

Relatório nº 5: Suggestions for Re-evaluation of Long-Term Internationalisation Strategies in the Portuguese Science and Technology System

The need for a long-term internationalisation policy

Internationalisation is critical for science and technology development at many different levels. First, most **challenges science faces are global** and can only be addressed with a transnational perspective. Major challenges such as the COVID-19 pandemic showed that research efforts cannot be seen in isolation from worldwide developments. It is critical to develop coherent research agendas guided by the international context. Second, **scientific questions are more often addressed in a multidisciplinary manner and/or require specific equipment or resources**, demanding cross-border collaborations. Third, scientific equipment is becoming more expensive and complex to use, being located in dedicated **shared infrastructures** in a foreign country. Fourth, it is recognised that international **mobility is important** to enhance scientific careers. Fifth, it is critical to have a **strategy that attracts, develops, and retains talent**. Finally, many of the **funds available today from the EU** are part of **partnerships/consortia**.

Internationalisation efforts thus require both strategic top-down activities around defined goals - national and global challenges, as well as bottom-up initiatives to promote the empowerment of researchers and institutions and talent attraction. Those efforts should always contemplate fundamental and applied research practices. Aside from collaboration in European partnerships and networks it is also important to define research programmes with strategic partners outside Europe, including low- and middle-income countries.

Needed Internationalisation activities.

1. Solving global challenges

International collaborations are critical to increase the scientific and societal impact of research. Collaboration creates more opportunities for innovation, removes barriers and creates opportunities for innovation we are striving for. International research programmes require coordination in terms of choosing thematic priorities and participating countries. It is important to identify relevant strategic themes and strive for coherent programming, planning and use of research resources.

Portugal needs dedicated and highly successful funding agencies that: 1. **advocate for programs** that fund research that is a priority for Portugal. 2. anticipate EU calls with **national programs that build capacity** and prepare researchers to apply. 3. scout for calls that may be interesting for our researchers and Portuguese R&D institutions. 4. **co-fund areas** that are important for the country (as many EU programs ask for co-fund). 5. **identifies areas/capacity that need to be developed to make our scientists more appealing to those networks.**

2. Development and use of large-scale research infrastructures

This form of collaboration demands stable long-term funding for sustained technological development required for large-scale facilities. Participation in large international research facilities and guaranteeing access to them is vital. Large-scale scientific infrastructures are very important for modernising research and achieving breakthroughs in every scientific domain, as well as to attract talent and companies. They contribute to innovation and to solving major scientific and societal issues. Improvement of large research facilities and infrastructure can help ensure and maintain a solid international position.

One should explore the chances and possibilities of reaching agreements with foreign research funders on the joint construction and/or shared use of facilities, and assessing what memberships are needed for that purpose. This could also require the phasing out of existing participations. **Long term strategy and effort are needed to manage the participation in these big infrastructures.**

3. Empowering researchers

Mobility might be needed for different reasons in a scientist's life: to discuss the work or do part of the work in a place that has the needed expertise/infrastructure; to start a collaboration for a work and/or a grant; to promote the training and visibility of our scientists; to promote the visibility of our research institutions. **It is therefore critical to have non-bureaucratic, accessible (at least 3 calls per year) and accountable funding, for exchanges of people, for short-medium term mobility in an institution, and for scientists to go to scientific events or organise seminars and conferences in Portugal.**

4. Attracting and retaining talent

The competition for talent is growing. It is important to **empower our research institutions to apply for training calls** (co-funds, Marie Curies, etc), perhaps even fund postdoc candidates that were well ranked but not funded [e.g. widening for EMBO and HFSP fellowships (this approach/strategy already exists for Marie Curie)]. Additionally, it is critical to **expand programs for talent attraction such as EMBO installation** in life sciences, where researchers are given 50k per year for 5 years to start their laboratory and belong to the EMBO network (networking, mentoring and other perks). Currently a maximum of 2 were given, while Portugal is always at the top of the evaluation. France has now created a new "ERC-like" scheme to attract and retain top scientists, which could also be interesting to Portugal. **Most importantly, salaries of fellowships and contracts increased very little in the last 20 years and with rents going up, Portugal is much less appealing for non-Portuguese residents. A housing allowance (like it exists in the UK), or residencies for scientists would be critical to further attract talent.** It is also important to have **regular calls and improve success rates in calls for projects and talent as the best scientists will not go to places where there is no certainty of calls.**

5. Improve research as an activity.

Research is evolving and Portugal should be at the forefront of that movement to be attractive for talent and also easily adapt to changes in EU calls.

Learning through international best practices on evaluation of research

To better understand the science system as a whole, it is advantageous to seek international collaboration such as with the EU (CoARA) or the Research on Research Institute (RoRI), a

worldwide initiative to transform the way that research is funded, communicated and evaluated. There should be growing attention on how institutions around the world should revise their assessment frameworks. The San Francisco Declaration on Research Assessment (DORA) in 2012, is a good example of the type of initiative that requires international participation.

Open Science movement

To promote more open and participatory research, with the results – publications, data, software and other forms of scientific information – being shared through new forms of international collaboration. This is crucial to fulfil the principle of FAIR data: data that are Findable, Accessible, Interoperable and Reusable for other researchers and interested parties. It is important to recognise and reward researchers who put open science into practice.

Data-based science

Research questions will be increasingly determined by the availability of data. Big Tech companies are taking a strong interest in this aspect, which can make science increasingly dependent on those companies, which requires careful thinking of agreements at national and international levels. It is important to participate in international initiatives that ensure that access to and utilisation of data remain available for researchers. Ethical aspects and evaluation of impact on society will be of paramount importance.

6. Knowledge security and data management

There are risks attached to international cooperation. **Knowledge security** is an important issue in science today and will help determine choices. The vastly greater level of digitisation also calls for better support of researchers in every branch of science in the form of further expansion of digital research and data infrastructure. **Investments in Digital Research Infrastructures, data management, IP and materials protection, would be highly advisable.**

Specific initiatives that FCT should support and fund:

- 1- National programs that build capacity and prepare researchers to apply to EU calls. Empower our research institutions to apply for training calls (co-funds, Marie Curies, etc), perhaps even fund postdoc candidates that were well ranked but not funded [e.g. widening for EMBO and HFSP fellowships (this approach/strategy already exists for Marie Curie)].
- 2- Co-fund areas that are important for the country (as many EU programs ask for co-fund-ERA-NETS etc- if needed ask scientific councils which areas should be funded).
- 3- Have calls involving Portuguese National Academic Institutions and International Companies to foster R&D activities at their National Branches. This would help development of R&D departments in the National Branches and foster Internationalisation of both academic and entrepreneurial R&D activities in Portugal.
- 4- Funding access to infrastructures which are unavailable in Portugal, to help solve specific research questions.
- 5- Non-bureaucratic, accessible (at least 3 calls per year) and accountable funding, for exchanges of people, for short-medium term mobility in an institution, and for scientists to go to scientific events or organise seminars and conferences in Portugal.
- 6- Expand programs for talent attraction such as EMBO installation in life sciences.
- 7- A housing allowance (like it exists in the UK), or residencies for scientists would be critical to further attract talent.

8-It is critically important to have regular calls and improve success rates in calls for projects and talent as the best scientists will not go to places where there is no certainty of calls.