Roscoff Marine Station (SBR):
A French joint-development centre exploring the field of marine biology and ecology

Brittany, France

General Information

Title	Roscoff Marine Station (SBR)
Pitch	A French joint-development centre exploring the field of marine biology and ecology
Organisation	Roscoff Marine Station
Country	France
Author	Olivier Mallet (Technopolis Group)

Nature of interaction

- ☑ Collaboration in R&D
- ☑ Commercialisation of R&D results
- ☐ Mobility of staff
- ☐ Academic entrepreneurship
- ☐ Governance
- ☐ Lifelong learning
- ☐ Joint curriculum design and delivery
- ☐ Mobility of students
- ☐ Student entrepreneurship
- ☐ Shared resources

Supporting mechanism

- ☐ Strategic
- ☑ Structural
- ☐ Operational
- ☐ Policy

Summary

The Roscoff Marine Station (SBR), a centre for research and higher education, is located in the region of Brittany (FR) and was founded in 1872. Since the 1980's, it has actively engaged in university-business cooperation (UBC) in the fields of marine biology and ecology. Over the last decade, SBR has seized funding opportunities at the regional, national and European levels to conduct joint R&D projects, increasing its UBC activities. By doing so, it has developed very specific expertise in the field of blue biotechnology and has become a well-recognised resource centre for businesses and industry. The station is part of a growing local ecosystem, where academics and businesses can work together to accelerate technology transfer and innovation take-up by firms.

Introduction & Overview

1. BACKGROUND

Founded in 1872 in Brittany (France), the Station Biologique de Roscoff (SBR, or Roscoff Marine Station) is a centre for research and higher education focusing on marine biology and ecology. It is jointly run by the French National Centre for Scientific Research (CNRS, or *Centre National de la Recherche Scientifique*) and the Pierre and Marie Curie University (UPMC, Paris - France). It comprises of around 300 staff members (70 of those researchers).

The first cooperation between SBR and the private sector started in the 1980's (joint research projects), but this type of initiative remained based on personal relationships. Even though these public-private partnerships remained occasional, they could however be very strong, even leading to the creation of a research unit under the authority of both CNRS and a private company, as it happened at the beginning of the 2000's. UBC has only become systemic in the 2010's.

Since 2005 and the creation of the French National Research Agency (ANR, or *Agence Nationale de la Recherche*), the share of funding for research channelled through competitive calls in France has increased, coming from different programmes at European, national and regional levels. Among those calls, a high proportion requires public-private partnerships. This has led to stronger cooperation between SBR and private companies.

Given the experience of SBR working with non-academic partners, SBR has contributed to developing a strong and integrated ecosystem focusing on blue biotechnology. With support (mainly) from local and regional policy makers, blue biotechnology has become a priority at regional level, creating a general positive context for the development of R&D activities on this scientific area.

At individual level, UBC experience is wildly spread among research teams and has increased in the last decade. The research field is an important factor to understand the context for increasing UBC activities, as blue biotechnology solutions are more and more ready to be tested at industry level.

2. OBJECTIVES AND MOTIVATIONS

By cooperating with the private sector, the SBR team is targeting different objectives:

- Valorisation of research, commercialisation of R&D results, and – more broadly – support to solving societal challenges are part of the mission of CNRS and UPMC. It is also increasingly important in the evaluation process of calls for projects of public-private partnerships;
- As a result of this evolution, resources available for SBR and other research units in France are increasingly channelled through calls for (large) collaborative R&D projects, at European, national and regional levels – making this type of project increasingly important for developing research activities;
- Even though valorisation-oriented activities are increasingly important for funding, they are not yet considered as important for career advancement of researchers. However, this type of research is seen by most SBR researchers as a good way to:
  - participate in solving societal challenges;
  - gain insight on priorities of companies in their different areas of specialisation.

In this context, cooperation with private companies is a source of new ideas for more fundamental research activities.

3. STAKEHOLDERS

The central stakeholder groups involved in UBC are HEI managers and academics.

HEI managers, at station level as well as at institutional level (CNRS, UPMC and even the Ministry in charge of higher education and research) are pushing for more public-private cooperation. This cooperation is seen as the best way to close the gap between academia and the private sector (considered by policy makers as a strong issue in France), as well as a source for funding and new ideas for research. The Director of SBR is a strong supporter of UBC who advocate for public-private partnerships. This is illustrated by his leadership of a project for the creation of a public-private science park gathering public researchers, technology platforms and companies on the same site (Blue Valley project – *see section on Sustainability measures*).

The other key stakeholders are researchers, as they undertake daily cooperation with the private sector, either through participation to the activities of the regional cluster focusing on marine resources (*Pôle Mer Bretagne Atlantique*[1]), participation to cooperative projects or direct work for companies (customer-buyer relationship).

Students and companies also participate with a minor role. Master's students can complete an internship in private businesses that are well connected to SBR; SBR PhD Alumni sometimes move to partner companies of SBR or even start their own businesses (with the possibility of being incubated at SBR). Companies are the direct partners for cooperation, even though they play no current role in the governance of SBR. Their role is expected to increase based on future projects (i.e. Blue Valley project, Blue Training project).

Implementation

4. INPUTS

UBC activities at SBR start with a series of human, financial and physical inputs.

Regarding the human resources, SBR is one of the most prominent French centres focusing on marine biology and ecology, with around 300 staff members (70 researchers, 160 management, technical and administrative support staff and 70 students). The Board of the station estimates that 50% of the team leaders are involved in some kind of UBC. Researchers provide business partners with scientific knowledge, know-how on infrastructures and methods. With the increasing importance of UBC activities in the station, all the different research areas covered by SBR are now involved in projects with/for the private sector.

Funding for UBC comes from two main resources. On the one hand, direct funding from companies occurs when SBR researchers are providing a direct service to a company or when companies want to have access to research infrastructures (companies cover 100% of the cost). On the other hand, funding for projects sponsored by regional, national or European authorities. At the moment, the most significant financial resources come from national calls for projects. These come from the ANR or other national bodies in charge of managing funding in the field of partnership research (such as the French National Investment Bank Bpifrance or the National Fund for competitiveness clusters FUI). For these types of projects, private funding represents between 20 and 50% of budget.

Finally, SBR also provides physical equipment; this is made available for companies and/or used to provide them direct services. SBR counts four technology platforms, on the following research areas: crystallography core facility; imaging core facility; mass spectrometry core facility; genomics core facility; bioinformatics core facility; molecular screening core facility[2]. SBR is also a member of the Biogenouest network, which gathers 34 technology platforms made available for companies and researchers, in the field of life science and the environment, in the west of France[3].

5. ACTIVITIES

Among the different UBC activities, the most significant ones are related to joint R&D projects. SBR has been involved in a large number of joint research projects in the last decade, especially in the framework of *Pôle Mer Bretagne Atlantique*, a 'Competitiveness cluster' (*pôle de compétitivité*) based in Brittany. It is focused on developing innovative projects in the area of marine economy, gathering major players from the public and private sectors. SBR is currently leading three large cooperation projects, EMBRC-France, Idealg and Oceanomics:

- **EMBRC-France** (€16m) is the French part of EMBRC (European Marine Biological Resource Centre), which aims to drive forward the development of blue biotechnologies to help facilitate innovation[4]. At French level, the objective is to unlock difficult access to marine biological resources and make available a major tool for the exploration and exploitation of marine biodiversity, from the molecular scale to ecosystems[5];
- **Idealg**[6]: this 10-year, €10m project gathers 13 partners (mostly from Brittany), including five businesses. It started in 2012 and focuses on the promotion of technologies for growing, producing and exploiting seaweed in a sustainable way considering impacts on the environment, the society and the economy;

- **Oceanomics**[7]: this eight year, €7m project gathers 16 partners, including six companies. The Oceanomics project aims at promoting a rational and sustainable use of ocean plankton in France.

These three projects are funded in the framework of the 'Investment for the Future' (PIA) national programme, as part of the sub-programmes 'Biotechnology and Bio-resources'[8] (Idealg and Oceanomics) and 'National Infrastructure for health and biology' (EMBRC-France). The objective of these two sub-programmes is to support the development of world-class research activities in the field of biotechnology, in order to create the possibility to develop a bioeconomy based on the exploitation of natural resources in a sustainable way.

SBR is also leader of the 'Horizon 2020' European Marine Biological Research Infrastructure Cluster (EMBRIC), that aimed at accelerate the pace of scientific discovery and innovation from marine bio-resources and promote new applications[9].

SBR students also participate in different education programmes, most of them including a training period in a company. However, the UBC dimension of this activity is less developed at the moment and has been identified as a potential area of development by the Executive Board of the station. Finally, SBR is also participating in the activity of the monitoring committee of the Brittany Smart Specialisation Strategy (S3), in the blue economy.

6. OUTPUTS

The main outputs that researchers achieve from UBC activities are scientific publications and commercialisation of R&D results. However, the recognition of UBC activities for career promotion is mixed. Publication in peer-reviewed journals is still indeed the main criteria for career advancement, so it is important for researchers to publish in high profile journals, and often the results come from joint-research projects. This is one of the major outputs for SBR of participating in this kind of projects (for instance, the project *Crazy Polysaccharides* led to two articles in journals as well as seven communications in scientific events[10]). Commercialisation of R&D results is however not taken into account for researchers' career advancement.

For researchers, the involvement in such activities is:

- a mean to gain insight on the issues the industry is focusing on;
- a way to increase the capacity to deliver tailored services to companies;
- an increasingly important source for funding for human resources and equipment, which allows the SBR team to maintain its knowledge at the frontier of science.

According to the SBR team, all these three aspects have been achieved over the last years.

From an industrial perspective, successful joint R&D projects with SBR (e.g. Aquactifs Pharmasea – *see next section*) have led to effective R&D development in the field of blue biotechnology (especially linked to micro algae). All the partnership R&D projects SBR participates in have to include a plan to deliver an effective technology transfer. Companies participating in such projects are often interested in the industrial property rights resulting from the project as well as in the know-how directly linked to them and detained by the SBR team.

The results of these activities are thus more cooperation between public and private sectors.

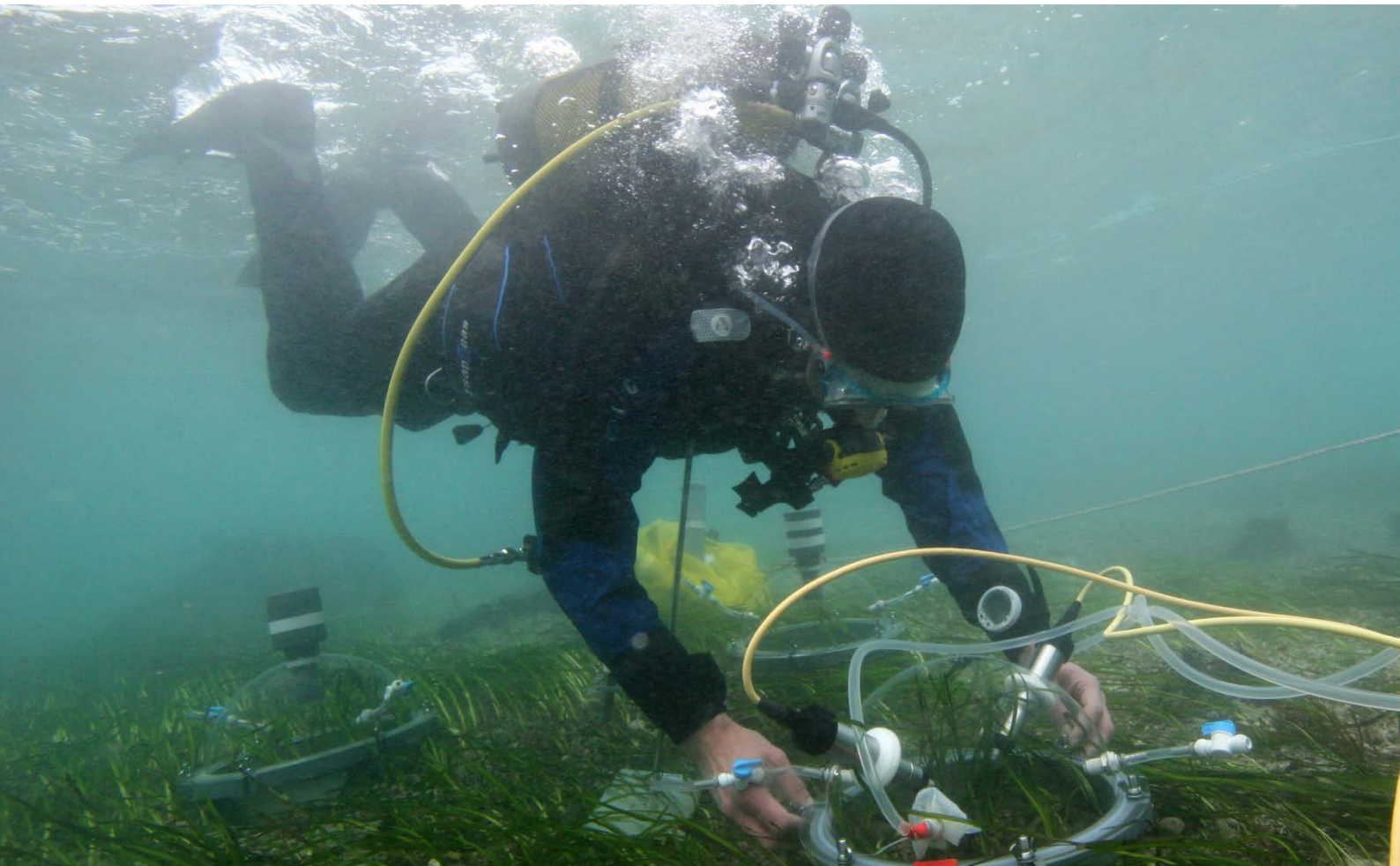
7. IMPACTS

Currently, there is not a dedicated monitoring and evaluation system of the UBC activities of SBR even though a couple of initiatives have started in the framework of the EMBRIC project. It is thus even more complicated to have a precise view of the direct impacts of these activities in terms of turn over or employment for companies. Moreover, the intervention of SBR has to be placed in a context of increasing research and R&D activities on blue biotechnology (*see following section on Drivers*).

However, there is a number of signs that indicates an impact of UBC for SBR over the years. First, several projects led to patents or job creation for industrial partners (e.g. the project Aquactifs, focusing on the use of micro algae for cosmetics[11], or the project Pharmasea, on the use of marine-based molecules for fighting Alzheimer disease[12]). In the last decade, SBR activities also resulted in the creation of two companies (Hemarina and ManRos Therapeutics), with remaining strong links with the centre. Students that have benefited from training at SBR have a high employment rate, including in local companies – participating in transferring knowledge from the centre to the industry.

Another sign of the positive impact is that Brittany Regional Authorities have assigned SBR the coordinator role of the bioresources sector of the 'Marine Activities for Blue Growth' Strategic Innovation Domain of the regional S3. This recognition shows the key role SBR has played in the last decade to build a bridge between science and industry in the field of blue biotechnology. As a consequence, marine activities for blue growth have been chosen as a top priority for public funding dedicated to support R&D and innovation. SBR has thus participated in local economic development and local authorities wish it will continue to do so.

Finally, SBR UBC activities have led to an increasing demand of cooperation from different companies, both in Brittany and in other territories (*see also Blue Valley project, in the Sustainability section*). This shows the impact SBR, among others, has had by communicating on the interests for companies of working with science institutions for the development of innovative products – especially in an emerging sector such as blue biotechnology.



Support & Influencing factors

8. SUPPORTING MECHANISMS

As presented above, UBC activities are not especially supported by career advancement mechanisms. The main supporting mechanism for UBC is the shift of important financial resources dedicated to research from non-competitive core funding of research units to competitive project-based funding. Project-based funding is often available for public-private partnerships only. This policy shift at national level has been followed at regional level. At national level, there are three major programmes funding this kind of projects:

- Programme of ANR: ANR funds basic research in all the different areas of research. Even though these projects can still target low Technology Readiness Levels, they must integrate activities to facilitate the take up of projects' results by businesses;
- FUI (*Fonds Unique Interministeriel*): this programme is available for members of the national Competitiveness Clusters (*Pôles de compétitivité*), such as *Pôle Mer Bretagne*. This programme only funds projects that gathers at least two companies and one public research unit. The objective of national Competitiveness Clusters is to support cooperation in the field of innovation on specific markets and/or technologies, in order for companies to provide the market with better and more innovative products and services;
- PIA programme[13]: launched in 2010, this €47b programme has the objective of supporting investments on various strategic domains with the idea of increasing the growth potential of France in the medium term. In the field of R&D and innovation, this programme funds world-class equipment, human resources, cooperation projects. It aims at supporting breakthrough in different research areas (health, biotechnologies, energy, ICT, and material sciences) as well as increasing the capacity of the industry to adopt and put in the market innovative products.

Given the increasing importance of such funding at regional, national and EU levels, it has led to the development of strategy at institutional and research unit level. For the Marine Station, this strategy has been formalised in the Blue Valley project (*see section on Sustainability measures*).

9. BARRIERS AND DRIVERS

For a long time, the main driver for UBC activities within SBR was personal relationships between some researchers and businesses. It has changed over the last decade, with a more systemic cooperation with the industry. As presented in the previous section, resources available for funding research are increasingly pushing for joint R&D activities and SBR has followed this general trend. At research field level, outputs of projects focusing on blue biotechnology are increasingly ready to move closer to the market, creating an incentive for stronger cooperation with the industry. Over the last few years, several institutions have been created with the objective of facilitating public-private cooperation in the field of research, innovation and technology transfer: clusters, technology transfer offices, networks of technology platforms, incubators… These have helped to increase the possibility for exchanges and meeting between the public and the private sectors. Finally, the strong support for marine biology and blue biotechnology at regional (S3), national and EU (see for example the 2012 EU

communication on Blue Growth[14]) levels have channelled funding for this sector in the last couple of years.

The SBR board has also identified several barriers that reduce the possibility of developing its UBC activities. First, the team considers that it lacks two to three engineers, focusing on joint R&D activities and working on improving the efficiency of technology transfer towards companies. It also considers that it needs one or two other technology platforms (e.g. on process chemistry) in order to complete its offer for researchers and companies. A final barrier relates with the complexity of the ecosystem for UBC on blue biotechnology in Brittany. The Blue Valley project also has the objective of improving the readability of the ecosystem for companies, especially smaller ones.

10. FUTURE CHALLENGES

The first challenge SBR is facing is to strengthen its UBC strategy. The board has started this work with the Blue Valley project. The idea is to precisely define its priorities, the procedures for working with the private sector and integrate their needs, and the ways of updating this strategy. The final objective is to develop a governance structure that will be able to detect the most promising projects, as SBR will not be able to answer positively to every request coming from its public and private partners. This is crucial in order to attract and retain companies to participate in these UBC activities.

Another challenge is to build on previous and on-going R&D projects, with different follow-ups:

- On the one hand, participating in broader projects (i.e. H2020 projects), as a mean to deepen its connections outside France, increasing its visibility and expertise, and serving as a liaison between local businesses and potential foreign partners.
- On the other hand, strengthening the monitoring of its commercialisation of R&D results, in order to gain a deeper knowledge of the impact of its projects, as a mean to fine-tune its service offer, attracting more companies and more funding from public and private partners.

A final challenge identified by the SBR team is to develop its UBC activities while at the same time remaining an excellent centre for basic research. This means dedicating time and means to this activity as well. The station will also have to manage to remain neutral with companies – companies that may have different or even conflicting objectives- and be perceived as such. This will be done by setting clear rules in the governance of Blue Valley, in particular in the area of industrial property rights.

11. KEY SUCCESS FACTORS

A first key success factor for the UBC activities of SBR is the scientific capacities of the team. Over the years, SBR has managed to position itself as a central scientific player in the field of blue biotechnology. It has participated in the emergence of technologies and increase the technology readiness levels of some of them. This has been done thanks to basic research projects as well as an increasing number of more R&D-oriented projects. The recognition of SBR as primarily an excellent centre for research is key to its attractiveness for the outside world. The feedback SBR has received from business partners is that the team is perceived as competent and knowledgeable.

Another success factor is the experience the SBR team has built on working with companies, on different levels including: exchanges in the framework of clusters or public-private strategic meetings focusing on innovation (S3); direct work for companies on dedicated projects; and common work on joint R&D projects.

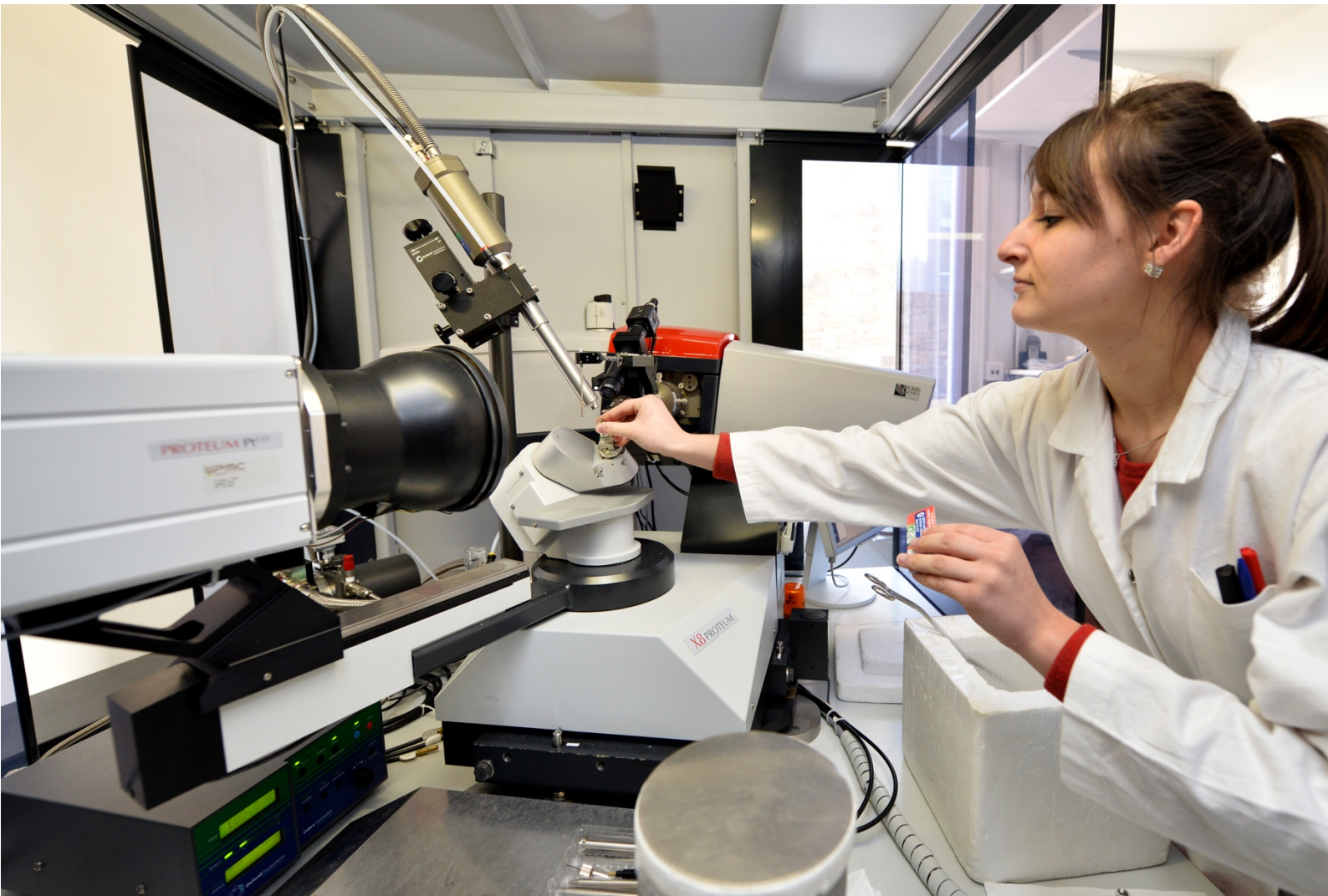
These different forums enable SBR to have a deep knowledge of the needs of businesses and adapt its offer. The long experience also serves as a reference when building new consortiums and targeting new companies.

Further Information

12. MONITORING AND EVALUATION

There is no systematic monitoring and evaluation mechanisms at station level for UBC activities. The station does however have to report to its authorities (UPMC and CNRS) about the cooperation with private partners. However, because UBC activities are mainly performed in the framework of national programmes, the marine station has to document the expected results and actual results of each project it participates in. Also, the Pôle Mer cluster was evaluated in May 2016 and the sub programmes of the PIA will be evaluated in the coming years. A special attention will be paid to the results and impacts of such projects on the development of this business area and the competitiveness of the blue biotechnology sector.

The entire SBR centre will be evaluated next year, as part of the national process led by HCERES (*Haut Conseil à l'évaluation de la recherche et de l'enseignement supérieur*), the French National body in charge of evaluation public research units and higher-education activities. In the framework of this process, the SBR team will have to provide information on the activities related to UBC, in the areas of research, education and innovation. The third criteria of the evaluation framework is 'Links with the social, economic and cultural environment'[15].



13. SUSTAINABILITY MEASURES

As presented before, blue biotechnology and exploitation of marine resources are seen as being of high potential for sustainable growth. It thus benefits from strong political and financial support at regional, national and EU levels. By being part of a recognised EU network (EMBRC) and being part of two major projects at national level, SBR has positioned itself as a key player in the French and European landscapes.

In order to further develop its UBC activities, SBR has worked on two major projects based on previous activities, results and networks SBR has contributed to create. These are:

- Blue Valley: the objective of this project is to develop the biggest European scientific park dedicated to marine biotechnologies, with SBR at its core. This park will offer access to technology platforms, high-value services for companies and research units and high-skilled personals. With these services, it aims at developing knowledge and technologies, attracting existing biotechnology companies and facilitating the creation and growth of biotechnology start-ups.

  This project has already been awarded funding from local authorities, and seven companies have agreed to join it. The objective is to finalise the governance of the project in the coming months in order to apply for other funding and start the activities of the park as soon as possible.

- Blue Train: the project aims to be the 'training leg' of Blue Valley. The objective is to develop a systemic offer, with both initial and vocational training in the field of blue technology, with the contribution of different public universities and private companies (over 15 at the moment). The project was submitted in the framework of the 'Partnership for vocational training and job' call (part of the PIA). This call aims to support the creation of sustainable partnerships in areas where the human resources needs of companies are not yet covered[16]. The results for this call will be published by the end of 2016.

These two projects show the willingness of SBR to develop its activities in partnership with companies and create a strongly integrated ecosystem dedicated to blue biotechnologies.

14. TRANSFERABILITY

There is no direct way of transferring the way SBR deals with its UBC activities. However, it seems that a number of factors have a significant impact on the development of such activities:

- The capacity of the research centre to be at the frontier of science in a specific field. This means developing its research based on state-of-the-art infrastructures, gathering a strong group of scientists, and participating in different scientific networks at regional, national and international levels. The capacity of connecting local businesses to national or international stakeholders is an asset for a research centre willing to work with private companies.

- The willingness of the research centre, as well as of researchers, to work with its local ecosystem – including through participation to local clusters' activities and regional strategy for research, R&D and innovation. This appears as an efficient way of gaining knowledge about the needs of the industry, as well as its way of working. It is also a good media to make the industry aware of the technical and scientific capacities of the research unit. The participation in meetings that gather both the public and the private sector is key to create a community of interests on specific issues.

15. AWARDS AND RECOGNITION

SBR has not yet received any award for its UBC activities *per se*. However, it has been recognised as a key player in Brittany, France and the EU in its field: it is the coordinator of different major UBC projects (at national and EU levels) and is also the coordinator of the 'Marine activities for Blue Growth' Strategic Innovation Domain of the regional S3.

16. LINKS

Station Biologique Roscoff http://www.sb-roscoff.fr/en/research-and-training-centre-marine-biology-and-oceanography/about-sbr/missions/innovation-and-technology-transfer

17. CONTACT PERSON

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