REUNICE – Research with and for society

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***Abstract*—This paper presents a new European project namely "REUNICE" which focuses on research with and for society. Specifically, REUNICE aims to promote cooperation between universities and other sectors in order to enhance the quality and competitiveness of the research activities and innovation. In order to attain this objective, the project focuses on four main topics, in particular open science, diversity, ties with industry, and sustainable science. Specifically, in this paper, we present the European university action plan in each topic and how external stakeholders can collaborate with the consortium in this project.**

***Index Terms*— European research, European Universities, Open science, Ties with industry, Diversity, Sustainable science**

I. Introduction

The rapid progress and changing landscape in many areas of science and technology have raised societal concerns and contributed to ambivalence about the role that research plays in society [1]. To overcome these concerns, the Science and Technology Advisory Council of the President of the European Commission published in 2014 a policy paper [2] on the relation between science and society in which it concluded that a new 'Science and society contract' is needed and "social learning and co-production of knowledge where appropriate together with the involvement of civil society in science and technology are [...] relevant factors to address". More recently, the current European Commissioner for Research & Innovation, Carlos Moedas [3] stated that "we must engage all of society in research and innovation processes." Therefore, in this context, the REUNICE European project was launched to deal with the topics related to research with and for society. In particular, REUNICE is a supplementary project of the ERASMUS+ project "EUNICE" (European University for Customized Education) and funded by the European Union's H2020 Research and Innovation Programme to align research and innovation agendas within EUNICE alliance.

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The REUNICE/EUNICE projects comprise seven universities from seven European countries, namely: (1) Politechnika Poznańska (PUT), Poland; (2) Brandenburgische Technische Universitat Cottbus- Senftenberg (BTU), Germany; (3) Universidad de Cantabria (UC), Spain; (4) Université de Mons (UMONS), Belgium; (5) Univesità degli Studi di Catania (UNICT), Italy; (6) Université Polytechnique Hauts-de-France (UPHF), France; and, (7) Vaasan Yliopisto (UVA), Finland. Specifically, REUNICE addresses the tactical and strategic interests of the European Commission, and of the partners involved particularly, by increasing the infrastructural and operational efficiency of the consortium. It aims to align the education, research and innovation strategies of European universities. The project design allows the alliance to foster a transformative agenda for itself that has a trans-disciplinary, intercultural, shared, integrated, and long-term joint strategy as its main foundation. By doing so, the alliance will contribute to the development of a society based on knowledge and innovation, focused on a smart, sustainable and inclusive growth. With reference to societal challenges and context, the implementation measures proposed, have the objective to provide concrete life experiences for the university community as a whole. In particular, the alignment of the three different conceptual phases related to education, research and innovation to the needs and challenges of society will be obtained within the REUNICE project by means of the following specific objectives:

1. Fostering an unprecedented cooperation between the European universities taking part in the European University Initiative;
2. Developing a REUNICE common research and innovation agenda and action plan;
3. Strengthening human capital by customized education;
4. Sharing research infrastructure;
5. Fostering the cooperation with the non-academic sector;
6. Promoting open science as a widely adapted practice in all EUNICE member universities, in order to make research more open, collaborative, and closer to society;
7. Pro-actively involving citizens, civil society and public/cities authorities in research and innovation.

REUNICE focuses on four main topics related to research with and for society, namely: (1) open science; (2) diversity; (3) ties with industry; and, (4) sustainable science, which are presented in the next sections.

II. Open Science

The aim of the United Nations (UN) sustainable development goal four (SDG4), namely "Quality Education" is to ensure inclusive and equitable quality education and empower lifelong learning opportunities for all. In particular, open science could be one of the concepts to achieve SDG4. It presents a new approach to the scientific process based on cooperative work and new ways of diffusing knowledge by using digital technologies and new collaborative tools [4].

Within the 2030 education strategies, several universities

participated in different open science initiatives. In REUNICE in particular, the promoted policies to make research more open, collaborative, and closer to society will be adapted through a multitude of actions. The first action is to study the current situation of open science in all seven participating universities. Specifically, two surveys were conducted to collect the different types of open science practices within EUNICE universities (e.g. open scientific knowledge and open science infrastructure), the main objectives of the implemented open science initiatives in each university, the applied open science principles, and the barriers handling the adoption of open science in their universities. Based on the collected data from the surveys, an open science governance model for the alliance universities was developed in order to align practices, principles and objectives.

In the second action, in order to promote an open science culture at all partners, an open science infrastructure, using new technologies like block-chains and smart contracts, will be developed based on the governance model. This infrastructure in form of a platform will be used as a collaborative environment to share and exchange data and projects between researchers and non-academic actors. In particular, to encourage participants to contribute to the collaborative platform, a rewarding/gamification system, using points, badges, and leaderboard, will be implemented. According to several researches, gamification systems can enhance students' intrinsic motivation and performance [5].

Then, cross-disciplinary partnerships will be enhanced through the support of new technologies like artificial intelligence (AI). Specifically, a multi-agent system will be implemented to identify, help and manage team-pairing. Also, AI will be used to provide recommendations to the participants according to their research interests and needs.

Finally, a joint action plan regarding research in AI that will connect REUNICE with other transnational alliances of European universities will be developed and implemented.

One of the main principles of open science is to provide equal opportunities to all scientists, regardless of their individual differences. Therefore, diversity and inclusiveness are gaining a high priority in the new open science strategies and policy making from European universities. The next section presents the action plan of REUNICE toward this topic.

III. Diversity

To stress diversity, inclusiveness and gender equality within the alliance, several actions were proposed to support all work packages in REUNICE in a cross-cutting manner. Specifically, including diverse publics can be a major challenge for universities in Europe, as there is no consensus on defining what publics should be included. Additionally, there is currently no harmonized terminology between EU countries, let alone between different institutions, and there is a general lack of data that could be used to make comparisons between countries and to assess the situation in (international) higher education area. Therefore, the first step was to propose a definition to the notion of inclusion to be referred by the alliance.

The starting point was the principle of "Inclusive, because every learner will have equitable access to higher education and will be fully supported in completing their studies and training"[6], the concept of inclusion for the Union will be applied primarily to students as the beneficiaries of a more inclusive system, but we believe that it should be extended to all stakeholders of the universities. Indeed, it is because the institution welcomes diversity into its ranks that enables an inclusive policy towards its beneficiaries to develop. Based on the Erasmus+ Program Guide, eight indicative obstacles that may lead to a reduction in opportunities were then identified, namely: (1) disabilities; (2) health problems; (3) barriers linked to education and training systems; (4) cultural differences; (5) Social barriers; (6) economic barriers; (7) barriers linked to discrimination; and, (8) geographical barriers.

After the agreement of all partners on the use of this definition as a starting point to reflect together and develop actions to promote inclusion within REUNICE, the design of concrete life experiences for students and staff and institutional arrangements to promote inclusion within the alliance was initiated. The first action started by collecting data from the partners using surveys to study the current situation in each partner regarding inclusion.

After an initial assessment of the current situation in each partner, there is an intent to create a working group that would draw up an action plan in each university to develop a better policy on inclusion. The added value of this group would lay on the exchange of good practices on the setting up of the action plans put in place by each university. For instance, set up and test at least two pilot courses aiming to raise inclusion awareness among students. Finally, an evaluation of the action plans (e.g., pilot courses) in each university and recommendations for the alliance regarding inclusiveness will be conducted. For instance, propose a roadmap to promote the development of an inclusion policy for the alliance. Also, establish an inclusive communication charter for the alliance.

Additionally, as another form of inclusiveness, this project focuses on cooperation between universities and companies and other non-academic actors to promote science and innovation. The next section presents the action plan of REUNICE regarding this topic.

IV. Ties with industry

Cooperation with non-academic sectors is another crucial key element in the REUNICE alliance. As a first action, and after verification of best practices on partnerships between university and industry, 69 best practices were identified. Then, the focus was put on building a virtual network of commercialization support resources, which will support the creation of a successful innovation and entrepreneurial ecosystem. In this context, an Expertise Exchange Platform (EEP) will be developed to connect university actors with other societal actors, especially industry actors, and to define and pilot a digital solution supporting cross-border commercialization activities like the creation of cross-border and cross-disciplinary venture teams, intellectual property and resource bundling, and the creation of international partner network of companies. The goal is to boost the innovation and entrepreneurial activity in the regions by supporting both local grass-roots student entrepreneurial movements and university lead commercialization activities, increasing the societal impact of research in each region. To this respect, EUNICE Cooperate Relation Office (CRO) was established in the Erasmus+ action of European universities.

Additionally, the REUNICE puts the spotlight on the industrial PhD in European universities. For instance, a workshop was conducted in October 2022 at one of the partner's university in order to connect university members with industry. Specifically, this type of events gives the opportunities to representatives of companies, industrial enterprises and institutions to meet with lecturers, researchers and PhD students to share Industrial PhD needs, opportunities, experiences and elevator pitches.

In line with current and future challenges of European universities, this project also focuses on reinforcing cooperation with the non-academic sector to promote sustainable science for business and society. The next section presents the action plan of REUNICE toward this topic.

V. Sustainable science

Education for sustainable development and global citizenship is also one of the 2030 sustainable development goals and it can be achieved by creating sustainable science that focuses on issues relating to the society and environment. Specifically, promotion of sustainable science for business and society will be reinforced in this project by involvement of citizens, civil society and public/cities authorities in research and innovation. In present days, society sets a problem/challenge, both as quick-thinking action in the short term, such as the current pandemic crisis, and in a strategic view in the long term (e.g., pollution, public health and ageing population, food safety, and renewable energy). The universities then mobilize scientific resources and expertise not only to address the social and technical nature of such sustainability problems, but also to anticipate the societal needs. To tackle these challenges, REUNICE proposes as a first action, university traineeships for undergraduate students 'transcribed' by societal stakeholders; co-designed and co-supervised with them. Also, cooperation and co-creation with other sectors will be reinforced through the training of research & innovation knowledge targeted at graduates and business sector employees, as a second action. In order to achieve this goal, it is very important to develop a strategy and action plan towards sharing of research infrastructure and expertise. Therefore, this project proposed a competence center to cluster new regional competence centers interconnected within the REUNICE network, as a result offering shared solutions for common problems as well as to address the local needs. In addition, the aforementioned Expertise Exchange Platform (EEP) will promote cooperation between universities and other sectors and will support the involvement of citizens, civil society and public/cities authorities by acting as a "virtual market" connecting university actors with other societal actors.

VI. Call for collaboration

As presented below, REUNICE focuses on four main topics namely, open science, diversity, ties with industry, and sustainable science. In particular, three platforms are currently under development to support the proposed actions in these topics, namely: (1) open science collaborative platform; (2) expertise exchange platform; and, (3) competence center. The work on these topics is continuing, therefore, actors from academic and non-academic fields, such as researchers, educators, enterprises, citizens, and associations are invited to join the project in the following tasks:

1. Academic actors are invited to participate in the open science platform by sharing, for instance, their projects, data, metadata, publications, and coding source. They are also invited to collaborate with researchers from other universities working on the same field to enhance research and foster innovation.
2. Non-academic actors, such as industry and enterprises are invited to collaborate with the universities on the shared projects on the open science platform. Specifically, they can fund the new projects that can be realized by master's or PhD students. Academic and non-academic actors have the possibility to exchange their expertise via EEP, which aim to build a virtual network of commercialization support resources that will go in line with the creation of a successful innovation and entrepreneurial ecosystem.
3. Public organizations, associations, and citizen are also invited to join this project by participating in the competence center through sharing their solutions for common society problems as well as to address the local needs. In this way, researchers and industries can focus more on projects that have more impact on the society.

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Mouna Denden received her Ph.D. degree in computer science from the University of Sfax, Tunisia, in 2020. She is currently a post-doctoral fellow at the Polytechnic University of Hauts-de-France (UPHF). She has published several academic papers in refereed international journals and conferences. Ms. Denden has been a member of the local organizing committee and program committees of various international conferences, as well as a reviewer in several peer-reviewed journals. Her current research focuses on educational gamification, educational games, distance learning, learner modeling, adaptive learning, machine learning, human-computer-interactions, educational psychology, open science, artificial intelligence in education and learning analytics.

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