Research Activities at the Polytechnic University of Porto

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1 Introduction

In this research paper, we explore the role of research and development (R&D) at the ATHENA - European University, focusing on the Polytechnic University of Porto (P. PORTO) as one of its member institutions. P. PORTO has made R&D and knowledge transfer a top priority in its strategic plan, aiming to enhance its position in internationally recognized research rankings through the production of high-quality research. The institution also emphasizes the promotion of scientific, technological, and artistic activities, including the integration of research-based teaching and student engagement in R&D. The emphasis on high-quality research, transfer of results to the civil community, promoting synergies between research and education, and engaging students in R&D initiatives is well aligned with ATHENA strategic priorities.

P. PORTO currently has 23 research units and groups across eight schools, actively participating in more than seventy R&D projects that have received recognition for their scientific contributions and impact on the surrounding community. Eight of the autonomous R&D units of P.PORTO are positively evaluated and financially supported by the Foundation for Science and Technology (FCT) – the Portuguese governmental body in charge of R&D financing. P.PORTO also incorporates eight reference research groups within Associated Laboratories and external research units.

Research at P.PORTO spans a wide range of disciplines, including Engineering, Business Sciences, Education, Arts, Technology and Management, Health, Hospitality and Tourism, and Media Arts and Design, reflecting the increasingly multidisciplinary nature of modern research.

The institution is actively involved in various research-related concepts and activities, such as intellectual and industrial property, technology and knowledge transfer, social and technology-based innovation, creative industries, entrepreneurship, incubation, spin-offs, and start-ups. P. PORTO aims to contribute to the development of innovative policies and strengthen competitiveness within the knowledge economy.

To facilitate research, technology transfer, innovation, and entrepreneurship, P. PORTO has established the PORTIC - Porto Research, Technology & Innovation Center. This center serves as a physical space where research units and groups converge, fostering interdisciplinary collaboration, partnership formation, and innovation. Additionally, P. PORTO offers dedicated structures like Porto Design Factory, Porto Business Innovation, and Startup Porto to further support innovation and entrepreneurship efforts.

The recognition of PORTIC as a Science and Technology Park within the mapping of Portuguese Technological Infrastructures signifies the external acknowledgment of P. PORTO's commitment to research and innovation. The mapping process was coordinated by the National Innovation Agency (ANI) under the guidance of the Working Group for Technological Infrastructure Capacity Building (GTCIT), led by the Office of the Portuguese Secretary of State for Economic Affairs.

2   The Research Landscape

Research plays a crucial role in enhancing the quality, prestige, credibility, differentiation, and attractiveness of an institution. The quality of education provided by an institution significantly relies on the quality of research produced by its faculty and researchers. Therefore, research is a central and strategic axis for any higher education institution, necessitating the establishment of a research policy.

The research policy at the institution is defined through five key lines of action:
1.   Consolidation of Research Units and Groups;
2.   Strategic Measures for Science Management and Support Structures;
3.   Integration of Research and Teaching: Promotion and Enhancement of Research Activities in Teaching and Learning.

In general, these measures aim to strengthen the research landscape at the institution, foster collaboration and synergy among researchers, and promote the integration of research activities into teaching and learning, thereby enhancing the institution's research capabilities and impact.

2.1 Outstanding Research

To enhance the research environment and activities, the institution has developed several strategies:
1.   Integration and Commitment of Researchers;
2.   Identification and Dissemination of Research Activities;
3.   Enhancement and Promotion of Research.

These strategies aim to consolidate the institution's research capabilities, promote research visibility, recognize outstanding researchers, and create an open and supportive research environment that fosters innovation and collaboration.

3   From Research to Innovation

The P. PORTO has identified research and knowledge transfer as a key priority in its Strategic Plan, aiming to strengthen its position in internationally recognized rankings of scientific research quality. One of the institution's goals is to promote pedagogical innovation by encouraging research-based teaching and involving students in research activities.

To facilitate research, technology transfer, innovation, and entrepreneurship, P. PORTO has established the PORTIC - Porto Research, Technology & Innovation Center, which brings together multiple research units and groups from P. PORTO's organic units in a single physical space. The PORTIC's vision is to foster sustainable projects that promote interdisciplinary and multidisciplinary knowledge exchange, discussion, and partnership-building, stimulating innovation, transfer, and entrepreneurship within a distinctive and inclusive community. P. PORTO also hosts innovation and entrepreneurship-focused structures such as Porto Design Factory, Porto Business Innovation, and Startup Porto.

Externally, the PORTIC has been included in the mapping of Portuguese Technological Infrastructures as a Science and Technology Park under the coordination of the National Innovation Agency (ANI), Working Group for the Strengthening of Technological Infrastructures (GTCIT).

By fostering a collaborative and innovative research environment, P. PORTO aims to contribute to knowledge advancement, technological progress, and socio-economic development, positioning itself as a key player in research-to-innovation endeavors.

4   Involvement of Students

Student involvement in research and innovation activities at P.PORTO is seen as an integral part of its education and training. Research is conducted in research units funded by FCT or external units that collaborate with P.PORTO. Each study program is associated with one or more research units in cooperation with the course director.

The involvement of students in research-related activities includes organized visits to research units, dissemination of ongoing projects and participation opportunities, a collaboration of researchers in the curricula with specific topics integrated into the course contents, and the completion of research projects within research units. Students also have the opportunity to establish connections with companies and industries, gaining valuable experiences related to their future professional careers.

Furthermore, P.PORTO organizes seminars, workshops, webinars, and conferences inviting experts from various fields to contribute to the student's education. These events facilitate networking and provide students with contacts that can be beneficial for their future professional activities.

P.PORTO offers research initiation courses to students starting from the first year of their undergraduate studies. These courses aim to stimulate scientific activities, critical thinking, creativity, and autonomy among students by engaging them in research practices, teaching them research methods, and involving them in the life of research units and groups.

The involvement of students in research projects has been growing, often leading to project funding applications and attracting students to research and educational activities in scientific

institutions. P.PORTO provides a wide range of scholarships for students who contribute to the development of research projects. These scholarships include research initiation scholarships or research scholarships at the undergraduate or master's level, enabling students to acquire new knowledge and develop additional skills beyond their regular study programs. Scholarships are funded through various national (FCT, co-promotion, companies, industries, etc.) and international (Erasmus+, Interreg, H2020, Horizon, etc.) programs, forming a significant portion of the contracted funding.

P.PORTO has also participated in other funding programs, such as the FCT's "Summer with Science," which awards research initiation scholarships to selected students. This program, initiated in 2020, supports scientific, artistic, and technological research activities in research units, aiming to promote science in its various dimensions and its relationship with higher education and society. Its objective is to stimulate the initiation of scientific activity among higher education students.

As an integral part of research activities, students are funded to participate in scientific conferences and congresses to discuss their work through oral or poster presentations. In cases where the work leads to publications, students are listed as co-authors, most of the time as first authors. P.PORTO has launched the "Support Program for Publication in High-Quality Scientific Journals" (PAPRE). This program supports publications in Web of Science-indexed scientific journals with impact factors. To recognize scientific excellence, authors who affiliate their publications with P.PORTO and publish in journals appearing in the top 10% of their respective citation indexes receive "Certificates of Merit for Scientific Publication." Students have also been beneficiaries of these certificates, which are a source of pride for both the students and P.PORTO.

In the field of artistic, technical, and research training, P.PORTO has established the "Applied Artistic Research Award" since 2021. This award aims to recognize up to a maximum of four innovative academic projects, individual or collaborative, that promote transdisciplinarity between Photography and at least one of the main areas of study at ESMAD – the School of Media Arts and Design, including cinema, multimedia, sound, design, and informatics. In the field of music, the "Helena Sá e Costa Award," established in 2003, promotes the participation of students and young professionals in the early stages of their careers in an interpretative competition. This award provides opportunities for participants to perform with an orchestra or attend courses, seminars, or masterclasses in Portugal or abroad. Over the years, numerous students have been recognized and awarded through this program.

Overall, the student involvement in research and innovation activities at P.PORTO reflects the institute's commitment to fostering a research culture, promoting interdisciplinary collaboration, and nurturing the next generation of researchers and innovators. Through these initiatives, P.PORTO aims to create a vibrant and dynamic research ecosystem that bridges the gap between academia and society, fostering knowledge transfer, and driving positive societal and economic impact.

5   The vision of ATHENA research-based cooperation

ATHENA seeks to create a dynamic alliance that transcends boundaries, leveraging the collective expertise and resources of its members to address global challenges and drive impactful research outcomes. This proposal outlines the strategic message and contribution of ATHENA to the idea of an alliance [1].

1. Vision Statement: The vision of ATHENA is to establish a global alliance of research-intensive universities committed to advancing knowledge, driving innovation, and addressing societal challenges through collaborative research endeavors. By promoting cross-institutional collaboration, ATHENA aims to create a vibrant ecosystem where ideas, talent, and resources converge to generate transformative solutions that positively impact our world [2].

2. Strategic Message: ATHENA's strategic message revolves around four key pillars that underpin the alliance's mission and goals:
    a. Excellence in Research
    b. Global Engagement
    c. Knowledge Transfer and Innovation
    d. Talent Development and Education

4. Contribution to the Idea of Alliance: ATHENA's proposed research-based cooperation brings significant contributions to the broader idea of alliances by:
    a. Amplifying Research Impact [3].
    b. Fostering Collaborative Innovation
    c. Facilitating Global Networks
    d. Empowering Future Leaders [4].

In summary, the vision of ATHENA as a research-based cooperation is to establish a global alliance that promotes excellence in research, global engagement, knowledge transfer and innovation, and talent development and education. By focusing on these pillars, ATHENA aims to amplify research impact, foster collaborative innovation, facilitate global networks, and empower future leaders [5].

Through strategic partnerships, joint research projects, knowledge exchange programs, and collaborative initiatives, ATHENA will create a vibrant ecosystem where ideas flourish, research thrives, and impactful solutions are generated. By leveraging the collective strengths and resources of its member institutions, ATHENA will contribute to the advancement of knowledge, the development of innovative solutions, and the transformation of society.

References

[1]   J. R. Cole, "The Research University in the World of the Future".

[2]   M. Grozdanić and J. Kiš (Eds.), "The Third Mission of Higher Education Institutions: Implications for Research and Practice".

[3]   M. K. Smith and B. Hall (Eds.), "The Engaged University: International Perspectives on Civic Engagement".

[4]   European University Association (EUA).

[5]   World University Network (WUN).