its dissemination and promotion at European level;*
- *Supporting industrial-university chairs and joint laboratories, and ensuring the widest and most educational dissemination of results for professional actors and decision-makers.*

EXPECTED OUTCOMES

- ◆ Positioning Brittany among the major regions in international and European competition and building a global benchmark region;
- ◆ Reinforcing Breton companies and scientific skills in the sector and attracting new ones.

VESSELS OF THE FUTURE

MAIN CHALLENGES FOR THE LEVER

The specific objectives are as follows: Energy efficiency; Eco-design; Ship safety and security; Conduct and operation of vessels; Competitiveness of the manufacturing base and needs of the sectors. Strengthening long-term relations between research and industry (especially shipyards) is essential to enhance the value of upstream work on all the above themes, thus reinforcing the competitiveness of the manufacturing base. In the nautical industry, and in particular for competitive sailing, manufacturing processes using multi-material assemblies and gluing pose a real challenge. The fishing industry wishes to improve fishing techniques that are more efficient, more selective and respectful of resources. The defence sector has specific needs in terms of platform survivability, acoustic sensors and robotics.

BRETON DYNAMICS AND KEY ACTORS

The naval and nautical sector in Brittany includes major industrial groups, the French Oceanographic Fleet, a heterogeneous network of companies, numerous academic players and high-performance laboratories. Grouped together within clusters (PMBA, BPN, EUROLARGE), they are involved in different segments of civil and military activities from shipbuilding to very upstream aspects (training). The Naval Industries Campus (Cinav) is a partnership framework allowing the deployment of responses that take into account the specificities of the sector in terms of skills. Within this framework, it has, for example, initiated a whole process aimed at the “navalisation” of existing training courses.

The main industrial players are Naval Group, Thales, Piriou. The main academic or public players are ENSTA Bretagne, Ecole Navale, UBS, IFREMER, IMT Atlantique, UBO, ENIB whose research is mainly grouped together within the framework of the IRDL, LabSTICC and IRENAV laboratories.



Operational objectives

- *Increasing ships' energy efficiency (reducing consumption of on-board systems and propulsive power requirements);*
- *Developing complementary energy production systems based on renewable resources;*
- *Developing on-board control systems and their automation for greater autonomy;*
- *Reducing environmental impacts through the use of new materials, manufacturing processes, ship architecture, optimising recycling throughout*

the life cycle (manufacturing, in service, maintenance and decommissioning);

- *Enhancing the performance of marine infrastructures (acoustic and electromagnetic radiation pollution, resistance and durability of structures, robotics);*
- *Developing sensors and systems for the detection of dangerous events (collisions, storms), diagnosis of premature wear and damage and predictive maintenance systems.*

EXPECTED OUTCOMES

- ◇ Reducing energy requirements: consumption of on-board systems, propulsive power requirements by optimising hull and propeller shapes, treating coatings, lightening structures, improving innovative or alternative propulsive concepts (sails), based on renewable resources and more efficient electrical energy management systems.
- ◇ Reducing environmental impacts: materials, processes, ship architecture optimising recycling and material and energy consumption throughout the life cycle. Materials, paints and coatings must limit their discharges of effluents, pollutants and biocides. Finally, shipboard systems must include technologies to limit acoustic nuisance and electromagnetic radiation.
- ◇ Increased safety: faced with harsh sea conditions, the resistance and durability of ships, which are essential safety components, are based on improved methods of mechanical dimensioning to fatigue, marine ageing and extreme loading. The development of sensors and systems for the detection of dangerous events (collisions and storms) and diagnosis of premature wear and tear and damage also contribute thereto, as do operational safety and predictive maintenance of on-board systems. It will be necessary to set up an R&D programme on health safety on board ships (crew and passenger protection) in order to develop solutions for dealing with pandemics.
- ◇ Autonomy and automation of on-board control systems: telecommunications capabilities and information processing, decision support functionalities and in particular route optimisation, limitation of ship damage.

PORTS, LOGISTICS AND MARITIME TRANSPORT

MAIN CHALLENGES FOR THE LEVER

The main priorities proposed are:

- ◆ **Developing logistics' attractiveness** by maintaining the fluidity of flows, monitoring performance to optimise the management of the passage of goods, and improving the performance of port equipment and predictive logistics;
- ◆ **Monitoring and improving the environmental performance** of ports through the production of data to understand and act on air quality, noise, water quality, water and electricity consumption, etc.

The Brittany Region thus intends to anticipate and adapt to the digital and energy transitions and to the new uses expected by industrialists, shipping companies, users and passengers by relying in particular on real-time information, traceability, the fluidity of flows in the port area and its connectivity to all international and European ports. It pays particular attention to the development of an optimum quality of service for port users and customers in order to help its regional port network evolve towards a “smart port” of the future, a data port at the service of logistics and environmental performance.

BRETON DYNAMICS AND KEY ACTORS

The territory is home to many public and private actors whose expertise and skills must be able to address the smart port issues mentioned above. As an example, the region is characterised by an economic fabric within the scope of Lever 4 of over 400 companies representing more than 9600 jobs. Among these key players are Naval Group, Piriou, Thales, Actemium, Accoast, AMO, Eiffage infrastructures, Sofresid, Effinor, Rtsys, etc. Academic skills also support the development of innovation with IFREMER, UBO, UBS and L'Ecole Navale.



Operational objectives

- *Deploying technological and usage innovations in the port of the future using a “smart port” approach;*
- *Increasing the fluidity of the port passage and the experience of maritime transport users and reducing the environmental impact of ports and maritime transport: introducing equipment to produce new data enhancing the fluidity of the port passage or facilitating the piloting of environmental performance such as sensors (e.g. aid and water quality probes, monitoring of water and energy consumption in real time...), new networks (5G network), dematerialisation of embarkation/disembarkation procedures, etc.;*
- *Producing interoperable data through the evolution of information systems for the management of ports of call/ships/goods; optimising port infrastructures for the supply and bunkering of hydrogen;*
- *Assisting innovative SMEs that develop port solutions.*

EXPECTED OUTCOMES

- ◆ Including Brittany in a “smart ports” approach to innovation and reducing the environmental impact of port and maritime transport activities (reduction of water and electricity consumption, improvement of air and water quality, quayside and/or on-board storage and supply of hydrogen, etc.);
- ◆ Setting up innovative companies in or near the ports;
- ◆ Improving the cost and port transit time of goods, particularly for containers in Brest and ferry freight from the United Kingdom; improving the customer experience for ferry passengers in Brest and Roscoff (in the post-Brexit and post-COVID-19 context).

MARITIME SAFETY

MAIN CHALLENGES FOR THE LEVER

Maritime safety is a prerequisite for the implementation of maritime activities. Moreover, cybersecurity has become an integral component of maritime safety. It constitutes a technological evolution of threats to the security of ships and port facilities. Clearly, it is a major issue in the current context of digital development and the risks associated with its use.

The main challenges lie in the ability to deploy systems and services that provide services on the coast and at sea:

- ◆ The defence of the interests and sovereign rights of States and the maritime defence of territories;
- ◆ The fight against illegal and malicious acts and the fight against environmental risks;
- ◆ Compliance with regulations and fisheries control;
- ◆ Safety of people and property.

BRETON DYNAMICS AND KEY ACTORS

The regional dynamics are very rich with, among other things and above all, the presence of major naval bases for the French Navy, but also of the Maritime Prefecture of the Atlantic invested with authority in all the domains where the State's action at sea is exercised. Two of the five regional operational surveillance and rescue centres (CROSS) are also in Brittany. These locations and activities have in part led to the development of an ecosystem rich in skills and expertise in this field. The economic fabric includes a limited number of companies (< 100) but features more than 7,000 jobs. Key companies include Thales, Naval Group, IxBlue, DCI, Syrlinks, CLS, ECA, Diateam, etc. The region also has an academic fabric of excellence in the field: IMT Atlantique, ENSTA Bretagne, Ecole Navale, Université de Bretagne Occidentale, ISEN and ENSM. Most of these different actors are closely involved with the development of expertise in maritime cybersecurity. One example is the Cyber Naval Defence Chair, which will enable the launch in September 2020 of a unique training course, the Master's degree in Cybersecurity of Maritime and Port Systems. It should be noted that this dynamic has prompted Brest to apply to host the future National Centre for Maritime Cybersecurity (CERT) in Brittany.



Operational
objectives

- *Being a leader in the development of maritime security solutions and systems in the fields of maritime cybersecurity;*
- *Developing the use of robotics for maritime safety purposes;*
- *Using AI and Big Data to monitor the ocean and associated activities;*
- *Develop training to meet the skills and expertise needs of the State and companies, particularly in maritime cybersecurity.*

EXPECTED OUTCOMES

The main expected outcomes are related to the development of complex systems and algorithms for the use of multiple data sources. They should be capable of facilitating the digitalisation of maritime activities and optimising maritime control and surveillance operations above and below the water. By way of example, these advances must be able to guarantee e-navigation and autonomous vessels. It is also a question of developing all components of maritime cybersecurity (research, training, industry) for greater collaboration

between players and greater visibility of the players and therefore of the territory at European and international level.

ENVIRONMENT, OCEAN HEALTH AND COASTAL MANAGEMENT

MAIN CHALLENGES FOR THE LEVER

Brittany, by virtue of its position, must be exemplary in meeting the challenges defined in the UN's Sustainable Development Goals (SDGs). Responding to such challenges necessarily involves a multidisciplinary approach combining human and social sciences, natural sciences and engineering sciences in order to improve knowledge of coastlines and oceans, from the regional to the global scale, to better understand past and present events and help human societies to anticipate future social and environmental challenges.

BRETON DYNAMICS AND KEY ACTORS

The Breton players in the sector are numerous and form a community that is able, thanks to its diversity, to develop collaborations to address these issues. Academics (CNRS, IFREMER, UBO, UBS, SBR, IRD, MNHN, Agrocampus Ouest, ENSTA Bretagne, etc.), public bodies and State services (OFB, DREAL, SHOM, Cerema, Cedre, EPCI Littorales, Cds, etc.), the private sector (EPCI, EPCI, EPCI, etc.) and the public sector (EPCI, EPCI, EPCI, etc.), innovation organisations (World Maritime Campus, Technopoles, Pôle Mer Bretagne Atlantique, etc.), and innovative companies (CLS, Actimar, Quiet-Oceans, etc.) work for ocean observation and constitute a unique regional ecosystem. The dynamics in place within this community are structured around objects of excellence such as the ISblue University Research School (EUR), initiatives like the World Maritime Campus (CMM), the Brittany Atlantic Maritime Cluster or the Breton Technopoles, which bring together academic and business collaborations in marine and coastal sciences. Participation in research infrastructures such as ILICO, ARGO, RESIF and ODATIS, as well as involvement in the Brest Iroise Workshop Zone (ZABRI), in CPER ROEC or Glaz-environment projects, and in the establishment and operation of platforms like DATARMOR are all assets for developing large-scale collaboration at European and international level. The ability of the Breton marine science ecosystem to influence the world has moreover led to the creation of the SEA-EU, European University of the Seas, which offers a new and sustainable framework for a European strategy in marine sciences in which Brittany occupies a central position.

DYNAMICS OF EUROPEAN COOPERATION

- ◆ European research infrastructures: Euro Argo, EMBRC, EMSO, JERICO-RI, European Long-Term Ecosystem Research infrastructure (eLTER), and participation of Breton research units in the marine sciences sector in major European and international bodies (Marine Board, JPI-Oceans, Ocean Decade UNU, ICES, WCRP, IPBES, IPCC, and management in Brittany of global observation platforms and networks (ERIC Euro-ARGO, EMSO, ILICO-JERICO-RI, Jcom-OPS), with the SDGs at the heart of the European university SEA-EU;
- ◆ Piloting in Brittany of numerous international research networks concerning marine and coastal sciences, ERC Chairs, hosting of international researchers in the member units of the EUR ISblue consortium of excellence.



Operational objectives

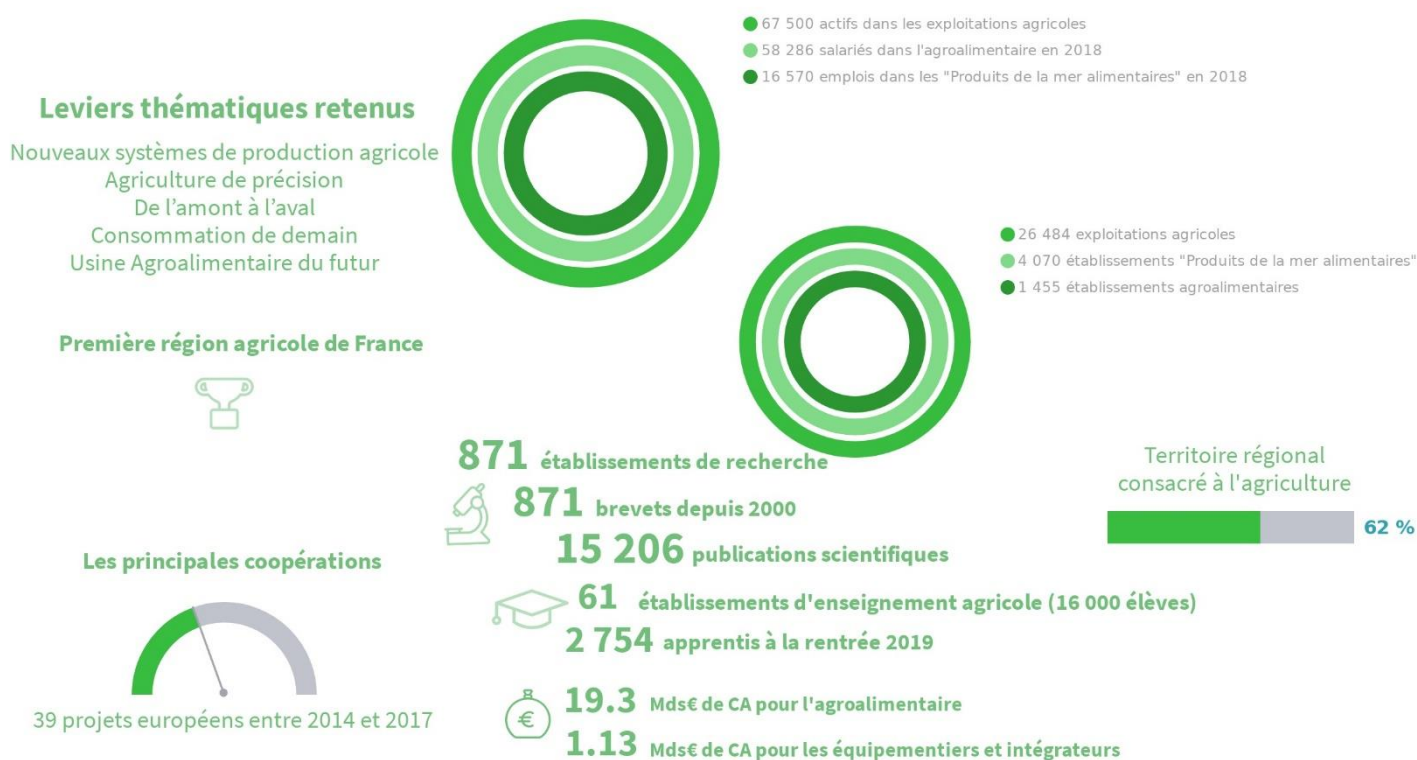
- *Reinforcing operational infrastructures for research into and observation of marine and coastal socio-ecosystems;*
- *Providing decision-making tools for the implementation of public policies for research, observation, risk and crisis prevention and remediation, management of coastal areas and coastlines;*
- *Establishing a regional coastline observatory;*
- *Developing new services for risk monitoring, analysis and prevention, based on new technologies (remote sensing, data mining, artificial intelligence, virtual reality, genomic and metagenomic analyses, isotope analyses, etc.);*
- *Developing regional collaboration between observation stakeholders at all scales of time and space, based on synergies between different technologies (satellites, multi-sensors, data transfer and management);*
- *Encouraging the development of participatory science to improve knowledge of these areas and societal appropriation of the Sustainable Development Goals – SDGs;*
- *Successfully training and integrating a new generation of researchers and engineers around these issues thanks to the synergies between the territorial actors.*

EXPECTED OUTCOMES

- ◇ Better monitoring of the oceans, physico-chemical properties and ecosystems, thanks to the synergy of new in situ and satellite observation systems and the development of new vectors and sensors (UAVs, etc.), greater consideration of the role of the oceans in climate change, and control of the evolution of exploited marine resources (fisheries);
- ◇ Tools for forecasting and assessing risks in the marine and coastal environment (scenarios or risk mapping for extreme sea states, erosion, landslides, tsunamis, etc. and risks related to pollution and entropic pressures);
- ◇ Development of new services for risk monitoring, analysis and prevention, based on new technologies;
- ◇ Better knowledge of the availability and quality of marine resources (biological and non-biological), in relation to their environment and global changes.

3.2 THE FOOD ECONOMY OF EATING WELL FOR ALL

3.2.a SIA IDENTITY SHEET



3.2.b SIA STRATEGIC ROADMAP

In light of changing diets, Brittany aims to remain a leading region in Europe in agricultural and food production based on “eating well for all”, for healthy, quality food that is affordable for all and creates value and pride. This mission falls to agriculture, aquaculture, fishing (see Maritime SIA) and upstream and downstream companies, particularly those in the processing industry. They must remain competitive by taking into account consumer demand and expectations, impacts on health and the environment, but also by adapting to climate change. The aim is therefore to support change at all levels (ecological and economic transitions in the production, processing and distribution sectors) and in particular through innovation. The strategic innovation area “The food economy of eating well for all” will be based on the three performance contracts, “Agriculture”, “Food sector” and “Fishery and aquaculture products”, which are intended to respond to the skills issues identified and to the achievement of expected changes, among which:

- ◆ **Renewing generations** in the primary sector through sustainable and diversified modes of transmission and settlement, in particular by supporting a larger proportion of people who do not come from an agricultural background;
- ◆ **Developing more resilient farms and businesses**, which generate higher added value and are capable of adapting to climatic and economic hazards;

- ◆ Adapting the skills and maintaining the employability of employees in the agricultural, agri-food and fisheries-aquaculture sectors, in the face of technological and organisational transition that punctuates the daily life of companies;
- ◆ **Reinforcing the attractiveness of the trades**, notably by improving working conditions and reducing work arduousness (“pénibilité”) through innovation;
- ◆ **Innovation at the service of “Eating Well” for all**, as one of the levers to inform and “give meaning” to the agricultural and food-processing professions.

These shared objectives will be able to build on the dynamics of training and pedagogical innovation initiated by apprentice training centres and campuses, for example the Campus des Métiers et des Qualifications “Techniques et technologies alimentaires” in Quimper, and the local campus in Pontivy (IPF3A, which brings together local players in the development of the agricultural and agri-food sectors in Central Brittany).

SIA ECOSYSTEM

The ecosystem of research and innovation in the food sector is particularly rich in Brittany, with more than 100 laboratories or research structures, nearly 40 support structures and nearly 100 training establishments working with these sectors.

Academic actors (INRAE, AGROCAMPUS OUEST, UBO, UBS, Universities of Rennes 1 and 2, ANSES) rely on regional operators such as SATT Ouest Valorisation and the European Projects Platform (2PE) - Brittany to develop numerous high-level research projects likely to find economic and innovation applications. The Valorial and VEGEPOLYS VALLEY competitiveness clusters, made up of innovative companies in the field, higher education establishments and research organisations, as well as ecosystem players, are major operators in driving innovation in the Breton food industry and forging links between large companies, ETIs, SMEs and research laboratories in collaborative projects. The innovation initiatives at the crossroads of the sectors with the territory’s other clusters such as Images & Réseaux, ID4Car and the Brittany Atlantic Sea cluster are worth highlighting.

The technological innovation centres also play an essential role as a link between research and the innovation needs of the various food sectors, first and foremost ACT food Bretagne, a federation of the five main Breton food sector centres (Adria, CEVA, IDmer, Vegenov and Zoopole Développement) but also Biotech Santé Bretagne, and the Centre Culinaire Contemporain (Contemporary Culinary Centre).

To promote the modernisation of the manufacturing base, notably through cross-fertilisation with Brittany’s digital skills, BDI is coordinating the regional AGRETIC programme and the collective action “Agro factory of the future”, which has strongly mobilised Valorial, CEA Tech and, more generally, the entire ecosystem.

The ecosystem is rounded out by other actors:

- ◆ Platforms like Prodiabio, Actalia, Biogenouest or CEA Tech Bretagne, which contribute to the development of new products and manufacturing processes;
- ◆ The Carnot Institutes: the “Breton” Carnot Agri-Food Transition, the Breton establishments of Carnot Qualiment (agri-food), Carnot Plant2Pro (vegetal) and France Futur Elevage;
- ◆ The chambers of agriculture, whose missions are based on anticipating developments, innovation, creating and disseminating references, supporting farmers in the evolution and adaptation of their businesses, representing the interests of the agricultural world and collaborating with all professional agricultural organisations;
- ◆ The ABEA, which represents the food industry;
- ◆ Produit en Bretagne (Produced in Brittany), which helps to develop employment in companies in the area as a recognised brand and a major economic network;

- ◆ SSE actors mobilised around bio-local production and short circuits.

AGRICULTURE, AGRI-FOOD AND DIGITAL TECHNOLOGY

Since 2016, Breton companies and researchers have been able to access European contacts and funding to meet their own innovation needs. The RUC-APS (Risk Uncertainty Collaboration Agriculture Production Systems - H2020) project, launched in 2016, has welcomed researchers from more than 10 countries. Since 2017, the involvement of regional players in two S3 platforms (High Tech Farming and smart sensors 4 agrifood) has facilitated the identification of qualified European contacts. From 2019, companies have been able to respond to the ERA-NET ICT-AGRI-FOOD call for projects at the crossroads of the food and information and communication technologies sectors, in which the Region has invested €500k. In 2020, SMEs have been able to benefit from 15 k€ to 60 k€ for digitalising their activities (S3Food Project). From 2021, a mapping of the skills of the 13 European partners will make regional companies visible.

Strategic objective 1

Developing sustainable, responsible and efficient agriculture and aquaculture by supporting environmental, energy, digital, economic and social transitions

Thematic levers

- New agricultural production systems
- Precision agriculture
- From upstream to downstream

Strategic objective 2

Making Brittany's agri-food sector a European leader in process control

Thematic levers

- From upstream to downstream
- Tomorrow's consumption
- The food processing plant of the future

Strategic objective 3

Responding to new societal and consumer expectations in order to conquer new markets

Thematic levers

- New agricultural production systems
- From upstream to downstream
- Tomorrow's consumption

NEW AGRICULTURAL PRODUCTION SYSTEMS

REGIONAL DYNAMICS

La CRAB (Regional Chamber of Agriculture of Brittany) and Vegepolys Valley, in conjunction with the following regional contributors: producers/cooperatives, experimentation stations, CIVAM networks, the Ecologically Intensive Agriculture (AEI) chair, technical institutes, research centres, ACT food Bretagne, Carnot AgriFood Transition Institute, agricultural training, economic and social sciences, communities, consumers, actors with genetic collections, life cycle assessment specialists, climate specialists, agro-materials actors, the French biodiversity agency, TRAME networks, Alli'homme association, POLE CRISTAL, LIT OUESTEREL, INRAE, Institut Agro-AGROCAMPUS OUEST, University of Rennes 1.



Operational objectives

- *Building RDI programmes/projects (individual and collaborative) geared to the emergence of innovative solutions (resources, genetic, energy, bio-inputs, etc.), to initiate a transition towards operating systems that are environmentally, economically and socially viable, diversified, resilient and adapted to climate change;*
- *Developing a systemic approach from the scale of the farm to the territory, taking into account the following parameters: resources (soil, water, uncultivated biodiversity, air); farmers' needs; ecosystem services of agriculture and natural environments; complementarity and/or competition between different productions (crop/animal production, cultivated/wildlife biodiversity); mitigation and adaptation of climate change in the medium-long term on the scale of a sector;*
- *Increasing the protein self-sufficiency of territories;*
- *Implementing projects for structuring and supporting new agricultural sectors and the upgrading of Breton production;*
- *Co-designing social and organisational innovations; enhancing the attractiveness of professions; encouraging the transfer, installation and support of future employees; implementing projects to increase the skills of employees and company directors;*
- *Facilitating projects with a methodology inspired by living labs by mobilising farmers, actors upstream of production, experimentation stations, sectors, research and consumers in order to facilitate the design and transfer of technical solutions;*
- *Increasing the number of agricultural facilities and accommodating new forms of rural and urban agricultural facilities and activities (emergence, access to trades, land and training).*

PRECISION AGRICULTURE

REGIONAL DYNAMICS

BDI with the collective regional programme AGRETIC, Valorial, CRAB, INRAE, INRIA, ZOOPOLE développement, Vegepolys Valley, CEA Tech Bretagne, Act Food and the Carnot Institute AgriFood Transition and Photonics Bretagne contribute to structuring this lever.

DYNAMICS OF NATIONAL AND EUROPEAN COOPERATION

The European Green Deal, the ERA-NET ICT-AGRI-FOOD, the S3 High Tech Farming platform, the Ministry of Agriculture's agriculture innovation plan 2025 and the Ministry of Economy's productive pact 2025.



Operational objectives

- *Building RDI programmes/projects (individual and collaborative) geared to the emergence of digital solutions/tools in response to the global challenges of the agri sector (environmental, economic, social, animal welfare, improvement of working conditions);*
- *Developing experimentation venues like living-labs and platforms to promote the dissemination and appropriation of digital tools, co-design and training of employees;*
- *Promoting the decision-making and financial autonomy of farmers in the mobilisation of digital tools through research-action to make the transfer of research to farmers more affordable: paying software versus free software; black box versus open and modifiable tools;*
- *Educating farmers, technicians and advisers about the issues and impacts of the digital transition;*
- *Taking steps to enhance the value of jobs and activities in the agricultural sector among students, professionals and citizens.*

FROM UPSTREAM TO DOWNSTREAM

REGIONAL DYNAMICS

INRAE and AGROCAMPUS OUEST with partners from the fields of animal production, plant production, recycling of organic residues, carbon footprint analysis, applied mathematics, human and social sciences, citizens/consumers, committed producers, CRAB, ACT food Bretagne, the Carnot Institute AgriFood Transition, LUBEM, Actalia and Idele.

DYNAMICS OF NATIONAL COOPERATION

The Anti-Waste and Circular Economy Act (AGEC).



- *Setting up RDI projects on the food supply chain, modelling the different links in the production chain and enhancing the value of co-products and residues in order to move towards a circular economy;*

Operational objectives

- *Supporting the implementation of demonstrators and modular technologies which enable decentralised/small-scale transformation;*
- *Enhancing the value of co-construction and feedback by setting up progress groups or Living Labs involving all the players in sustainable food production and society;*
- *Developing models at the different links of the production and processing chains in order to identify the most relevant trajectories in a circular economy approach (plant-animal links and their sectors; biotechnical systems and effluent management; decision support tools for assessing the circularity and sustainability of the new systems implemented);*
- *Promoting the development of short circuits and the structuring of more resilient sectors.*

TOMORROW'S CONSUMPTION

REGIONAL DYNAMICS

Facilitated by ACT Food Bretagne and Valorial, in conjunction with regional contributors: Biotech Santé Bretagne, Cristal cluster, Contemporary Culinary Centre, Institut Carnot Agrifood transition, Actalia, CEA Tech Bretagne, University of Rennes 1, UBO (LUBEM, LEGO), ABEA, CIVAM, Brest Business School, INRAE, AGROCAMPUS OUEST (UMR STLO, Institut Numecan)



Operational objectives

- *Developing new food products which incorporate consumer expectations (food quality and safety; naturalness with reduced use of chemical preservatives, colourings, etc.; diet; waste reduction; halving food waste to combat food wastage; respect for the environment) at all stages of the food chain from production to consumption;*
- *Halving plastic packaging from non-renewable resources by 2030 and developing eco-designed, reusable or biodegradable packaging;*
- *Increasing added value through biotechnological transformation processes of co-products and the marketing of new assets;*
- *Reshoring using “short circuits” and networking of local sales network;*
- *Anticipating and promoting changes in eating habits and consumption patterns.*

REGIONAL DYNAMICS

Facilitated by BDI in association with Valorial, CEA Tech Bretagne, ACT food Bretagne, ABEA, Actalia, INRAE, Pôle Cristal, Photonics Bretagne, UBS, UBO (LUBEM), CARNOT AGT, Pôle Images & Réseaux, AGROCAMPUS OUEST.

DYNAMICS OF EUROPEAN COOPERATION

The S3 FOOD project and ERA-NET ICT-AGRI-FOOD.



Operational objectives

- *Developing and deploying digital tools for processing, distribution and marketing that meet the new economic, environmental and societal challenges (food quality and safety, environmental standards, working conditions), in particular the robotisation of food processing plants that generate MSDs and numerous repetitive tasks;*
- *Creating a connected power supply cluster and encouraging the creation of startups in this area;*
- *Building a clear offer of industrial demonstrators and technological platforms for access to experiments on laboratory pilots, then semi-industrial and industrial sites.*
- *Supporting the promotion and dissemination of innovations in the agri-food sector at European level;*
- *Evaluating and disseminating promising new processes to industrialists.*

3.3 THE SECURE, RESPONSIBLE DIGITAL ECONOMY

3.3.a SIA IDENTITY SHEET

Leviers thématiques retenus

Cybersécurité
 Electronique
 Photonique
 Données et intelligence
 Images et contenus / Réseaux et IoT
 Spatial
 Technologies numériques sobres et responsables



5 785 établissements
 soit 3% du parc français
 (9ème rang national)



+ de 5 Md€
 de chiffre d'affaires estimé



● 35 000 emplois directs
 ● 26 000 salariés

Soit 3.1 % des emplois de la région
 4.1 % des effectifs salariés du numérique français

Principaux marchés du numérique

DEFENSE AGROALIMENTAIRE
 COMMUNICATION INDUSTRIE
 SANTE AUTOMOBILE
 ADMINISTRATION FINANCES



182 établissements de recherche
7559 familles de brevets depuis 2000

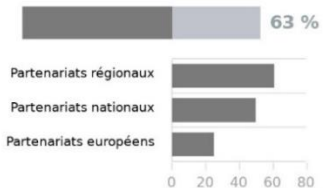


26 établissements de formation



5,4% contribution au PIB de la Bretagne

Entreprises qui ont déjà eu
 une expérience de projets
 collaboratifs



Digital technology is a sector with long-standing roots in the Breton economic landscape. Due to the widespread dissemination of digital data, there is a need to distinguish the designers of tools from the users of these tools, and the S3's strategic innovation area will focus on technology producers. The orientations for this area are more generally in line with the Brittany Region's road map for responsible digital strategies. Within the framework of the S3, the digital sector is understood as an area of strategic innovation as well as one of the components of the cross-cutting axis: the former concerns the development of digital technologies, in which Brittany plays a key role in France and Europe, while the latter addresses the digitalisation of the economy as a whole. These two strands are complementary and must be addressed differently in terms of RDI.

3.3.b SIA STRATEGIC ROAD MAP

SIA ECOSYSTEM

The R&I ecosystem of the digital sector is particularly rich in Brittany with more than 180 research structures, at the forefront of which are major UMRs supported by the Breton Universities, the first national INRIA centre, two sites of the Institut Mines Télécoms Atlantique (IMTA), Centrale Supélec and nearly 30 public or private training establishments.

The Images et Réseaux competitiveness cluster, made up of innovative companies in the field, higher education and research organisations, as well as players in the ecosystem, is a major operator in driving innovation in Brittany's digital sector and forging links between large companies, ETIs, SMEs and research laboratories in collaborative projects.

Brittany’s seven science and technology parks, which are the driving force behind French Tech in the region, support the creation of innovative companies, lead the network of innovative digital start-ups and SMEs, and help to disseminate digital technologies to other economic sectors. The Institut de recherche technologique b<>com is a collaborative R&D entity between research laboratories and companies, and mobilises its own resources or those of its members to implement structuring innovation programmes.

This ecosystem is rounded out by other specialised “technology” or “market” players:

- ◆ The Pôle d’Excellence Cyber, a national centre of excellence based in Brittany, focuses on cybersecurity;
- ◆ The technical centre Photonics Bretagne and the Lannion Campus des métiers et des qualifications (CMQ) Numérique et Photonique;
- ◆ The GIP Campus Esprit specialised in electronics and the MobBi platform of the University of Rennes 1;
- ◆ In the aerospace industry, the GIS BreTel, the Booster Morespace with the Pôle Mer Bretagne Atlantique, the ESA-BIC with the seven technopoles (Technopôle Brest Iroise).

Strategic objective 1	Boosting innovation in digital technologies and applications (electronics, photonics, space, images and content, networks and connected objects, mobility)
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Thematic levers

- Cybersecurity
- Electronics
- Photonics
- Images and contents / Networks and IoT
- Aerospace industry
- Sober and responsible digital technologies

Strategic objective 2	Building collective intelligence around data
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Thematic levers

- Cybersecurity
- Data and intelligence
- Sober and responsible digital technologies

Strategic objective 3	Building leadership in the European cybersecurity and digital security industry
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Thematic levers

- Cybersecurity
- Electronics
- Photonics
- Images and contents / Networks and IoT
- Aerospace industry
- Sober and responsible digital technologies

CYBERSECURITY

MAIN CHALLENGES FOR THE LEVER

Cybersecurity covers a wide range of topics such as encryption, surveillance, identity management, authentication and human organisation. It encompasses hardware, software and services. A rapidly expanding field with a market estimated at between €100 and €600 billion worldwide, it is expected to grow by around 17% on average over the next five years. The major challenges for Brittany are to build and develop the regional cybersecurity ecosystem and make it easier to understand in order to make Brittany a key region in the field of cybersecurity in France and Europe.

BRETON DYNAMICS AND KEY ACTORS

In Brittany, the cyber “sector” currently represents some 8000 jobs and 160 companies. The region is home to the DGA-MI site, the Comcyber and soon the ANSSI.

DYNAMICS OF EUROPEAN COOPERATION

DIH Brittany to support the digitalisation of companies; Leadership of the S3 platform in cybersecurity; ECSO PPP; INTERREG Europe Cyber



Operational
objectives

- *Organising and supporting a strong and growing Breton built ecosystem (attractiveness);*
- *Developing skills and training to meet the growing employment, education and awareness needs of professionals;*
- *Supporting public and private investment in innovative approaches to research and innovation (including C-Cube, a centre of expertise in cybersecurity);*
- *Undertaking collective national initiatives on our territory;*
- *Participating in strategic programmes and projects at European level; support for SMEs to access the European market.*

ELECTRONICS

MAIN CHALLENGES FOR THE LEVER

This field concerns players in the production of electronic components, connectors or printed circuits, the design and assembly of electronic boards, sensors and sub-assemblies, the distribution or even the publishing of embedded software and software tools for the design of electronic systems, but also players in the repair, recycling and maintenance of this equipment. The challenges for Brittany are therefore focused on structuring the electronics sector and supporting the move upmarket, including the environmental dimension.

BRETON DYNAMICS AND KEY ACTORS

- ◆ 220 companies and more than €700M in turnover;
- ◆ 36 research institutions including 250 doctoral students;
- ◆ 10,000 jobs.



Operational objectives

- *Consolidating the research and technology transfer centre specialised in sensors and electronic & digital and photonic systems necessary for the smart and secure management of energy, aeronautics, autonomous mobility and industry;*
- *Identifying the innovative means of production necessary to accompany the sector towards the energy transition and the reshoring of the means of production in a search for sovereignty;*
- *Structuring electronics skills in Brittany to complement the existing dynamics in the other regions, based in particular on a skills map;*
- *Developing sustainable industrialisation and logistics processes for electronics, based on fruitful collaboration between companies and academic laboratories in Brittany;*
- *Analysing the life cycles of electronic products to reduce their carbon impact.*

PHOTONICS

MAIN CHALLENGES FOR THE LEVER

In addition to fibre optic transmissions, photonics also includes lasers, optical sensors and imaging, and is involved in the manufacture of many everyday products. Photonic technologies can also be found in the development of innovative processes for the advanced fields of detection, sorting, processing, machining and data transmission for all application fields.

Four specific challenges have been identified for Brittany, namely, creating a technological centre of structuring excellence to develop highly innovative sensors throughout the value chain; also achieving European and worldwide recognition of photonics expertise in Brittany in order to become a key player in the field; remaining at the forefront of the world development of digital and analogue optical transmission systems; and promoting the use of photonics for the energy transition. Training in these technologies will make it possible to match business demand with the skills of the local workforce.

BRETON DYNAMICS AND KEY ACTORS

- ◆ 80 companies (110 perimeter extended to integrators) and nearly €650M in turnover;
- ◆ 28 generalist research establishments and 10 specialists, including 120 doctoral and post-doctoral students;
- ◆ 5,600 jobs.

DYNAMICS OF EUROPEAN COOPERATION

Inclusion of Photonics Bretagne in the S3 Photonics platform and in the PPP partnership, as well as in the few key bodies of the European networks (EPIC, Photonics21, DIH Photonics).



Operational objectives

- *Positioning Brittany as a major photonics region at European level in terms of research, innovation and economic development;*
- *Encouraging the emergence of Breton companies that are leaders in their technologies on a European scale;*
- *Developing the level of expertise in certain key areas and in particular optical communications (secure and energy-efficient transmission systems), special optical fibres and their applications in lasers, sensors, imagers and transmission systems, photonic sensors with new techniques for the analysis of living organisms and quantum technologies;*
- *Strengthening the industrial dynamism of Brittany through the development of synergies with the academic world.*

DATA AND INTELLIGENCE

MAIN CHALLENGES FOR THE LEVER

This lever covers the entire life cycle of data, from its production, generation/capture, routing, storage, processing, enhancement and finally recycling, whatever its nature, to data infrastructures, data management tools, cybersecurity tools to manage and process data, software and services for data analysis, processing and enhancement (data science).

The main challenges are as follows:

- ♦ Integrating the Regional Data Strategy into the European Data Strategy with a view to promoting the creation of a European Data Area;
- ♦ Contributing to the creation of a European data model which reconciles the interests of economic players and Member States in terms of digital sovereignty and enables the emergence of high added value services based on the use of these technologies;
- ♦ Averting risks of value capture and threats to individual and collective liberties induced by insufficient control of data on the territory.

BRETON DYNAMICS AND KEY ACTORS⁸

- ♦ 60 data enhancement companies (statistical analysis tools, Big Data processing etc.);
- ♦ 23 research establishments, including nearly 750 doctoral students;
- ♦ 20,000 employees concerned by data processing.



Operational objectives

- *Improving the competitiveness of enterprises and the efficiency of public policies through the appropriation of data collection and processing tools;*
- *Building a data infrastructure (datacenter and services) for academic research and its partners;*
- *Encouraging projects for the exploitation of environmental data;*
- *Incorporating ethical rules into the data life cycle;*
- *Integrating work in the field of cybersecurity (see dedicated lever) into the challenges of collecting, storing and processing sensitive data.*

⁸ Survey on the Digital Observatory, BDI 2019

MAIN CHALLENGES FOR THE LEVER

This lever covers all activities relating to the design, production, repair and recycling of products such as software or hardware, or services, making it possible to capture, digitalise, generate, route, store, analyse/process, enhance/restore media-type digital datalike still or moving images, textual, mixed, sound, synthetic, real or hybrid documents. Brittany's ambition is to become a benchmark region at the European level on sovereign and sustainable communication networks.

BRETON DYNAMICS AND KEY ACTORS

- ◆ 1,000 companies concerned;
- ◆ 41 research institutions including more than 250 doctoral and post-doctoral students;
- ◆ 11,000 jobs.



Operational
objectives

- *Participating in a “sovereign” sector of tools for sharing content, communication and digital infrastructures;*
- *Promoting the construction of products and services which meet the needs of application sectors which are both secure and environmentally friendly;*
- *Controlling the value chain of connected objects to promote industrial reshoring;*
- *Positioning the Region on future disruptions of content and networks (communication and quantum processing, new forms of holography and their uses).*

MAIN CHALLENGES FOR THE LEVER

This lever concerns the development of space technologies and their applications:

- ◆ Upstream: technologies, equipment and infrastructures required to carry out a space mission (e.g. satellite, on-board sensor, launch infrastructure, space motorisation, etc.);
- ◆ Downstream: technologies, infrastructures and equipment needed to be able to exploit digital data from a space mission.

The main objective is to structure the sector on the regional territory. This should result in Brittany's positioning as an important region in the field on a national and European scale, with priority for interaction with the other thematic sectors. Brittany will also have to position itself as a precursor in the use of space technologies and their applications, whether at the level of companies or public institutions.

BRETON DYNAMICS AND KEY ACTORS

- ◆ 300 companies which are in the space sector or whose activity contributes to the sector;
- ◆ 50 research actors, including more than 250 doctoral and post-doctoral students;
- ◆ 3,000 jobs.

DYNAMICS OF EUROPEAN COOPERATION

The Brittany Region is a member of the NEREUS network (Network of European REgion Using Space technologies) and will be able to increase its visibility by building on the relationships already established by academic actors, clusters, technopoles, etc., particularly through the COPERNICUS programme (Relay and Academy for MORESPACE and GIS Bretel) and other clusters or networks such as EARSC, ESA BICs or various recent European projects (CONNECT-EO, STEPHANIE, IDEEO, DORIS-Net, etc.).



Operational
objectives

- *Implementing the objectives of the Brittany Region - CNES convention on research, innovation and economic development issues, based on the regional ecosystem;*
- *Promoting the emergence of a Regional Institute for Space Innovation - IRISPACE - based on the strengths of GIS Bretel, ESA-BIC and the technopoles, as well as the Booster Morespace and the Pôles Mer et Images et Réseaux;*
- *Increasing the visibility of the region on a European scale, and consolidating the existing European dynamics;*
- *Reinforcing European leadership of the territory for the development of satellite subsystems in the field of communications and photonics, the development of services and applications from satellite infrastructures related to Earth Observation and/or Positioning and Navigation or communication (digital content) in particular in the maritime field, the uses and appropriation of space technologies and their applications.*

MAIN CHALLENGES FOR THE LEVER

This lever addresses the intrinsic evolutions of digital technology, with the challenge of changing the life cycle of digital technologies to make this cycle sober and responsible.

The digital world itself is a user of resources and the need for digital technology that is more environmentally friendly, more easily recyclable and less energy-intensive is becoming an absolute necessity.

BRETON DYNAMICS AND KEY ACTORS

Brittany has strongly committed to the transitions through the Breizh COP. Several initiatives have been born out of the desire to develop digital technology and its uses, transversally to the application sectors, such as the SMILE dynamic on smart energies (Brittany and Pays de la Loire) or INOUT, implemented by Rennes Métropole, on mobility. The industrial companies present in the region both in the sector of digital technology (Orange, Thalès, Nokia, Interdigital, Dassault Systèmes, etc.) and its uses (PSA, Naval Group, Keolys, SNCF) can contribute, alongside academic players, to working on the challenges identified through an open/collaborative innovation approach with numerous SMEs and digital and applications startups, in conjunction with academics (MARSQUIN, LOUSTIC). Producers of digital technologies are already working on the markets of environmental and climatic changes, in particular with the development of low tech, but it remains difficult to apply these virtuous principles on a large scale in their own product or service design processes.



Operational objectives

- Reducing the energy consumption of the hardware and software components that make up the functional building blocks of communication networks, connected objects and applications, particularly those relating to next-generation content;
- Encouraging the recycling of electronic devices;
- In particular, in the energy and mobility sectors, ensuring that the territory's digital know-how (hardware and software) contributes to environmental changes, towards greater autonomy and security.

3.4 THE HEALTH AND WELL-BEING ECONOMY FOR A BETTER QUALITY OF LIFE

3.4.a SIA IDENTITY SHEET⁹



3.4.b SIA STRATEGIC ROAD MAP

Health needs are growing at all levels (population growth, prevalence of chronic diseases including cancer, ageing population, changing lifestyles, spread of infectious diseases and pandemics, as demonstrated by the COVID-19 health crisis). At the national level, issues include the financial sustainability of the health system, the reduction of social and territorial inequalities and maintenance of the quality of care.

Healthcare industries must therefore successfully transition from a historical model centred on a single product (drug, medical device, diagnostic instruments, etc.) to a model of personalised medicine based on the convergence of several products. The digitalisation of health data and their use and circulation within the health chain require the decompartmentalisation of players and increased collaboration between professionals and with patients. Healthcare independence also appears to be a sovereignty issue in a context of increasing internationalisation and globalised production.

In terms of the composition of its industrial and academic ecosystem, Brittany is presenting itself as a region of innovation and experimentation in health, committed to the health of tomorrow, based on the 6 Ps (preventive, predictive, personalised, participatory and evidence-based medicine, health pathways), putting the patient at the heart of the health system, strengthening the role of prevention and improving patient care, with the prescription of more effective and targeted treatments. The question of uses and e-health makes it possible to respond in part to the needs of patients and to offer them adapted health pathways and

⁹ References: SATT Ouest Valorisation; www.filiere-sante-bretagne.fr; Study « L'emploi dans les industries de la santé en Bretagne » conducted by CCI Bretagne and Biotech Santé Bretagne, funded in conjunction with the CPER <https://fr.calameo.com/read/000906079bd5ccae5a7e0>

follow-up. Brittany can differentiate itself in this field thanks to active collaboration between players in the health and digital sectors.

The challenge of prevention is to support people in their life course, for health and ageing well, by incorporating the dimensions of “health and environment”, “health at work” and “nutrition and health”. Cosmetics can also contribute to everyone’s well-being, with an ecosystem developed and recognised in Brittany.

The employment-skills study conducted in 2020 by the CCI Brittany and Biotech Santé Bretagne on the health industries shows that the level of qualification in the sector is high, with a significant proportion of employees possessing a level of education higher than Bac+3. Innovation is a particularly important competitiveness lever for these companies, with the R&D function being the most common. Quality and regulatory aspects are also sought after. A few professions are still open at baccalaureate level (production operators for example), but the transformations linked to automation should also result in an increase in the required qualifications. Staff training is therefore an important issue.

A need for the development of hybrid trades and skills in advanced technologies has been identified. It is vital to maintain a quality training offer, in order to gain attractiveness and retain research skills, particularly in the public sector.

SIA ECOSYSTEM

The SIAS ecosystem is made up of both higher education and research organisations (UBO, UBS and UNIR universities, grandes écoles, engineering schools - EHESP, ENS de Rennes, ESIR IMT Atlantique, ISEN, etc.) and universities of applied sciences (EHESP, ENS de Rennes, ESIR IMT Atlantique, ISEN, etc.), major research organisations - INSERM, CNRS, etc.), technological platforms, health and medico-social establishments, living labs in health and autonomy, professional federations, more than 400 innovative companies (health, cosmetics) and the Biotech Santé Bretagne technological innovation centre (CDT label), which is the Breton branch of the Atlanpole Biotherapies competitiveness cluster and is at the interface between research players, players in the care sector and innovative companies in health and cosmetics. **Biotech Santé Bretagne** is the main operator for driving innovation in the Breton health sector and forging links between large companies, ETIs, SMEs, research laboratories and healthcare players (public and private hospitals). Other players, such as CRESS Bretagne, are involved in facilitating the SIA. Operators such as other competitiveness clusters (Images & Réseaux, PMBA, Valorial), technopoles, SATT Ouest Valorisation or the PEC also work to coordinate and implement collective action plans. Federations of health professionals and establishments in Brittany, the Regional Health Agency and their operators (GCS e-Santé, FHF or GCS HUGO for example) may also be involved, along with local authorities.

Strategic objective 1

Becoming a leader in health technologies, including innovative medical devices and e-health solutions

Thematic levers

- Health technologies
- Disability
- Ageing well

Strategic objective 2	Increasing innovation in (bio)therapies, including the development of new molecules and biomaterials, and the identification of biomarkers in precision medicine.
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Thematic levers

- Innovative (bio)therapies
- Health technologies (for patient monitoring)

Strategic objective 3	Strengthening regional excellence in “good living” in a context of global transitions including prevention (environment, nutrition, sport, work, behaviour) and cosmetics.
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Thematic levers

- Prevention – nutrition - environment work
- Ageing well
- Disability
- Cosmetics

TECHNOLOGIES FOR HEALTH

MAIN CHALLENGES FOR THE LEVER

- ♦ **Being recognised as a leading European region with regard to technologies for health** through excellence in research and high-level innovative training that meets the needs of healthcare companies/institutions;
- ♦ **Developing added value in the territory thanks to technological innovation co-constructed with users** (professionals and patients/citizens), whether for diagnostic, therapeutic, patient follow-up or healthcare improvement purposes. This lever concerns innovative medical devices, secure and interoperable e-health solutions where appropriate. It encompasses medical imaging, computer-assisted surgery, massive data exploitation, artificial intelligence, cybersecurity, interoperability, IoT and technical solutions to support the life course of patients and vulnerable persons.

BRETON DYNAMICS AND KEY ACTORS

- ♦ A research force made up of 17 research units (major research organisations and universities in Brittany); hospital centres (CHU, CH) for testing innovations; engineering schools, EHESP, IRT B<>com, CIC-IT in Rennes, three platforms dedicated to medical imaging, platforms on the use of digital technology, living lab health autonomy; an inter-regional network of 34 life science platforms (Biogenouest);
- ♦ Several innovative structuring projects (FHU, RHU, Labex, data warehouses and platforms, data management infrastructure and data chaining);
- ♦ More than 150 companies, 200 public and private healthcare establishments, 1500 medical and social establishments and services, a GIP (SIB) and the GCS-e-santé Bretagne.

DYNAMICS OF EUROPEAN COOPERATION

- ◆ Participation in the S3 Medtech platform, in the EchAlliance network and in INTERREG projects (e.g. INTENCIVE project), accompaniment of research units and companies by members of the Noé network;
- ◆ Positioning of the health sector in the Digital Innovation Hub project (DIH Bretagne);
- ◆ Involvement in European projects ERC, H2020, Erasmus+, Digital Health Europe, SME Instrument, etc.



Operational objectives

- *Strengthening the regional “Big Data/AI/Cybersecurity/interoperability” strategy to structure access to and management and use of health data for the development of innovations;*
- *Continuing support for innovative companies in health technologies by promoting the development/creation of platforms for the evaluation of medical devices and e-health solutions and by backing innovation co-construction initiatives with users;*
- *Structuring the e-health sector so that it is recognised nationally and internationally by 2025;*
- *Reinforcing training on offer within academic institutions in line with the needs of companies and 6P medicine (supporting interdisciplinary training courses in engineering sciences, digital sciences, SHS).*

EXPECTED OUTCOMES

- ◆ Greater national recognition of Brittany’s massive health data;
- ◆ A medical devices and e-health sector that is structured and internationally recognised, in particular through its excellence in the fields of cybersecurity/data security and interoperability in health, and attractive for companies (target of +30% of companies, including production sites);
- ◆ Recognition of Brittany as a land of co-construction and experimentation in health, associating patients/citizens and contributing to the development of 6P medicine through training, research and the implementation of interdisciplinary structuring projects, and the monitoring of cohorts of patients benefiting in particular from breakthrough medical innovations.

INNOVATIVE (BIO)THERAPIES

MAIN CHALLENGES FOR THE LEVER

- ◆ Strengthening the Region’s position in the field of innovative (bio)therapies, with expertise recognised at European level, more specifically in the value enhancement for health of molecules from agricultural or marine resources, their (bio)production, in the development of new chemical synthesis routes, in the development of new biomaterials, as well as in the development of investigation models in toxicology and infectiology and the identification of new biomarkers in the context of 6P medicine;

- ◆ Having a more visible and attractive biotech health sector for researchers, clinicians, companies and major pharmaceutical companies;
- ◆ Structuring research-training-innovation ecosystems recognised at national and European level on specific areas (cancer, auto-immune diseases, etc.);
- ◆ Making Brittany a territory for co-construction and experimentation as well as a territory for evaluating health policies and proposing new models.

BRETON DYNAMICS AND KEY ACTORS

- ◆ A research force made up of 23 units and involvement in structuring projects (FHU, Labex, national infrastructures, labcoms, Carnot), an interregional network of 34 life science platforms (Biogenouest);
- ◆ Three biological health resource centres, 200 public and private health care establishments (including two university hospitals);
- ◆ Some sixty companies operating in the field of health biotech, CROs, pharmaceutical production sites; companies that can provide resources of marine and agri-agro origin for health innovations.

DYNAMICS OF EUROPEAN COOPERATION

- ◆ Involvement in the dynamics of the European network of clusters dedicated to biotechnologies and health (CEBR), involvement in IMI 2 (Innovative Medicine Initiative) and H2020 projects; capitalisation on INTERREG ADAPT and BOOST4Health projects for example;
- ◆ Contribution of expertise to biocide dossiers at national and European level.



Operational objectives

- *Promoting the development of innovative molecules derived in particular from marine resources, from POC to bio-production;*
- *Encouraging the development of new synthesis routes for molecules and biomaterials and the setting up of a production platform;*
- *Developing fundamental research in integrative and systems biology as well as translational research;*
- *Supporting initiatives to develop innovative human cell models and bioartificial organs to test the effect of new therapeutics;*
- *As part of the “One Health” concept, strengthening work on the transmission of emerging and/or zoonotic infectious agents and structuring regional expertise on microbiotes (salivary, pulmonary, cutaneous, intestinal, etc.);*
- *Establishing a large-scale strategy on massive epidemiological, bioclinical and genetic data by developing high-resolution “multi-omics” (e.g. metabolomics) approaches to the individualised response to treatment by (bio)therapies.*

EXPECTED OUTCOMES

- ◆ An area recognised for the development of new therapies from the sea, new biomaterials or new synthesis paths;
- ◆ An attractive area thanks to the implementation of quality cohorts and the development of multi-omic analyses for the monitoring of personalised therapies and the identification of biomarkers;
- ◆ Consolidation of expertise on pre-clinical investigation models in toxicology and infectiology;

- ◆ Recognition of Brittany as a land of co-construction and experimentation.

PREVENTION – NUTRITION - ENVIRONMENT - WORK

MAIN CHALLENGES FOR THE LEVER

- ◆ Making Brittany, in a context of global transition, a region recognised at national and European level in the fields of prevention, especially by acting on determinants linked to the environment, diet, physical activity, well-being at work or addictive behaviour, including in the “One Health” approach. In particular, this will involve developing innovative solutions (nutritional with health claims, digital, environmental, social, organisational, etc.) and setting up new cohorts to better identify the overall health determinants of the regional population;
- ◆ Becoming an international centre of excellence in the field of exhibitions for the benefit of prevention, and obtaining national (TGIR) and even European (ESFRI) recognition for the chemical “exposome”;
- ◆ Developing predictive models (using Big Data) for food and environmental quality, well-being and risk assessment.

BRETON DYNAMICS AND KEY ACTORS

- ◆ A research force made up of 31 units: Biological Resource Centres (BRCs), Centres of Competence in Rare Diseases (CCMRs), an interregional network of platforms;
- ◆ Agri-food companies, specialising in ingredients of marine or agricultural origin, as well as companies in the field of analysis and digital solutions for prevention;
- ◆ A Carnot AgriFood Transition institute supported by the ACT Food Bretagne federation;
- ◆ Care and prevention actors mobilised to develop new responses adapted to the needs of the population;
- ◆ A Regional Health Observatory and a Campus of Sports Excellence.



Operational objectives

- *Using clinical studies to demonstrate the health benefits of new food offerings for different target populations;*
- *Structuring regional public and private expertise on microbiotes and setting up a dedicated database;*
- *Developing a global prevention strategy, in particular for chronic diseases (including cancer) and psychological risks;*
- *Strengthening Brittany in the field of cohorts to better identify the determinants of the population’s health;*
- *Introducing a large-scale strategy for the management of massive epidemiological, bioclinical and genetic data;*
- *Making Brittany an international centre of excellence on the exposome for prevention and a land of innovation in the fight against environment-related risks, by investigating the new challenges linked to climate change, endocrine disruptors, waves and nanomaterials, etc.*

EXPECTED OUTCOMES

- ◆ A structured ecosystem that can be harnessed for the health validation of food offers in primary and secondary prevention;
- ◆ Recognition of regional competences on microbial, epidemiological and prevention aspects;
- ◆ A region recognised as a land of prevention, particularly with regard to chronic diseases;
- ◆ A TGIR or even ESFRI (at the European level) type recognition on the chemical exposome.

DISABILITY

MAIN CHALLENGES FOR THE LEVER

- ◆ Structuring the sector of disability (physical, mental and sensory) and loss of autonomy in Brittany, through innovation for the health and well-being of people with disabilities;
- ◆ Leveraging the Handicap Innovation Territoire structuring project to increase its impact and enhance the national and international visibility of the disability sector;
- ◆ Promoting “handicapowerment” and the well-being of citizens with disabilities throughout their lives (also involving carers), thus making Brittany a land of innovation in terms of the integration of people with disabilities.

BRETON DYNAMICS AND KEY ACTORS

- ◆ A mobilisation of research players with 16 research units/teams/platforms within Breton universities, organisations and Grandes Ecoles, on both technological (materials, digital, etc.), health and SHS aspects, including a Chair in Home Support Services (M@D);
- ◆ 45 innovative companies (technological assistance, prostheses and equipment, digital solutions for monitoring and care, home automation, Internet of Things);
- ◆ More than 750 social and medico-social establishments for adults and children with disabilities, and a network of Living Lab Santé Autonomie.



Operational objectives

- *Consolidating the dynamics developed as part of the HIT project in the Lorient Agglomeration and partner territories (Rennes and Brest) and disseminating the innovations developed in Brittany at national and international level, in particular via the CoWork'HIT centre;*
- *Facilitating reflection on data in the field of disability with a view to future innovations;*
- *Developing multidisciplinary research and training initiatives involving users, businesses and local authorities;*
- *Developing inclusion models and promoting the “good life” for people with disabilities (educational, professional - especially for young people - and social inclusion, prevention through nutrition, sport) to improve the life course of people with disabilities;*

- *Strengthening the strategy around the Living Labs Health Autonomy and promoting the development of the REHAB-LAB community.*

EXPECTED OUTCOMES

- ◆ A centre of expertise and resources, CoWork'HIT, with national and international influence;
- ◆ A structured, attractive network of Living Lab Health Autonomy in rehabilitation/rehabilitation;
- ◆ Breton leadership for the REHAB-LAB community at the European level;
- ◆ Improved life courses for people with disabilities, thanks to technological and organisational innovations.

AGEING WELL

MAIN CHALLENGES FOR THE LEVER

- ◆ Improving the quality of life of older people on the territory, in terms of not only health, social links and inclusion in society but also food and housing;
- ◆ Making Brittany a region recognised at national and European level for promoting “ageing well” and developing innovation in the sectors of health, well-being and the life course of older people - including those with disabilities.

BRETON DYNAMICS AND KEY ACTORS

- ◆ The CRESS and the actors gathered within the association Kozh Ensemble coordinate the regional dynamics on the issue; a steering committee brings together some twenty actors from the territory (universities, university hospitals, health professionals, companies, associations, local authorities, the State);
- ◆ A dozen research units are involved, the Home Support Services chair (M@D);
- ◆ More than 30 technology companies offering solutions for home care and home automation.



Operational objectives

- *Structuring the sector through the identification and linking of stakeholders;*
- *Coordinating actions between companies, beneficiaries and local authorities to identify the main needs and propose appropriate and rapid responses, in particular with regard to health and social issues;*
- *Developing a gerontopôle / resource centre type dynamic and a collective tool on “Ageing well” to encourage the emergence and development of innovative companies or services in Brittany;*
- *Promoting care and remediation of cognitive disorders.*

EXPECTED OUTCOMES

- ◆ A better quality of life for older people (social ties, living arrangements, health, nutrition, etc.) and their carers;
- ◆ The structuring of a network of companies in connection with universities, research laboratories and training structures on the problems of ageing.

MAIN CHALLENGES FOR THE LEVER

- ◆ Reinforcement of the image of a territory of well-being;
- ◆ Recognition of Brittany as a reference territory at national and international level in terms of innovation in marine cosmetics and biotechnologies applied to cosmetics (ingredients, active ingredients, efficacy tests, cell models, analyses, etc.);
- ◆ Reduction of the impact of cosmetic innovations on health and the environment.

BRETON DYNAMICS AND KEY ACTORS

- ◆ A dense research and training ecosystem (network of technological platforms, renowned research centres, cutting-edge training in cosmetics and/or marine biotechnologies);
- ◆ An international leader in plant cosmetics and innovative, exporting SMEs.



Operational
objectives

- *Positioning Brittany as an international leader in marine and sustainable cosmetics and strengthening the image of an innovative region through the encouragement of cross-fertilisation with other sectors;*
- *Boosting production of eco-labelled cosmetic products;*
- *Consolidating skills or platforms for the production and value enhancement of local bio-resources in cosmetics;*
- *Strengthening ties between industrial players and scientific experts;*
- *Increasing the participation of Breton academic teams in cosmetics research networks (GDR CNRS, etc.) and developing partnerships in biotechnologies, including marine biotechnologies.*

EXPECTED OUTCOMES

- ◆ Increase in the number of innovative companies and job creation in the field;
- ◆ Increased participation of Breton academic teams in cosmetics research networks;
- ◆ Development of partnerships in biotechnologies, including marine biotechnologies, notably through the hosting of events in the cosmetics sector;
- ◆ Development of innovations at the crossroads of sectors, networking of stakeholders.

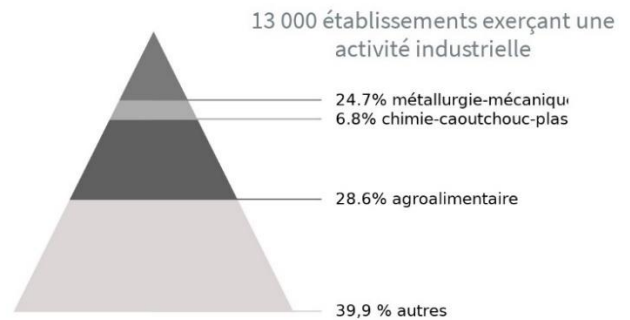
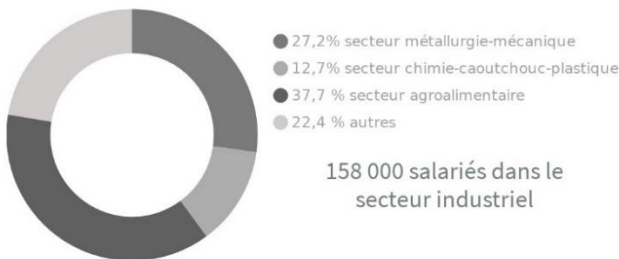
3.5.a SIA IDENTITY SHEET¹⁰

Leviers thématiques retenus

Matériaux
Technologies liées à la production industrielle
et technologies de production
Energies
Industrie des mobilités
L'humain dans l'industrie et les usages

121 établissements de recherche
1 990 familles de brevets depuis 2000
20 000 publications scientifiques depuis 2000

29 plateformes technologiques
23 Mds € de CA dans le secteur de la métallurgie
180 M€ de CA dans le secteur des composites



3.5.b SIA STRATEGIC ROAD MAP

France experienced an unprecedented industrial shock in 2020 with a risk that the manufacturing industry will drop below the critical threshold of 10% of GDP that threatens the entire national economy, and indeed the regional economy. In this context, the Breton industry must face several challenges:

- ◆ **Ecological sobriety and environmental responsibility:** decarbonising and producing more cleanly, through the reduction of polluting or noise emissions, in a more resource-efficient way (energy, water, raw materials), and by promoting the circular economy and new energies;
- ◆ **Repositioning people at the heart of industry:** employee training, particularly in connection with the performance contract for metallurgy, in order to integrate new technologies, the attractiveness of professions, development of the quality of life, health and safety at work, and development of user-centred approaches;
- ◆ **Performance and competitiveness:** in particular through integration into companies in order to accelerate their modernisation towards industry 4.0 (robotics, artificial intelligence, cyber, etc.) and to promote their attractiveness (among young people in particular);
- ◆ The challenges of industrial **sovereignty** are also key, with the need to keep production sites in the regions or even reshore some production.

Efforts to structure the ecosystem must be continued, particularly through a collaborative approach and the cross-fertilisation of sectors. Since these challenges are imposed on all players on a European, if not global,

¹⁰ Sources: Key figures for metallurgy (Fusion 92 UIMM), SATT Ouest Valorisation, GREF

scale, the challenge is also to support the development in Brittany of an innovative technology offer for industry. Finally, the aim is to promote the identification of Brittany as a leading region for certain technologies (e.g- friction stir welding, laser material treatment and surface technologies).

SIA ECOSYSTEM

Research actors and platforms. The academic research ecosystem is made up of all the Breton universities, major organisations and grandes écoles (ENS de Rennes, IMT-Atlantique, INSA de Rennes, ENSTA Bretagne, ENIB, etc.). Several meta-research projects (MAT&TRANS, coordinated by the University of Rennes 1; INDUSTRIE DU FUTUR, coordinated by the University of Bretagne-Sud; IF-SYS-Mer, coordinated by ENSTA Bretagne) are presented to the CPER in connection with this SIA. The technological platforms of institutions such as SUNI (ENS), CompositIC (UBS in partnership with ID Composite in St Brieuc), GCM (INSA in Rennes) but also SCAP Industrie (UBS) and MASMECA of ENSTA Bretagne, as well as the Campus Esprit in Redon, contribute to the development of new products and processes.

Innovation actors. The ID4CAR and EMC2 competitiveness clusters are major operators in driving innovation in Brittany’s industrial sectors, and forging links between large companies, ETIs, SMEs and research units in collaborative projects. The technological innovation centres, including the technical centres of the Cristal cluster (climatic engineering) and the Institut Maupertuis (industrial technologies), as well as the Excelcar platform, play an essential role as a link between research and the innovation needs of the various industrial sectors.

Industrial actors. The industrial scope of the SIA is twofold: industrial companies wishing to innovate in their own modes of production as well as suppliers of key technologies for the transformation of industries. The Breizh Fab collective programme brings together the entire Breton ecosystem at the service of the development of industry in the region (CETIM, UIMM, CCI Bretagne, Institut Maupertuis, FIN, PlastiOuest, ABEA, France Chimie Ouest Atlantique, etc.).

Strategic objective 1	Developing advanced production technologies to increase competitiveness
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Thematic levers

- Materials
- Technologies related to industrial production and production technologies
- Mobility industry

Strategic objective 2	Developing a transition industry
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Thematic levers

- Materials
- Energies
- Mobility industry
- People in Industry and Uses

MATERIALS

MAIN CHALLENGES FOR THE LEVER

Whatever the industrial sectors considered, the needs to redesign the materials, transformation processes, structures and objects that result are immense. They stem from the demands of a society concerned with energy savings (lighter transport structures, insulation), productivity gains (increasingly reliable wind turbines and hydro turbines), safety (smart, self-repairing materials) and respect for the environment and health (biomaterials, choice of resources, recyclability and end of life, waste management). Simulation tools must be able to connect by incorporating the selection of materials, process simulation and the evolution of residual constraints during development using these technologies. They must also integrate the evolution of properties over time.

BRETON DYNAMICS AND KEY ACTORS

- ◆ Benchmark players in the academic sector (universities, grandes écoles, major research organisations), operators of technological platforms (ComposiTIC, ID Composite, GCM, etc.) and a specialised technical centre (Institut Maupertuis). Research is carried out in particular by the laboratories involved in the meta-projects presented at the CPER (ISCR, IPR, IETR, ScanMAT, LGCGM, IRDL, CEMCA, Optimag for MAT&TRANS; Lab-STICC, IRDL, ENSTA and ENS research units for the Industrie du Futur project);
- ◆ An industrial ecosystem made up of large groups, a network of SMEs throughout Brittany and a few startups;
- ◆ A FabLabs network.

Brittany can rely on innovative sectors in materials, particularly composites. Research and innovation, often born in the field of excellence of competitive sailing, find applications in many markets: automotive, space, aeronautics, energy, telecommunications and defence, health, construction, sea, etc.



Operational objectives

- *Encouraging the emergence of new materials (in particular biosourced ones) or assemblies to accompany the economic changes in the sectors: energy, construction, land and sea transport, packaging, etc.: energy, construction, land and sea transport, packaging, etc.;*
- *Contributing to safer production using enhanced performance materials, including in harsh environments;*
- *Giving thought to the materials linked to their processes and production tools;*
- *Reducing the environmental impact of materials and devices by promoting reuse, recyclability and waste management;*
- *Developing a range of qualifying and more cross-cutting training courses.*

TECHNOLOGIES FOR INDUSTRIAL PRODUCTION

MAIN CHALLENGES FOR THE LEVER

- ◆ **Developing new, more competitive and sustainable manufacturing processes**, to achieve new performances in terms of output, lead time, lifespan, quality, customisation, eco-efficiency, eco-design, functionalisation, etc;
- ◆ **Controlling and improving process/product quality** to guarantee products throughout their life cycle, prevent production stoppages and thus optimise the productivity and durability of products and machines;

- ◆ **Automating and increasing the flexibility of production systems** in order to enable efficient production management: development of robotics/cobotics and plug-and-play production system management tools, in a “reconfigurable factory” approach;
- ◆ **Developing the plant’s digital twins** to optimise design and operation, speed up projects for the installation of new equipment, consolidate data in real time for process drift monitoring, quality prediction, predictive maintenance and facilitate training by involving future users in the virtual environment.

BRETON DYNAMICS AND KEY ACTORS

The key industrial actors (principals, subcontractors, equipment manufacturers, integrators and design offices) and R&D players are brought together by the four competitiveness clusters dedicated to industrial sectors (EMC2, ID4CAR, Images&Réseaux, Valorial), industrial clusters, technical centres but also the dynamics of ongoing industrial transformation.

Research is driven by laboratories like IRDL, ISCR, Lab-STICC, IETR, IRISA, the INRIA centre in Rennes, as well as institutions, laboratories, departments and research teams from universities and grandes écoles in Brittany.



Operational objectives

- *Developing and disseminating advanced manufacturing, assembly, surface treatment and shaping processes for different materials in order to increase skills and speed up their integration by industry;*
- *Developing industrial ecodesign;*
- *Developing and disseminating means of real-time and online control of processes, as well as monitoring tools (connectivity);*
- *Developing robotisation and/or process automation and their integration into the process;*
- *Accelerating the flexible, reconfigurable and compact factory approach;*
- *Developing tools based on the virtualisation of the factory and expanding the digitalisation of production through the development of digital tools in an approach based on efficiency, competitiveness, flexibility and security.*

ENERGIES

MAIN CHALLENGES FOR THE LEVER

- ◆ Developing ecosystems for the use of 100% renewable hydrogen, in line with Brittany’s renewable hydrogen roadmap (new storage materials, technologies for transporting and storing energy produced at sea, conversion of zero-emission fleets, new generations of electrolyzers);
- ◆ Reducing consumption through energy efficiency and sobriety (reducing the energy impact of housing, developing less energy-intensive and recyclable lighting solutions, developing digital applications for the energy transition and deploying low-carbon digital networks), changing uses and production methods);
- ◆ Developing smart energy systems and diversifying the uses of renewable electricity;
- ◆ Developing the production of next-generation renewable energies;
- ◆ Facilitating energy-climate research and innovation and integrating the issues of training/expertise, via the strengthening of interactions between socio-economic actors, laboratories and academic platforms, in order to produce alternative energy-climate scenarios.

BRETON DYNAMICS AND KEY ACTORS

As far as academic research is concerned, several benchmark centres exist in Brittany: research organisations, ISCR, LGCGM, Foton, IPR, IETR, CEMCA, IriSa, IRDL, IFPEN, BRGM Brest, ITE France Energies marines, etc. Major groups (industrialists, network operators), a network of SMEs and startups, are involved in the field of energy. Public-private collective dynamics, organised around structuring industrial and territorial projects, exist in the field of smartgrids (“Smart Ideas to Link Energies”, SMILE facilitated by BDI), marine energies (around France Energies Marines and the Breton MRE roadmap), renewable hydrogen (within the framework of the Breton roadmap for the deployment of renewable hydrogen). The Breton Energy and Climate Transition Conference is the regional consultation body for all stakeholders.

DYNAMICS OF EUROPEAN COOPERATION

Several INTERREG project dynamics were launched during the period (“SET UP” project in the smartgrid sector; “TIGER” project on the Paimpol-Bréhat water turbine test site and “ICE” project on Ouessant in the MRE sector; “EMPOWER” project on energy data and their uses; “EERES4WATER” project for the promotion of energy efficiency and renewable energies in water networks). H2020 projects (FET OPEN and FET Proactive) have also been financed, notably on photovoltaics with INSA as partners in the DROP-IT and Nano-EH projects.

The Region is also part of the European S3 platform for the establishment of industrial cooperation for hydrogen valleys and coordinates the “Port and Maritime Hydrogen Ecosystem” group involving more than seven European regions.



Operational objectives

- *Building one of the first commercial floating wind farms in France, integrating in particular a value enhancement component for part of the energy in the form of hydrogen (South Brittany);*
- *Encouraging the emergence and consolidation of Breton companies involved in sectoral energy transitions;*
- *Elaborating energy models, technology bricks and demonstrators, then pilots and industrial pre-series; and defining business models for these processes;*
- *Articulating and coordinating the ecosystem around structuring projects defined by the Brittany Renewable Hydrogen Road Map, but also around energy management and the use of thermal heat.*

THE MOBILITIES INDUSTRY

MAIN CHALLENGES FOR THE LEVER

Strongly structured by the automobile sector, the Breton industry must respond to changes in the market for the mobility of goods and people, including in view of the challenges of new forms of mobility (multimodality, bicycles, electric vehicles, etc.). Mobility therefore faces the following major challenges:

- ♦ **Energy transition:** developing the roadmap for carbon neutrality and the actions needed to be an actor in the energy and ecological transition (electrification of motors, development of “soft” mobility, renewable energies, etc.);
- ♦ **Industrial transition:** guaranteeing the future of automotive plants in a sector undergoing strong global change with pressure on high-cost sites, by facilitating the establishment or modernisation of

sites, anticipating skill needs and the evolution of training courses, and developing new activities (electric bicycles, porters, last mile, etc.);

- ◆ **Digital transformation:** accelerating the development and implementation of solutions to support the gradual change in mobility consumption habits towards new uses and new services (e.g. carpooling);
- ◆ **Technological acceleration:** innovating on (cyber)security and automation of mobile systems (robotisation technologies, AI), made possible by the progressive deployment of connectivity for cars, shuttles, buses and trucks (growing autonomy);
- ◆ The issue of **mobility as a factor of socio-economic inclusion** is also a major challenge.

BRETON DYNAMICS AND KEY ACTORS

The players are both the principals of the regional automotive industry with large sites, cutting-edge techno-providers, mobility service providers, universities, research organisations and engineering schools (CNRS, IMT Atlantique, INRIA, Centrale Supélec, INSA Rennes, UR1, UBO, UBS, ENSTA Bretagne) and technical centres (Maupertuis, EXCELCAR).



Operational
objectives

- *Encouraging innovation projects that meet the major challenges of the sector: optimising the functional and ecological performance of vehicles through the development of new materials and associated processes, bringing new functionalities to vehicles by developing on-board electronics and intelligence, proposing new uses by developing new architectures and new complete add-on modules;*
- *Responding to the new mobility challenges through the development of smarter services and infrastructures,*
- *Maintaining the regional industrial sites of the automobile sector (and encouraging new locations / reshoring);*
- *Creating an industrial campus accelerating the mobility industry, in particular in connection with metropolitan Rennes;*
- *Developing the attractiveness of the sector and supporting skills needs; defining new training courses that meet the needs of the mobility industry, by strengthening the links between training institutions and companies;*
- *Coordinating the ecosystem of mobility service stakeholders (ICTs, specific vehicles, operators) while working on new mobility schemes as close as possible to the territories.*

PEOPLE IN INDUSTRY AND USES

MAIN CHALLENGES FOR THE LEVER

- ◆ **Encouraging the development of operator assistance technologies;**
- ◆ **Accelerating the professional integration of people with disabilities in industry:** raising awareness and promoting jobs for people with disabilities, partnerships with adapted systems, workplace adaptation, training for employees in how to welcome people;
- ◆ **Accompanying the evolution of skills and the transmission of know-how:** facilitating access to training (digital tools, “gamification”), accelerating experiments in a virtual environment, supporting

the leveraging of know-how, to change the image of the industry and reduce arduous work, with a view to developing the attractiveness of the industry;

- ◆ **Development of new user-centred approaches and methodologies:** backing and encouraging the use of new tools and technologies that integrate empathy and emotions in order to encourage their adoption by as many people as possible, leading the community and encouraging the emergence of innovation projects by integrating methodologies based on user experience, sociology and psychology.

BRETON DYNAMICS AND KEY ACTORS

The territorial dynamics are first of all part of the Breizh Fab industry transformation programme and the Committee for the Development of Industries in Brittany (CDIB), as well as the actions of ARACT, which intervenes specifically on working conditions.

The key players in research and innovation are the four competitiveness clusters dedicated to industrial sectors, industrial clusters, technical centres, platforms (IMMERSTAR, IMMERSIA and IMMERMOME), the IRT B<>COM, as well as several research units such as the CERV, IRDL, IRISA, LOUSTIC, Lab-STICC, LAUREPC and PTAC. INSA is also identified. The MSHB must play a driving role in ensuring that this lever is fully embodied in R&D programmes in Brittany. A few startups are also emerging specifically on this issue.



Operational objectives

- *Increasing the number of collaborative innovation projects integrating uses from the design stage, in conjunction with employees/operators and Human and Social Sciences skills to measure the effects of innovations during and at the end of projects (new forms of work organisation, production tools to improve working conditions, etc.), following the example of the CPER INDUSTRIE DU FUTUR project (creation of a platform for describing human factors in Factory 4.0 and a platform for the ergonomic and cognitive evaluation of technologies);*
- *Incorporating “human factors” into the development of new technologies;*
- *Supporting skills development to strengthen the attractiveness of the industry;*
- *Developing new methodological tools which incorporate empathy and emotions;*
- *Increasing the inclusion of people with disabilities in industry and employment.*

4.

MONITORING AND EVALUATION-EVOLUTION



4. MONITORING AND EVALUATION-EVOLUTION

4.1 AN ONGOING AND EVOLVING R&I POLICY

A monitoring and evaluation system for Brittany's S3, for the period 2021-2027, aims to provide a tool for steering the regional innovation strategy. The S3 monitoring and evaluation system has been designed to meet the following objectives:

- **Reporting continuously on the achievements and results** of the implementation of the S3 at a global level but also by the SIA and the cross-cutting axis;
- **Having elements for questioning the relevance of the strategy**, and its operational variations, and revising it if necessary;
- **Facilitating roadmaps and action plans** by the SIA and the cross-cutting axis;
- **Having reporting and communication elements** (Executive, CCRRDT, regional authority, ecosystem, general public, etc.) **at the service of S3 governance.**

This monitoring-evaluation is designed to allow continuous S3 monitoring. The strategy includes numerous support, assistance and funding mechanisms for innovation in all its forms, mobilising a wide range of operators in the territory in connection with the strategic innovation areas (SIAs) and the cross-cutting axis. In defining the indicators, it will be necessary to propose a scope that covers the exhaustiveness of the SIAs and the cross-cutting axis, as well as the associated roadmaps, while responding to the different strategic objectives pursued through S3 implementation.

The evaluation mechanism will be based on existing observatories (in particular those run by BDI, the consular network, and the BDI/2PE European Projects Observatory) as well as the skills bases of ESRI players (CRAFT and Plug in labs Ouest, Ouest valorisation) identified through the prism of the S3 and fed by some fifty contributing players, most of whom are involved in running the S3.

The monitoring and evaluation mechanism is placed under the responsibility of the Regional Council and its departments, for reporting in particular to COPIL S3, but it will be everyone's role and responsibility to contribute to it.

4.2 CONTINUOUS EVALUATION AND INDICATORS

The S3 monitoring system is based on a set of three types of indicators:

- **Context indicators:** these make it possible to monitor the changing regional context in terms of innovation and identify new sectoral dynamics that could lead to changes in the SIAs and the cross-cutting axis included in the S3;
- **Achievement indicators:** these measure and monitor the achievement of the strategy, through the implementation of the different roadmaps and action plans by the SIA and the cross-cutting axis;
- **Performance indicators:** these measure and monitor progress towards expected results, and establish the 'success' of the action at the overall level of the S3, by the SIA and the cross-cutting axis.

The S3 monitoring system is based on shared tools/dashboards that make it possible to define the following for the different types of indicators: the location and source of the data; the data collector; the means of collection; the collection process; the collection timeframe; the method of calculating the indicators; and the values.

Innovation ecosystem actors have a role to play in ensuring that the specific dashboards are fed by the SIA and the cross-cutting axis. Moreover, the monitoring system must be consistent with the ERDF monitoring system and the various mandatory common indicators that will be collected and calculated for all RDI operations benefiting from ERDF funds. The S3 monitoring mechanism alone cannot respond to the analysis and understanding of the dynamics (achievements and results) associated with the S3. Accordingly, the Regional Council proposes to set up a specific mechanism for continuous evaluation.

The evaluation mechanism will be based on the following elements:

- **Annual SIA review**, proposed by the SIA focal points, explaining achievements and results. This assessment is based on the evaluation of output and result indicators by the SIA;
- **Annual review for the cross-cutting axis**, proposed by the transition referents, explaining the achievements and results obtained. This assessment is based on the evaluation of the achievement and performance indicators of the cross-cutting axis;
- **Annual review of S3 achievements and performance**, proposed by the COPIL S3 secretariat, explaining achievements and performance at a global and aggregated level. This assessment is based on the development of achievement and performance indicators at the S3 level;
- **Establishment of a mid-term implementation and impact evaluation** to verify the efficiency, relevance and effectiveness of the strategy (outsourced work);
- **Establishment of an ex-post evaluation of implementation and impacts**, making it possible to take stock of the strategy and prepare its updating (outsourced work, etc.).

4.3 TOOLS FOR S3 IMPLEMENTATION

For its implementation, the Breton S3 will be able to rely on support from the European Union (direct and indirect), the State (at national or regional level), national agencies (Bpifrance, ADEME, etc.), the Regional Council, and Breton local authorities.

All public levels are in fact the support structure for the implementation of the S3:

- The first pillar is naturally made up of European policies supporting research, innovation and economic development, embodied in Horizon Europe, but also in Digital Europe or cooperation policies (INTERREG, etc.), and obviously within the “Green Deal” and the European recovery plan. Indeed, participation in European programmes should also help to strengthen the resilience and digitalisation of the Breton economy. The European Commission has therefore launched a major initiative called the “Green Deal”, aimed at accelerating the transition of the EU Member States towards a model that is more respectful of the major natural equilibria. Particular emphasis should be placed on the emergence of innovative European projects to prepare the regional territory for climate change and disseminate models of societal innovation in the economic and academic worlds (low tech, circular economy, relocation, new uses, open innovation, etc.). As for the Digital Europe programme, it is geared to enhancing the European Union’s capacities in global technological competition (digitalisation, cybersecurity, etc.). Brittany has a rich ecosystem in terms of digital skills, which should enable the region to be proactively involved in this European dynamic (DIH, etc.);

- The second pillar consists of national research, innovation and economic development policies, whether they are policies implemented by the Ministry of Higher Education and Research - MESRI, the DGE or other thematic government policies (food, health, environment, etc.). These national policies will in particular be crafted to support the S3 in their implementation of the Future Investment Programme coordinated by the SGPI (laboratories and equipment of excellence, SATT, technological research institutes - IRT/ITE, etc.);
- The third pillar is that of the regional policy to support research and innovation in all its forms (including social), to support the research programmes of Breton laboratories, the engineering needs of the higher education, research and innovation ecosystems - in particular technological innovation centres -, collaborative projects between laboratories and companies - in connection with competitiveness clusters -, industrial chairs, as well as innovative projects of companies, in particular SMEs, through the range of INNO schemes for example. The regional policy also provides backing for cross-cutting actions, such as the promotion of public research and technology transfer actions towards the Breton economy (notably through the partnership agreement with SATT Ouest Valorisation), support for student entrepreneurship (PEPITE Bretagne), for the creation (Emergys Bretagne Incubator) or development of innovative companies (Booster Bretagne type accelerator);
- Finally, the S3 will be able to rely on support from Brittany's local authorities (départements and EPCI) according to their competences, orientations and priorities.

TOWARDS A CPER AND AN ERDF/FSE+ OPERATIONAL PROGRAMME ALIGNED WITH THE S3

In addition, two budgetary documents/multi-annual framework documents align the priorities of all the funders for the S3 period with, on the one hand, the ERDF/ESF+ 2021-2027 European Structural Funds Operational Programme and, on the other hand, the State-Region (and local authorities) 2021-2027 CPER. In parallel with the public authorities' recovery plans following the COVID-19 crisis, this alignment of objectives and means over the same period will constitute a real leverage effect for S3 implementation.

THE CPER 2021-2027

Summary of the actions of the Higher Education Research and Innovation (ESRI) component of the CPER 2021-2027

- ◆ Support for major research programmes defined by the university sites Alliance Universitaire de Bretagne - AUB / Université du site de Rennes UNIR and major organisations (see diagram below with the titles of the meta-projects built for the CPER);
- ◆ Financing of research infrastructures (investments), Very Large Research Infrastructures (TGIR), Digital Infrastructures (GENECI, ESKEM Numérique), etc.;
- ◆ Financing of innovation support operators (PFT, CRT, CDT).

CPER – Bretagne Volet recherche 22 méta-projets de recherche



ACTIONS WITHIN THE FRAMEWORK OF THE ERDF-SFE+ PO 2021-2027

- ◆ Financing of research infrastructures (investments) and digital infrastructures;
- ◆ Support for the integration of research in Brittany into the European RDI area;
- ◆ Technology transfer, student entrepreneurship (PEPITE), creation of innovative companies;
- ◆ Collaboration between associations & companies / Science & society and social innovation;
- ◆ Collaboration between research/companies, collective research/company structuring projects (Living Lab, demonstrators, etc.);
- ◆ Growth of innovative enterprises, financing of innovative enterprises and innovation in all its forms;
- ◆ SME support (industrial transition, investment, collective actions, financial engineering, etc.);
- ◆ Support for the digital transition;
- ◆ Emergence and accompaniment of European projects;
- ◆ Coordination of S3 governance.

In order to implement the S3, a budget model of SO1 “A Smarter Europe” of the POFEDER/ESF+ has been planned, fully geared to S3 priorities with a budget of €150 M from the ERDF out of a total of approximately €323 M, i.e. above the regulatory threshold of a minimum of 40%. Similarly, SO2 “A greener Europe” will be able to serve S3 priorities, and will be supported beyond the regulatory threshold of 30% minimum.

In addition to these Europe-State-Region & Local Authorities multiannual frameworks, regional partnership tools will enable the S3 to be applied to its various thematic or cross-cutting areas, such as the Social Innovation Fund (FISO) launched in July 2020 between the State, the Region and Bpifrance with a budget of €2.9M for the period 2020-2023.

FOR INNOVATION ECOSYSTEM SUPPORT, STRUCTURED BY THE S3

The innovation ecosystems identified in the strategic innovation areas or within the cross-cutting axis are essential cogs in the declination of a regional research and innovation strategy. These players in support, engineering and the link between research and businesses are therefore strictly speaking tools for S3 implementation.

In order to guarantee the overall coherence, understandability and visibility of regional action in the field of research and innovation, for the period 2021-2027, support will be committed through the prism of the S3. The annual action plans, R&D or investment projects of these operators will have to demonstrate their inclusion in the S3 and in particular in the roadmaps of the Strategic Innovation Areas and their thematic levers.

TOWARDS FINANCIAL TOOLS ADAPTED TO ECOLOGICAL ISSUES

In order to respond to the cross-cutting issues of transitions and in particular the ecological transition, echoing the “Green Deal” or national plans, regional tools will be adapted.

The Regional Council’s measures respond primarily to the creation or maintenance of employment in the territories, while also targeting the objectives of quality and sustainability of employment, gender equality and the desire to improve working conditions. They promote projects aimed at encouraging participation in territorial balance and support participatory and cooperative approaches. Without abandoning the tools that are essential for preserving jobs, a range of “sobriety” measures have been created to complement current regional aid, with a priority focus on the ecological transition and to provide more and better support for the players involved in taking up these issues. The innovation support schemes were thus the first to be supplemented by a “sobriety” range.

More generally, regional support will be analysed, beyond the main principles of sobriety, proximity and solidarity, using the following six criteria:

- Commitment to a sober approach to land ownership;
- Commitment to the preservation of water resources;
- Commitment to the protection of biodiversity;
- Commitment to a low-carbon energy and climate approach;
- Commitment to reshoring or/and territorial rebalancing of activity;
- Commitment to a process of job quality, integration and social dialogue.

REGIONAL RESEARCH AND INNOVATION STRATEGY

SMART SPECIALISATION STRATEGY (S3)

BRITTANY - 2021-2027

ANNEXES

1. GLOSSARY

2. SUMMARY OF THE S3 EVALUATION 2014 - 2020

3. METHODOLOGY FOR REDESIGNING THE S3

4. SUMMARY OF THE COMPANY SURVEY - 2020



1.

GLOSSARY

KEY DEFINITIONS

S3	<p>Smart Specialisation Strategy – Research and innovation strategy</p> <p>Each region must concentrate its resources on those areas of innovation where it has the best assets compared to other European regions. Across Europe, administrations, businesses, research centres and universities have therefore worked together to identify the sectors of activity within their region with the most promising growth potential.</p>
SIA	<p>Strategic Innovation Area</p> <p>Areas of well-argued differentiation, for which Brittany enjoys “comparative advantages” on an international scale - proven or potential - and which will have a “knock-on effect” for the Breton economy. The region is claiming or could claim leadership in these areas. An SIA for Brittany crosses growth markets and development issues of the Breton economic sectors - basic or emerging - dynamics of innovative companies, expertise in public research and training. It also responds to societal issues identified on a European scale and/or specific to the Breton territory.</p>
Thematic lever	<p>The thematic levers were determined collectively by the regional R&I ecosystem for each SIA. These levers are coordinated and have specific operational action plans which are integrated into the SIA roadmap.</p>
SRDEII	<p>Regional strategy for economic development, innovation and internationalisation</p> <p>As a framework for Brittany's economic development over the 2014-2020 period, the SRDEII aims to set a realistic course to give it a new industrial impetus in an open and globalised economy</p>
HERI	<p>Higher Education, Research and Innovation</p>
RD / R&D	<p>Research, Development and Innovation / Research and Development</p>
Breizh COP	<p>The Breizh Cop is the definition of Brittany’s project for the future up to 2040, which will have to respond to climatic and environmental emergencies, to major planning issues but also to democratic requirements.</p>
SRADDET	<p>Regional plan for spatial planning, sustainable development and equality of territories, which merges several sectoral documents or existing plans (regional plan for spatial planning and sustainable development, regional plan for waste prevention and management, regional plan for intermodality, regional plan for climate, air and energy, etc.).</p>

TERMINOLOGY

ABEA	Breton Association of Agri-food Companies
AGRETIC	Programme that encourages the emergence of projects between the agriculture and agri-food industry and Breton digital and electronic solution providers
BDI	Bretagne Développement Innovation. Regional economic agency, strengthens the attractiveness of the region, anticipates and accelerates transitions in the regional economy, with and for businesses
BPN	Brittany Naval Cluster
Breizh Alim	A coordinated and participatory regional approach to sustainable and local food
Breizh Hin	A project that aims to provide regional actors with a structured framework for action in favour of adaptation, actions to raise awareness and improve general knowledge of these phenomena and their impact on the environment will form the basis for regional action.
CCI Bretagne	Brittany Chamber of Commerce and Industry
CESER	Regional Economic, Social and Environmental Council
COFIL	Steering Committee
Employment objective contracts, training, guidance and counselling	Reciprocal commitment between the State, the Region and the representatives of the profession, which defines priority objectives in a coordinated manner, on the basis of the diagnosis and prospective work carried out within the framework of the regional Prospective Studies Contract (CEP).
CPER	State-region plan contract. Document by which the State and a region commit to multiannual programming and financing of major regional development projects.
CRAB	Brittany Chamber of Agriculture
CRESS Bretagne	Brittany Regional Chamber of Social and Solidarity Economy
ETC	European Territorial Cooperation
Deep Tech	Start-ups that offer products or services based on breakthrough innovations, usually involving collaboration with public research.
DGE	Directorate-General for Enterprise
EDIH	European Digital Innovation Hub The European Commission defines DIHs as structures to help and support businesses, in particular SMEs, to improve their business and production processes and their products and services through the use of digital technologies.
MREs	Marine renewable energies
EPCI	Public establishment for intermunicipal cooperation
ERC	European Research Council
SSE	Social and solidarity economy
ETI	Mid-size company
EAFRD	European Agricultural Fund for Rural Development
ERDF/ESF	European Regional Development Fund / European Social Fund
Green Deal	EU plan to cut greenhouse gas emissions
Horizon Europe	Horizon Europe is the European Union's research and innovation programme to succeed the Horizon 2020 programme. It takes effect on 1 January 2021
AI	Artificial Intelligence
INTERREG	INTERREG is a European programme to promote cooperation between European regions and the development of solutions.
IRDL	Dupuy de Lôme Research Institute

IUEM	European University Institute of the Sea
I3	Interregional Innovation Investment The new I3 initiative aims to help actors involved in smart specialisation strategies (S3) to regroup, develop and bring innovation to the European market.
Label CDT	“Technological dissemination cells” label, issued by the State to structures which play an interface role between companies and competence centres (research laboratories, technical centres, vocational and technological high schools, university institutes of technology, etc.).
Living Lab	The living lab is a methodology in which citizens, inhabitants and users are considered as key players in the R&I process.
MNHN	National Museum of Natural History
MOOC	Massive Open Online Course
PMBA	Brittany Atlantic Sea Cluster
SME	Small or medium-sized enterprise
Réseau NEREUS	Network of European regions using space technologies
HSS	Human and Social Sciences
SMILE	SMart Ideas to Link Energies. Bi-regional collaborative project deployed in the Brittany and Pays de la Loire Regions. Officially launched in spring 2016, it is part of the operational implementation of the energy transition and green growth at regional and national level. Its objective is to accompany and support the deployment of a series of major regional industrial projects related to smartgrids.
VLRI	Very Large Research Infrastructure, part of the State’s strategy (MESRI)
Ti kub	Digital services incubator, opened by the Region
VSE	Very small enterprises
UBO	University of Western Brittany
UBS	University of Southern Brittany
UR1	University of Rennes 1
UR2	University of Rennes 2
PPP	Public-private partnership
2PE	European projects platform – Brittany Supporting the European opening up of Higher Education, Research and Innovation in Brittany
7TB	Federation of the seven technology parks of Brittany
Research units available at the portal Plug in labs: https://www.pluginlabs-ouest.fr/	

SUMMARY OF THE S3 EVALUATION 2014 - 2020



Review of the lessons learned from the evaluation of the implementation of S3 Brittany 2014-2020 (January 2020)

The S3, a structuring strategy for the Region

EU cohesion policies seek to **reduce the development gaps between different European regions**. The Structural Funds are the main lever for action. In order to ensure the efficient allocation of these funds, while directing funds to key areas in the regions, for the period 2014-2020, European regions have been asked to develop regional innovation strategies for a Smart Specialisation Strategy (S3).

The work to define the S3 for the 2014-2020 period has proved to be a real opportunity for the Region: it is notably the basis of the Higher Education and Research Strategy (SRESR) and the Strategy for Economic Development, Innovation and Internationalisation (SRDEII), the “Glaz economy”.

The following objectives were associated therewith:

- **Sharing a direction:** co-constructing and instilling a strong economic vision, strong in order to be uniting and operational with a view to encouraging commitment;
- **Positioning Brittany:** analysing the assets and niches of performance and competitiveness in the globalised economy, defining areas of common future for Brittany and the means to realise their development.

The S3 thus constitutes the basis for the Region’s intervention in research and innovation policies, with the aim of positioning Brittany in the European research and innovation area:

- A **global innovation support strategy** optimised across the entire value chain
- A **priority of European funds**, in particular the ERDF, on strategic innovation areas (SIA, S3 areas).

The current S3 has been defined in partnership with all the actors of the regional innovation ecosystem around seven Strategic Innovation Areas (SIAs):

- Social and civic innovations for an open and creative society;
- A sustainable food chain for quality food;
- Maritime activities for blue growth;
- Technologies for the digital society;

- Health and well-being for a better quality of life;
- Cutting-edge technologies for industrial applications;
- Observation and ecological and energy engineering at the service of the environment.

An evaluation of the S3 in view of defining the future strategy for the period 2021-2027

The definition of the S3 and its regional deployment since 2013 marked a first major step in the prioritisation process in Brittany, which will continue over the period 2021-2027. In this respect, the Region is conducting an evaluation process in order to draw up an assessment of the implementation of the current S3 with a view to its updating.

For this assessment, the following investigations were carried out over the period from June to December 2019:

- Analysis of the Region's innovation funding data;
- Analysis of framework documents, activity reports, diagnostics, data from observatories (particularly European projects) and SATT Ouest value enhancement, etc.;
- Interviews with all stakeholders in innovation ecosystems by SIA, targeted written consultation with “research operators”;
- Facilitation of working groups by SIA.

An assessment of S3 implementation, highlighting the major investments made in terms of innovation in the Brittany region

Over the period, **more than 346.4M€** were invested by the Regional Council, on its own or within the framework of the ERDF (€50.8M) and the CPER (€50.8M), to support innovation in all S3 SIAs in close partnership with the other Breton local authorities on the one hand and with the State in the region on the other hand (note an underweighting of the social and civic innovation SIA).

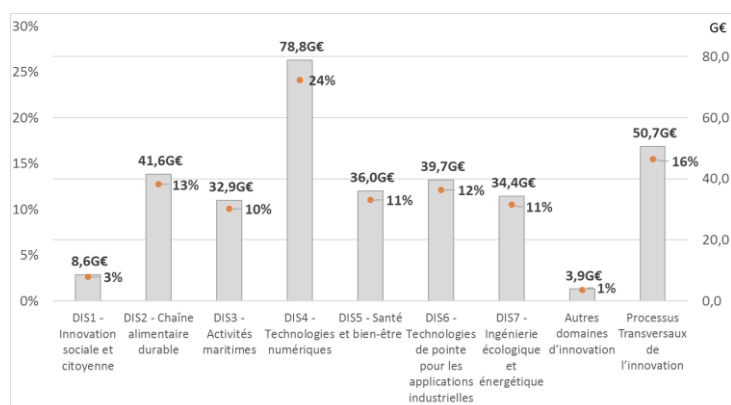


Figure 1: breakdown by SIA of financial support for innovation in Brittany (2015-2019) / Sources: data (SIS, SDENSU, SISESS) from the Brittany Regional Council.

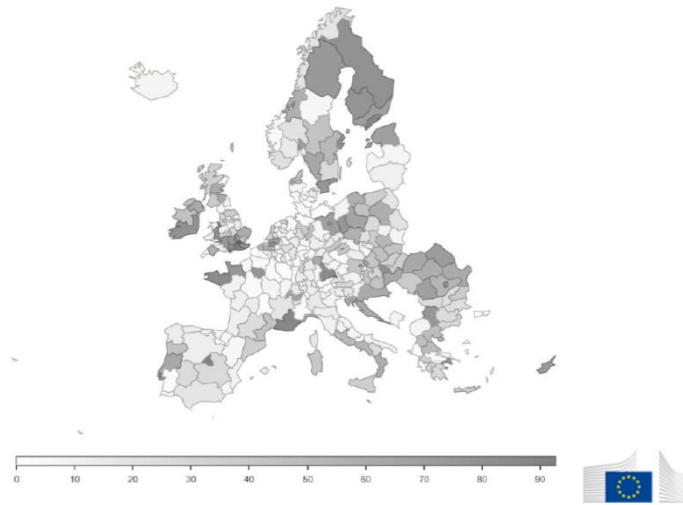


Figure 2: potential of European regions for cybersecurity technologies / Source: European Commission data

A structuring S3 in the Brittany region...

The evaluation highlighted the following key successes and strengths of S3 Brittany:

- **The strategy was built in partnership mode;** it has provided direction on the main thematic priorities of the Region, thus supplying a focus for research and innovation actors;
- **The S3 has structured the Region's various forms of support for innovation** (earmarking of funding) for the benefit of a very rich RDI ecosystem in Brittany, which today covers a broad research-innovation-training continuum in several fields;
- **Brittany is now recognised at European level in many fields:** the Region is a leader or participates in various partnerships within thematic platforms (Cybersecurity, Marine Biotechnologies, High-tech Agriculture, Intelligent Sensors, Traceability and Big Data, Photonics, Medical Technologies, Intelligent Networks);
- Brittany currently has real differentiating factors in several areas, such as agri-agro, maritime activities and digital activities;
- The S3 has become a **support for contractualisation with higher education and research players**, making it possible to align medium-term intervention strategies, particularly with research organisations.

... which presents several possible areas for improvement

The evaluation also identified the following areas for possible improvement:

- **The S3 is to date very inclusive and the research and innovation ecosystem appears more or less rich according to the SIA;**
- **The S3 has not been facilitated for all SIAs.** S3 implementation has not taken the form of the introduction of real action plans for each SIA;
- **The partnership strategy, which at this stage is primarily linked to opportunities for collaboration, is gradually evolving,** particularly at the level of the S3 platforms. These platforms reflect a desire to strengthen opportunities for transnational research, development

and innovation projects for regional actors, access European funding and to gain recognition at the European level;

- **The S3's impact on value enhancement and technology transfer would benefit from being strengthened;**
- **Governance would also benefit from being rethought**, as regards issues related to facilitation, consultation/consultation spaces, and the tools to be put in place to enable better monitoring-evaluation of the S3 with a view to optimising the achievement of objectives.

Developments envisaged for S3 updating over the period 2021-2027

- **The various S3 SIAs should be adjusted in line with changes in the regional strategic framework (Breizh Cop...) to better illustrate and take into account the areas of excellence (mature and/or emerging) of Brittany, and also, to make the SIA sub-areas more coherent with each other;**
- **Each Strategic Innovation Area should be based on real strategic and operational roadmaps**, whose implementation methods would be defined and shared with all the actors of the thematic ecosystems;
- **The partnership strategy (French and European) should be more formalised for the different S3 SIAs** in order to address specific issues relating to the development and attractiveness of regional excellence;
- **The principles of S3 governance, monitoring/piloting and management should be further specified, formalised and above all operationalised** throughout the future thematic scope of the S3;
- **The budgetary strategy should be adjusted to the previous recommendations.** Thus, in view of the needs and challenges in terms of innovation in the regions, a budgetary strategy (cross and/or cross-financing) should be defined for projects/sectors/structured approaches, making it possible to clarify the financial mechanisms mobilised and/or to be mobilised (whether regional, national or European), particularly in the context of multiannual programming such as the CPER, ERDF/ESF OPs, financial engineering mechanisms, PIA programmes (Investissements d'Avenir - Investments for the Future). It would also aim to further encourage private R&D, while consolidating Brittany's academic research.



3.

METHODOLOGY FOR REDESIGNING THE S3

The regional research and innovation strategy (known as S3 for “smart specialisation strategy”) for the period 2021-2027 is part of the continuation of the first Breton S3 for the period 2014-2020. The development of the S3 2014-2020 gave Brittany a real opportunity to define its priorities for intervention in terms of innovation in its strategic sectors. It was and will remain the common basis of the higher education and research strategy (SRESR) and the economic development, innovation and internationalisation strategy (SRDEII).

The smart specialisation strategy 2021-2027 is part of the continuation of the S3 2014-2020, drawing lessons from previous experience and looking ahead to the new challenges for Brittany’s future. Thus, the assessment of the implementation of the S3 2014-2020, conducted in 2019 by the Brittany Region (in support of the Technopolis/Edater/Amnyos consortium,¹¹ the CESER study “Research and innovation in Brittany” - October 2018 - and with the support of the European Commission), highlights the major investments made in terms of innovation in Brittany over the 2014-2019 period and has been able to provide guidelines and recommendations,¹² meeting the requirements of the European Commission for S3 updating for the 2021-2027 period.

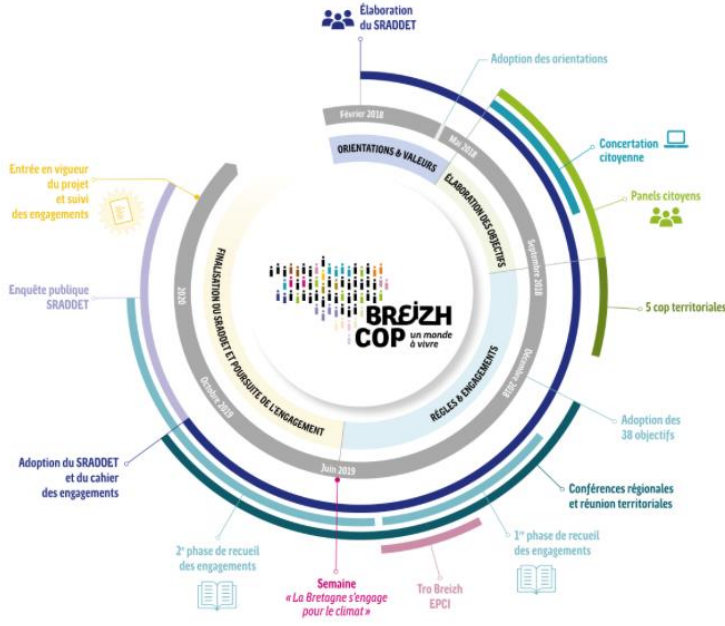
The adoption of an S3 is first and foremost a response to a request from the European Commission, which sets it as a precondition for the approval of Regional Structural Programmes (ERDF-ESF), in order to mobilise structural funds within the framework of the cohesion policies pursued by the European Union seeking to reduce the development gaps between the different European regions. As the structural funds are its main lever of action for this purpose, and in order to ensure an efficient allocation of these funds, all European Regions have been asked to develop regional innovation strategies or “Smart Specialisation Strategies”, a prerequisite for the approval of Regional Structural Programmes (ERDF-ESF) for the period 2021-2017. The S3 in Brittany is committed to co-constructing and instilling an economic, strong, uniting, operational and committing vision for the territory and regional innovation ecosystems. By analysing assets and opportunities, the S3 should enable the basis of regional intervention to be adjusted by prioritising resources on areas of innovation in which Brittany has proven or potential comparative advantages, on a national and European scale, and which have a knock-on effect for the Breton economy of tomorrow. In this sense, in relation to the 2014-2020 strategy, the S3 must both refocus on its powerful strategic areas of innovation and be open to the opportunities and constraints of tomorrow, particularly in terms of accelerating transitions. In concrete terms, the Strategic Innovation Areas (SIAs) have narrowed from 7 to 5 between the two periods, with a more pronounced “market” orientation, whereas the former SIAs *Social and civic innovations for an open and creative society* and *Environmental and energy observation and engineering* have taken on their full transformative dimension via their integration into the “market” areas and through due consideration of the challenges and changes brought about by the digital, industrial, ecological, energy and social transitions. These evolutions and transformations are part of a cross-cutting axis of transitions, in connection with the evolutions of the regional strategic framework, that of the Breizh COP and Brittany up to 2040.

¹¹ Evaluation of the S3 in the Brittany region: review of the smart specialisation approach and prospects for the coming years

¹² Idem

The S3 in Brittany thus provides a reference framework for an integrated approach to public policies in targeted areas of innovation and research and for prioritising public funding. In this sense, the Brittany Regional Council has chosen to favour both a vertical approach with the identification of thematic strategic areas of innovation, and a horizontal approach focused on cross-cutting issues that go beyond the DIS, leveraging the main thrusts of Brittany’s regional strategies, in a more systemic approach linked to the major digital, social and environmental transitions. As Dominique Foray has developed,¹³ “The change has led to the conception of innovation as a subject closely linked to R&D (2007), then as a subject straddling between research and innovation (S3 2014-2020) and tomorrow as a punctual or systematic process of exploration, experimentation and discovery that allows the detection of emerging activities with high potential, within existing sectors or between sectors, involving a group of actors, companies and research, and generating a significant structural change for the regional economy.” This notion of entrepreneurial discovery, involving the sharing of the strategy and its processes with all Breton stakeholders, is also a founding element of the Breton S3. Co-construction and governance for the collective implementation of the strategy is a guarantee of success.

The S3 process also leverages that of the Breizh COP, which occupied Brittany for more than a year:



As an extension of this dynamic of regional projection up to 2040 and despite the context of the COVID-19 crisis, the Region has therefore seized the opportunity to build a shared vision of innovation areas of the future in Brittany with all stakeholders. The regional research and innovation stakeholders took ownership of the exercise and were able to become directly involved in order to co-construct the strategy. In-depth, collective and collaborative work has made it possible to define the regional strengths and niches for Brittany to seize in the knowledge economy. This is a structuring approach, which offers an occasion to accompany the changes in the Breton economy, the changes in its core activities and the structuring of new growth relays based on the assets and creative dynamics of the whole of its territory and by supporting innovation in all its forms. As a result, the S3 makes Breton assets

¹³ Dominique Foray, L'économie de la connaissance, Repères 2018

and dynamics visible, determines the development and attractiveness of regional economic activities and positions the region in the European Research and Innovation Area.

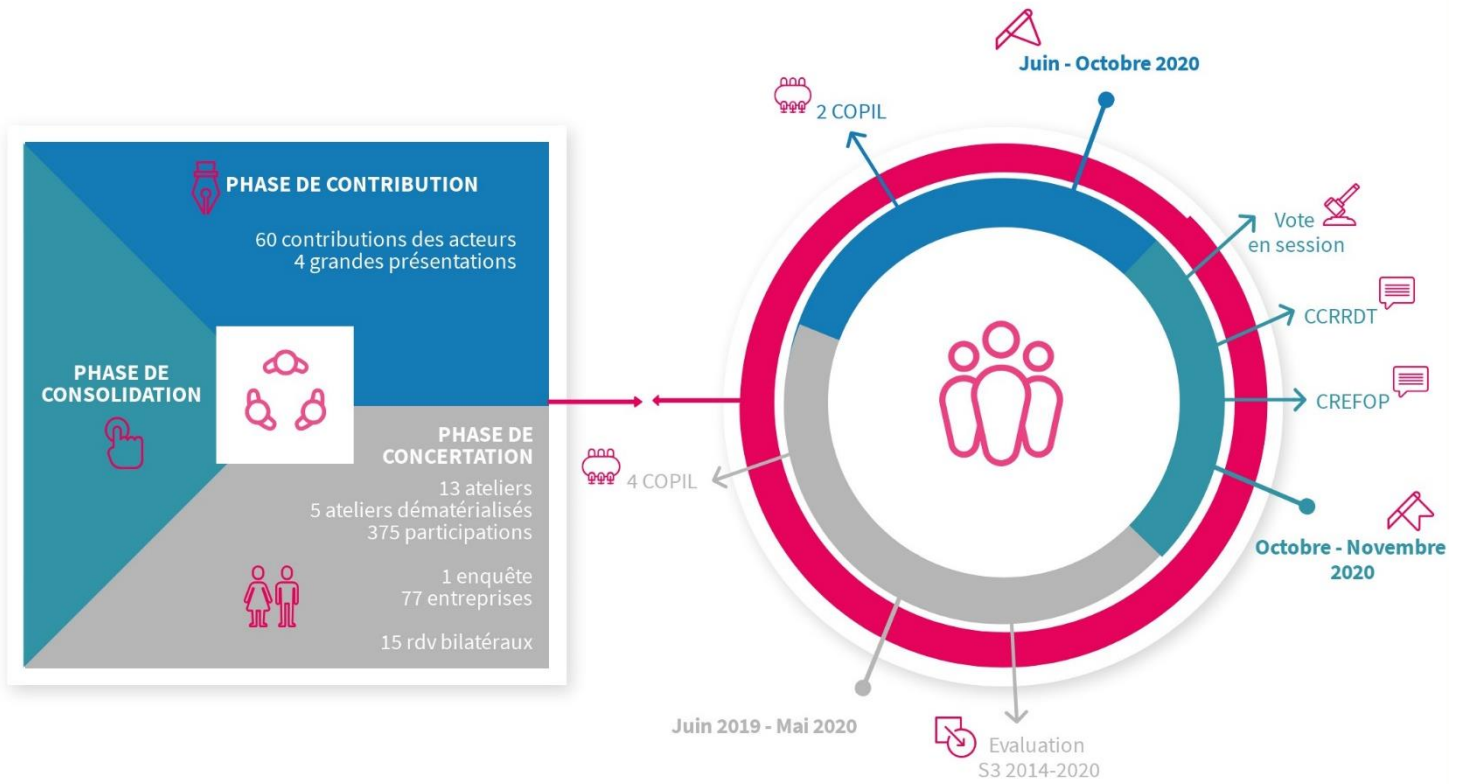
PROCESSUS DE REFONTE DES DOMAINES D'INNOVATION STRATEGIQUES

Processus soutenu par les acteurs des écosystèmes de chaque DIS retenu



Within this collective approach, there were three waves of working groups in the presence of ecosystem stakeholders as well as numerous bilateral exchanges during the development phase. In accordance with the diagram above, Strengths/Weaknesses/Opportunities/Threats (SWOT) matrices were used to define the challenges of the different SIAs, then the thematic levers and operational action plan units, before pooling these actions and consolidating a collective roadmap for each SIA for a shared strategic vision. In concrete terms, through physical or virtual exchanges, meetings have made it possible to collectively identify the issues at stake for each RDS and to establish the structure of the future S3 around five RDS and a cross-cutting axis. A second wave of working groups identified the thematic levers, more precise segments, at the level of each RIS and shared all the operational action plans co-constructed by lever during a third workshop. At the same time, several periods of consultation and exchange on the content and approach took place with a large number of stakeholders to feed into the discussions and ensure the overall relevance of the work, which was based on regional expertise and the consortium of project management assistance providers (Technopolis, Edater and Amnyos). Quarterly steering committees also made it possible to monitor and amend the redesign work. At the same time, the principles of governance, monitoring, steering and coordination of the S3 were specified throughout the S3 scope, in consultation with the main players. Within the framework of this future governance, these efforts, coupled with the work of the various consultations of the CCRRDT (Regional Consultative Committee for Research and Technological Development) and the CREFOP (Regional Committee for Employment, Training and Vocational Guidance), have made it possible to refine and validate the proposals in relation to the strategic issues at stake in Brittany.

Finally, a survey dedicated to regional companies was carried out in order to consolidate the work carried out, and to ensure a match between the proposed structure of S3 and the expectations/visions of Breton SMEs.





4.

SUMMARY OF THE COMPANY SURVEY - 2020

BRETAGNE



2021 / 2027
Point de vue d'entreprises
Enquête 2020 - Synthèse



CONTEXT, OBJECTIVES AND METHODOLOGY

I – OBJECTIVES OF THIS STUDY

II - METHODOLOGY

INNOVATION: ASSESSMENT AND FEEDBACK FROM COMPANIES

FUNDING, HUMAN RESOURCES AND NETWORKING TO INNOVATE

PRIORITIES IN TERMS OF PUBLIC POLICIES IN SUPPORT OF INNOVATION

SOCIAL INNOVATION: AN IMPORTANT ISSUE FOR 2/3 OF RESPONDENTS

INNOVATING DURING A HEALTH CRISIS

Context, objectives and methodology

Like all European regions, the Brittany Region is setting a new framework and course for its research and innovation strategy. For the regions, this exercise, known as the Smart Specialisation Strategy (S3), consists of defining the guidelines and areas of innovation to be prioritised for the period 2021-2027.

After an assessment of the current S3, the objective is to increase the understandability and visibility of the future strategy as well as its relevance with regard to changes in the socio-economic context in Brittany, by relying on the regional research and innovation ecosystem (Technopoles, Competitiveness Clusters, Innovation Centres, CCI Innovation network, Bretagne Développement Innovation, SATT Ouest Valorisation, etc.).

The Brittany Region wanted to identify the priorities of companies in this context by also offering them the opportunity to answer an online questionnaire. It commissioned Bretagne Développement Innovation to consult the companies and process the data collected.

The S3 is based on the assets and opportunities of our region. This framework makes it possible to concentrate investment and adapt business support tools by combining European, regional and national funds.



In the prism of the Breizh COP, the redesign work carried out for the next period 2021-2027 has made it possible to identify a:

- - Cross-cutting axis for transitions (digital & industrial, ecological & environmental, social & civic)

As well as five strategic innovation areas:

- The maritime economy for blue growth;
- The food economy of eating well for all;
- The secure and responsible digital economy;
- The health and wellness economy for a better quality of life;
- The industry economy for smart production.

It should be noted that within the framework of the S3, hundreds of companies benefit each year from support for their innovation projects, whether in terms of access to scientific resources, funding or specialist advice from support networks.

Under the S3, the Brittany Region has invested more than €346.4 M (in its own right, ERDF - €50.8 M (15%) - and CPER) between 2015 and 2019; of which €143 M between 2015 and 2018 within the framework of programmes P.0201 - Stimulating innovation and developing the knowledge economy, P.0202 - Supporting the structuring of key sectors of the Brittany economy and P.110 - ERDF-ESF Operational Programme 2014-2020, benefiting 558 beneficiaries.¹⁴

Objectives of this study

Involving companies in the S3 overhaul process and gathering research and innovation needs around the following themes:

¹⁴ Technopolis, Evaluation of the S3 in the Brittany region: review of the Smart Specialisation Approach and prospects for the coming years, final report, February 2020, p21-22

- Taking stock of innovation practices in companies;
- Giving an opinion on the support systems and the future S3;
- Expressing the need to develop future projects (scientific and technical resources, technology transfers, access to support networks, funding, human resources, etc.).

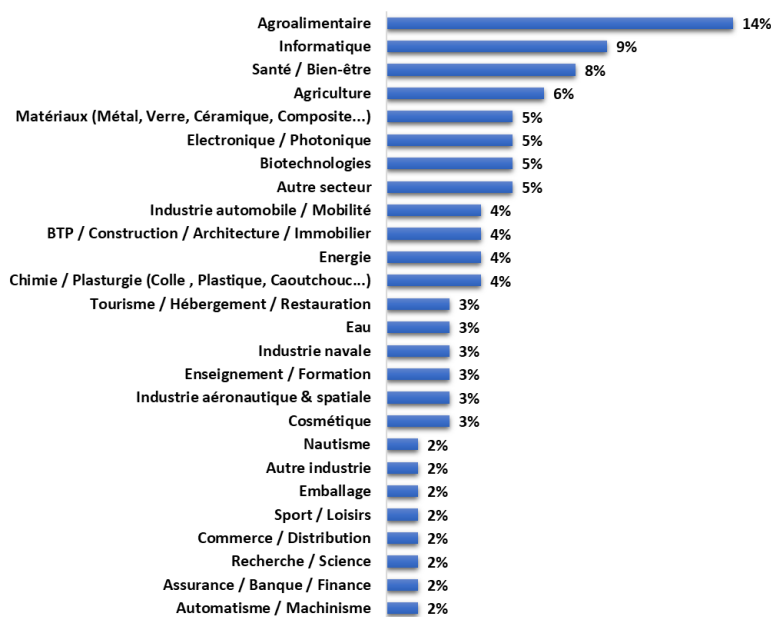
Methodology

- Distribution of a questionnaire via a secure web platform (LimeSurvey);
- Online replies only;
- Duration of one month, between 4 September and 5 October 2020;
- Distribution via the BDI newsletter and its LinkedIn and Twitter accounts relayed by the Brittany Region, public structures (CCI, Technopoles, etc.) and the press via a press release.

77 replies were received. They concern Breton companies of all sizes, all sectors and all geographical areas. As the sample is small and not representative of the characteristics of Breton companies, the results are not extrapolated. Nevertheless, the answers provide interesting indications and avenues for reflection in the evolution of strategy and support for companies. They reinforce certain orientations and/or provide additional elements.

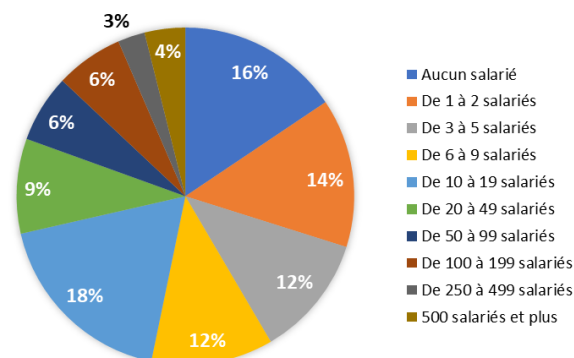
RÉPARTITION DES ENTREPRISES PAR SECTEURS D'ACTIVITÉ

77 répondants - Répartition par secteur principal



DES RÉPONDANTS DE TOUTES TAILLES

77 répondants - Répartition par tranche d'effectifs





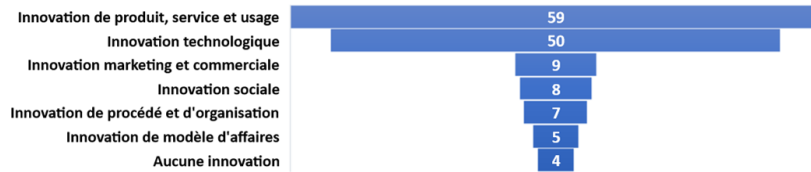
Innovation: review and feedback from companies

Main product innovations:

- 77% of respondents have developed product, service or usage innovations in the last 3 years.
- 65% of them have developed technological innovations.

NATURE DES INNOVATIONS DÉVELOPPÉES PAR LES ENTREPRISES CES 3 DERNIÈRES ANNÉES

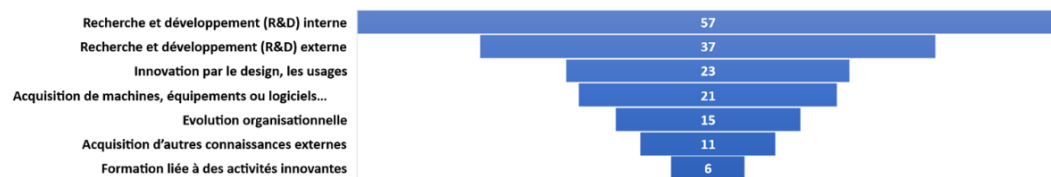
Plusieurs réponses possibles - 77 répondants



Innovation activities are mainly carried out in-house: 74% of companies innovate thanks to in-house R&D.

ACTIVITÉS D'INNOVATION ENGAGÉES PAR LES ENTREPRISES CES 3 DERNIÈRES ANNÉES

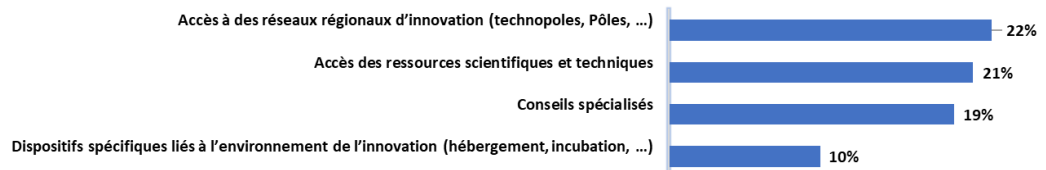
Plusieurs réponses possibles - 73 entreprises ayant innové



To innovate, they rely more on financial tools: 55% of respondents have received financial support, with which they are 80% satisfied to very satisfied.

Generally speaking, innovation support tools are good tools for developing the network and accessing new skills and funding. However, respondents regret the administrative burden involved (complex files).

LES AUTRES TYPES DE SOUTIEN DONT LES ENTREPRISES ONT BÉNÉFICIÉ



Other benefits:

- Access to external skills and expertise (public scientific knowledge, regulatory information, technological and legal watch, etc.);
- Access to equipment;
- Support and advice.

Other difficulties:

- Availability of “expert” partners;
- Long-term access to equipment (laboratories, technology halls).



Funding, human resources and networking to innovate

The needs remain above all financial: 80% of companies consider innovation funding to be very important or important.

To innovate, they also have a strong need for human resources: 53% of respondents rank the recruitment of engineers among their top 3 needs.

43% of companies express the need to be connected to networks (innovation, European, etc.) in order to innovate.



Priorities in terms of public policies in support of innovation

36 companies (47% of respondents) are ready to get involved in the implementation of the new S3, by participating in working groups.

They prioritise:

- **Supporting transitions (social, environmental, digital and industrial) and promoting the economic spin-offs of innovation on the territory for 82%.**

“The digital economy, the key to success for an industry economy for smart production and a secure and responsible digital economy.”

“[...] With the video industry already well established, Brittany could play a role in reducing the carbon footprint of video consumption while preventing piracy.”

“Inclusive digital: the development of technologies that allow broadband coverage of the whole territory and enable every citizen to have access to high-speed, mobile Internet.”

*“The priority must be **blue growth** [...] as it is cross-cutting. Brittany [...] lives in particular from two productive ecosystems, land and sea, which are now often too compartmentalised. [...]”*

*“Working on **blue growth** in a more global way.”*

- **73% would like to see better coordination among the players involved in setting up innovation projects.**

“Innovation moves fast. Those who want to support it must become more agile and be where innovators can meet their peers, their customers, their suppliers very simply. We need to network more, to adopt a mode of communication that is as un-pyramidal as possible, [...]”

“Reflect on forms of ‘territorial innovation’ in order to boost regional innovation ecosystems. [...]”

Other issues to be taken into account in the new S3:

- **Apprenticeship, training and the attractiveness of the trades:**

“Attracting talent, engineers, entrepreneurs, etc. and retaining those who are there [...]” “[...] training and upgrading the skills of the region’s human resources are as important as innovation. [...]” “Training of high school students in the economy: function of the company, capital markets, entrepreneurship issues [...]”

- **Tourism:** *“It is surprising not to see the tourism sector from an ecotourism perspective.”*
- **Construction:** *“The economics of building construction and energy-efficient building renovation”*

Social innovation: an important issue for 2/3 of respondents

“The economy and the social dimension are intimately linked” “Social innovation enables new solutions to be found to meet unmet social/environmental needs in the territories.” “There must be cross-reconciliation of economic performance and the social utility of projects” “Social innovation takes on all the adaptations to our economic and social environment. It enables us to anticipate the needs and expectations of populations (mobility, ecology, housing, etc.)” “Innovation and performance should not be associated. Innovation also aims to make a service accessible to people who do not have access to it. Or to make ‘profitable’ an activity whose productivity remains deliberately low.”

Innovating during a health crisis

64% of respondents said that their innovation processes had been impacted by the health crisis:

- Stoppage or delay in projects (partners not available, projects no longer funded, etc.);
- Decline in activity;
- Priorities re-evaluated (refocusing on production activity, etc.);
- A brake on collaboration (partnerships, networking, etc.).

But nearly **50%** of companies believe that innovation is an essential driving force to get out of the crisis (totally agree and rather agree) => less than 10% do not consider innovation as such.¹⁵

18% of companies consider that they need specific tools or tools that complement existing ones:

Businesses are in favour of help to form partnerships and to have better visibility of the opportunities available to them: financial aid, collaboration on different geographical scales, etc.

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¹⁵40% of non-responses: 36% of companies answered “no” or did not answer the question “Has the health crisis impacted your innovation processes?”

BRETAGNE 
DÉVELOPPEMENT
INNOVATION



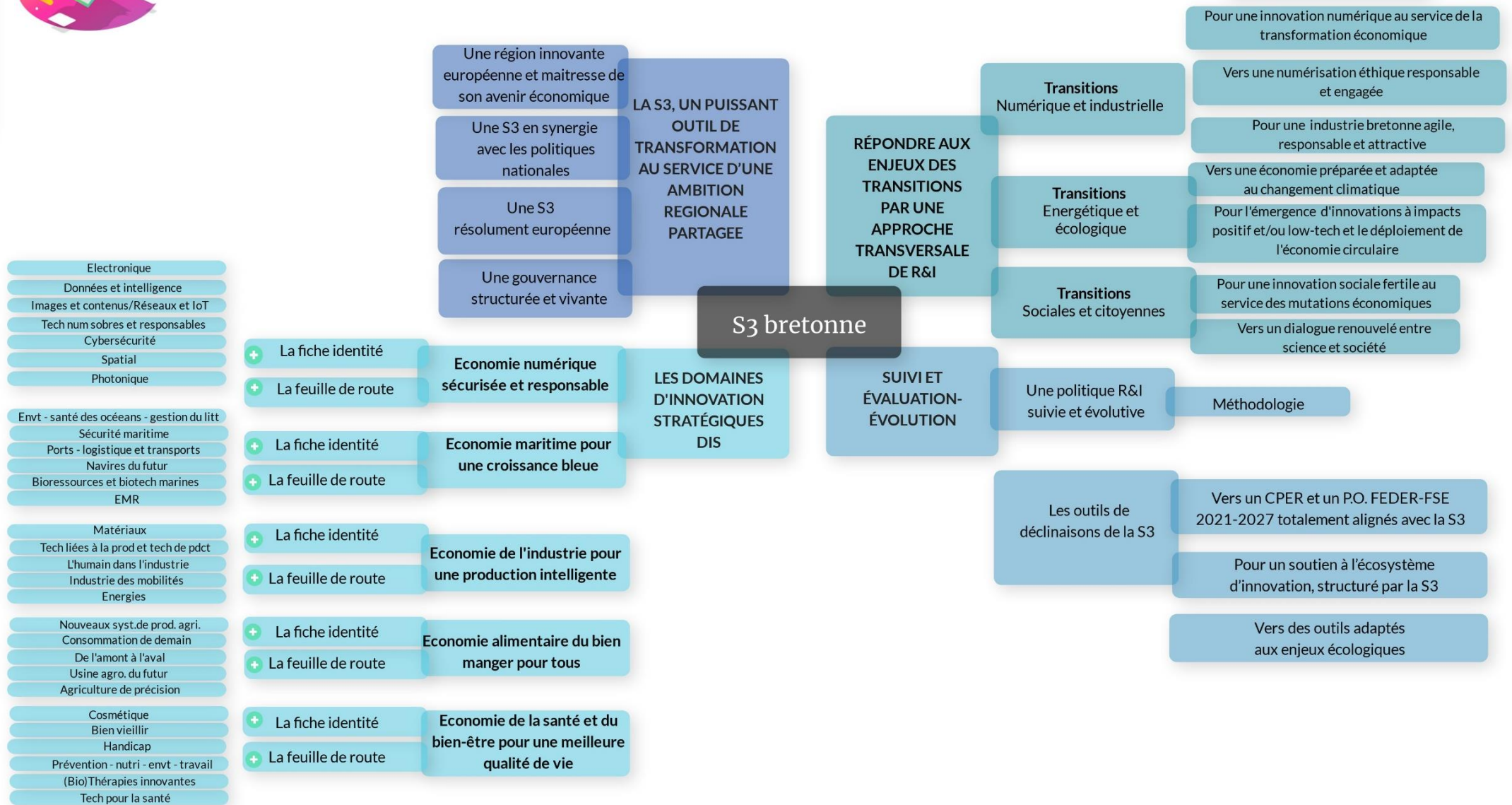
UNION EUROPÉENNE
UNANIEZH EUROPA



L'Europe s'engage / *Arre le Fardh eur-veves*
en Bretagne / *de di-vevesennet-veves*



5. MIND MAP AND IMPACT LOGIC DIAGRAM (ILD)



OBJECTIFS STRATEGIQUES



Accompagner les mutations structurelles de l'économie bretonne, de ses principaux secteurs d'activités et de ses entreprises et stimuler la RDI et la création de richesses

Mettre l'accent sur les enjeux climatiques et de biodiversité



Développer des modes de travail et de vie plus soucieux des réalités géographiques vécues par la population

Favoriser la cohésion sociale, le dialogue social et la qualité de l'emploi dans les entreprises



Irriguer les prog. de recherche des laboratoires bretons, les besoins d'ingénierie des écosystèmes de l'enseignement supérieur de R&I, les projets collaboratifs entre laboratoires et entreprises, les projets innovants des PME

AMBITIONS

Répondre par l'innovation aux enjeux des transitions en donnant des inflexions nouvelles aux politiques publiques régionales, via les 6 engagements prioritaires inscrits dans l'ensemble de ses politiques et au sein de la Breizh COP et suivant trois grands principes : sobriété, proximité et solidarité

Améliorer la visibilité, la reconnaissance et la présence de la Bretagne dans les programmes européens de R&I

Renforcer les coopérations interrégionales sur les sujets et thématiques prioritaires identifiés

OBJECTIFS OPERATIONNELS

Faire converger les moyens publics et faciliter la réponse aux AAP nationaux et européens



Développer une innovation qui se différencie d'autres régions du monde et assurer en continu une réflexion prospective sur les futures pistes de spécialisation

Faire émerger des actions, démarches et projets structurants, répondant aux enjeux des transitions



Piloter, animer, évaluer la S3 et faciliter la communication autour des résultats

Renforcer les pratiques de valorisation, de transfert et les partenariats



Soutenir le réseau des partenaires régionaux d'accompagnement de programmes européens de recherche et d'innovation

RESULTATS

Concentration des moyens publics sur les DIS et pistes de spécialisation

Production de bilans annuels d'activités à l'échelle des DIS et de l'axe transversal

Développement de l'offre de conseil:services aux entreprises, sensibilisation et échanges de bonnes pratiques

Accélération du positionnement breton sur des secteurs socles ou émergents

Nouveaux clusters et pôles

Création / regroupement d'acteurs de recherche et économiques à vocation internationale

Nouvelles connaissances, nouvelles compétences

Nouveaux produits, services, technologies et solutions innovantes

Emergence de nouvelles entreprises (création, attractivité)

Développement de projets collaboratifs et de qualité et nouveaux partenariats

Hausse de l'excellence des laboratoires

Positionnement amélioré dans H2020

IMPACTS

Réduction de l'empreinte carbone et économie de ressource par toutes les productions et modes de production

Renforcement de la souveraineté économique

Renforcement de la résilience et de la digitalisation de l'économie bretonne

Développement de la proximité entre espaces de production et de consommation

Alignement renforcé des politiques publiques, sur les valeurs et les grands principes qui les structurent

Alignement des compétences et orientations rég. nat. et eur. favorisant l'émergence d'écosystèmes construits

Relocalisation d'activités

Meilleure diffusion de l'innovation sur le territoire

Hausse du niveau de la recherche et de l'innovation

Hausse de la visibilité à l'international de la recherche, dans les pistes de spécialisation

Transformation de l'économie régionale : nouvelles compétences stratégiques différenciantes

Hausse du niveau d'innovation régional : DIRDE, emplois en R&D



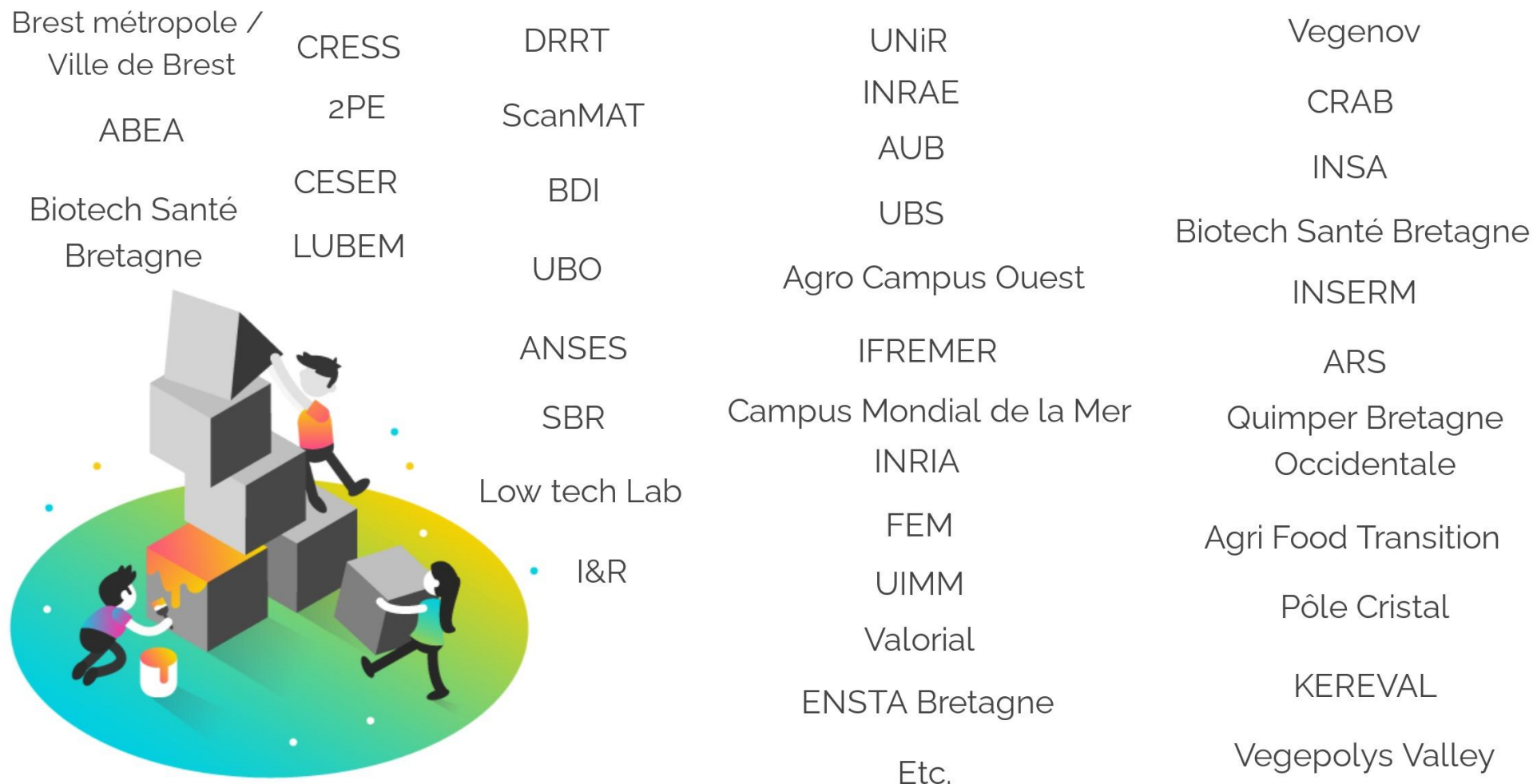
6. ACKNOWLEDGMENTS

Nous remercions l'ensemble des participants à la phase de concertation

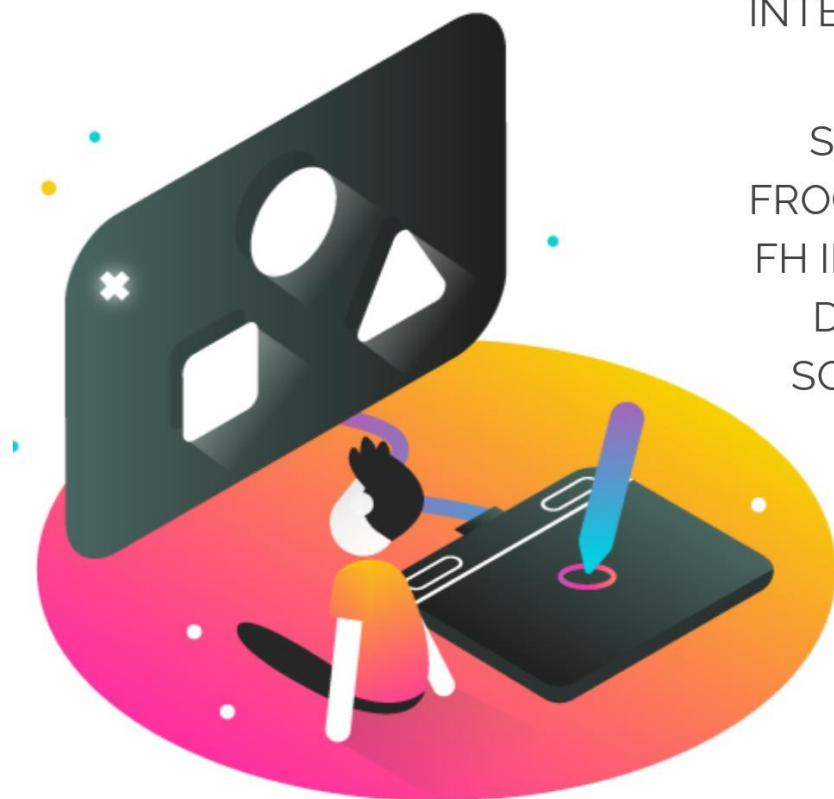
PMBA		Produit en Bretagne	Actalia	Vegepolys Valley	
Bretagne pôle naval		7TB	CNRS	CEA TECH	Vegenov
Campus Mondial de la Mer		BPI Innovation	Biotech Santé Bretagne	ABEA	IMT Atlantique
Agri Food Transition		CCI Innovation	UNiR	COREB	ENS Rennes
Centre culinaire		SATT Ouest Valorisation	AUB	Zoopole	CHU Rennes
Pôle EMC2	IDComposite	CRESS	MSHB	Agro Campus Ouest	CHU Brest
IFREMER	ExcelCar	2PE	INRAE	Photonics Bretagne	FHF
Institut Universitaire Européen de la Mer	CEVA	ADEME	Act Food	EPITECH	LTSI
	UIMM	CESER	ARS	PEC	LATIM
	ID MER	BDI	INSERM	IMT Atlantique	INRIA
	ID4Car	DRRT	b<>com	DGA MI	Pôle Cristal
	FEM	ENSTA	Valorial	Campus ESPRIT	LBAI
	Etc.	SBR	Atlanpole biothérapies	GIS Marsouin	CRAB
					Pôle I&R



Nous remercions l'ensemble des participants à la phase de consolidation



Nous remercions les entreprises ayant participé à l'enquête et souhaitant s'impliquer dans la S3 2021-2027



INTERDIGITAL
ISITIX
SEABIRD
FROGI SECURE
FH INDUSTRIE
DEMETA
SOLUTION
ETC.

EDIXIA
SHIP ST
STIRWELD
SOCOMORE
INGENOVA
BRETAGNE PLANTS
INAKYS
EVOSENS
MULTIPLAST
ENAG
FLAVOCEAN
BIOTECH MARINE /
SEPPIC
ARCHINAUTE

TIBIB
AOD'HIN
EDEN ET MITAINE
ALGROUPE
DIANA PETFOOD
MIZENBOX
GROUPE CLAIRE
ANC
AU BON MATIN
ALL 4 FEED
HPC INTERNATIONAL
INTRADYS
ABYSS INGREDIENTS
FOOD INNOV

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