European Funding Programs for Scientific Research and Education

Elisabetta Delle Donne[1]

Abstract

The European Commission, through different funding Programmes provides opportunities to enhance international cooperation in Science education research and innovation.
This paper starts with an introduction to the Europe 2020 strategy, the political framework that the European Union adopted to create the conditions for a smarter, sustainable and inclusive growth. Europe 2020 strategy provides the background to the funding Programmes in the period 2014-2020.
The paper then addresses the main funding Programmes providing students, teachers, professors and researchers with opportunities to finance science education, scientific researches, mobility and career development. Examples of initiatives, already funded by the European Commission in the field of Sciences, are also presented.

1. The Political Framework

Europe 2020 is the growth strategy of the European Union that aims to creating the conditions for a smarter, sustainable and inclusive growth. Five key targets have been set for the European Union to be achieved by the end of the decade. These are related to the promotion of employment, supporting research and development; sustainability (climate change and environment); education; fighting poverty and social exclusion.

The Europe 2020 strategy is structured in seven Flagships, identifying the priorities and the initiatives to be implemented to achieve the planned benchmarks: innovation, the digital economy, employment, youth, industrial policy, poverty and resource efficiency.

More information on Europe 2020 can be found at: https://ec.europa.eu/info/strategy/european-semester/framework/europe-2020-strategy_en

2. Erasmus+ Programme

Erasmus+ is the EU programme for education, training, youth and sport replacing and merging from 2014 more than 5 former international programmes.

The aim of the Erasmus+ Programme is to contribute to the achievement of the objectives of the Europe 2020 Strategy, as well as of the objectives defined within the strategic framework for European cooperation in education and training (ET 2020), including the corresponding benchmarks.

The specific objectives of the Erasmus+ Programme are to:

- improve the level of key competences and skills, with particular regard to their relevance for the labor market and their contribution to a cohesive society;
- foster quality improvements, innovation and internationalization of education and training institutions;
- promote the emergence of a European lifelong learning area and support the modernization of education and training systems;
- enhance the international dimension of education and training;
- improve the teaching and learning of languages and to promote the EU's broad linguistic diversity and intercultural awareness.
- Promote multilingualism

---
[1] Pixel, Italy

3. The Structure of Erasmus+

In order to achieve the above mentioned objectives, the Erasmus+ Programme implements the following Actions:

KEY ACTION 1 – MOBILITY OF INDIVIDUALS
This Key Action supports:
- **Mobility of learners and staff** provides opportunities for students, trainees, young people and volunteers, as well as for professors, teachers, youth workers, staff of education institutions to undertake a learning and/or professional experience in another country;
- **Erasmus Mundus Joint Master Degrees** supports high-level integrated international study programmes delivered by consortia of higher education institutions worldwide;
- **Erasmus+ Master Degree Loans** offers loans guarantee schemes backed up by the Programme to be used by students to follow abroad for a full Master Degree.

KEY ACTION 2 – COOPERATION FOR INNOVATION AND THE EXCHANGE OF GOOD PRACTICES
This Key Action supports:
- **Strategic Partnerships** aimed to promote innovation, exchange of experience and know-how between different types of organisations involved in education, training and youth.
- **Knowledge Alliances** between higher education institutions and enterprises aiming to foster innovation, entrepreneurship, creativity and multidisciplinary teaching and learning;
- **Sector Skills Alliances** involving VET institutions and companies in the analysis and anticipation of job market and specific economic sectors needs in order to delivery joint vocational training curricula, programmes and innovative training methodologies;
- **Capacity Building** projects promoting the cooperation between European and partner countries to support modernization and internationalization processes of Higher Education institutions and systems.

KEY ACTION 3 – SUPPORT FOR POLICY REFORMS
- **Structured Dialogue** taking the form of meetings, conferences, consultations and events promoting the active participation of young people in democratic life in Europe.
- **Partnerships** to explore and develop proposals for systemic reforms in the field of education and training

JEAN MONNET ACTIVITIES
- **Jean Monnet Activities** support excellence in teaching and research in the field of European Union studies worldwide.

SPORT ACTIONS
- **Collaborative Partnerships**, aimed to combat doping at grassroots level, to fight against match-fixing, to contain violence and tackle racism and intolerance in sport.
- **Not-for-profit European sport events**, granting individual organizations in charge of the preparation, organization and follow-up to a given event.

4. Erasmus+ Budget

Overall Budget 14.77 Billion Euro for the entire 7 years period
KEY ACTION 1 (around 63%) of the total budget
KEY ACTION 2 (around 28%) of the total budget
KEY ACTION 3 (around 4%) of the total budget
Further information on the Erasmus+ Programme is available on the European Commission's website at: http://ec.europa.eu/programmes/erasmus-plus/index_en.htm

5. Horizon 2020 Programme

Horizon 2020 is the programme that finances research, development and innovation activities.

The main general objectives of the Horizon 2020 Programme are:
- Raising the level of excellence of Europe's scientific research through the support to researchers in order to explore and implement their innovative ideas
- Making Europe an attractive location for the world's best researchers.
- Making Europe a more attractive location to invest in research and innovation by promoting activities where businesses set the agenda
- Pooling investments in key industrial technologies and help innovative SMEs to grow into world-leading companies.
- Gathering together resources and knowledge across different fields, technologies and disciplines to address strategic challenges for the future wealth of European societies
- Supporting activities aiming to foster the passage from research to market with a new focus on innovation-related activities, such as piloting, demonstration, test-beds, and market uptake.

6. The Structure of Horizon 2020

The Horizon 2020 Programme is organised in three Pillars.

PILLAR 1 - EXCELLENT SCIENCE

Pillar 1 aims to reinforce the excellence of the EU's science base and to make the EU's research and innovation system more competitive on a global scale. The 1st Pillar also provides opportunities for individual and group researches according to science-driven nature. Pillar 1 is mainly 'bottom-up' and investigator-driven.

The Pillar is divided in four actions:
- **The European Research Council (ERC)** provides flexible funding opportunities to enable talented and creative researchers (individually and in teams) to pursue the most promising frontier research.
- **Future and Emerging Technologies (FET)** supports collaborative research for advanced and paradigm-changing innovation. It finances scientific collaboration across disciplines on radically new, high-risk ideas to accelerate development of the most promising emerging areas of science and technology.
- **Marie Skłodowska-Curie Actions (MSCA)** finances opportunities for researchers' training and career development through their cross-border and cross-sector mobility.
- **Research infrastructure**s ensures access to world call research facilities

PILLAR 2 - INDUSTRIAL LEADERSHIP

Pillar 2 aims to make Europe a more attractive location to invest in research and innovation by promoting activities where businesses set the agenda.

The Pillar is divided in three areas:
- **Leadership in enabling and industrial technologies (LEIT)** provides support for research, development, demonstration, standardisation and certification of highly innovative products and services in three topic-based areas identified by the Programme:
    - Information and communications technology (ICT)
    - Nanotechnologies, advanced materials, biotechnology, advanced manufacturing
    - Space
- **Access to risk finance** offers financial support to overcome deficits in the availability of debt and equity finance for R&D and innovation-driven companies.

- **Innovation in SMEs (SME instrument)** provides a SME-tailored funding scheme to stimulate all forms of innovation in SMEs, targeting those with the potential to grow and internationalise across the single market and beyond.

PILLAR 3 - SOCIETAL CHALLENGES

Pillar 3 aims to address major concerns shared by modern societies through a challenge-based approach, bringing together resources and knowledge across different fields, technologies and disciplines.

Funding focus on topic-based challenges, already defined by the Horizon 2020's Workprogrammes, published every 2 years.

The 7 challenges are:

- Health, demographic change and wellbeing
- Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the Bioeconomy
- Secure, clean and efficient energy
- Smart, green and integrated transport
- Climate action, environment, resource efficiency and raw materials
- Europe in a changing world - inclusive, innovative and reflective societies
- Secure societies - protecting freedom and security of Europe and its citizens

7. Horizon 2020 Budget

The total budget for the 2014-2020 period is 70 billion euros:

- Excellent Science: 24.4 Billion Euro
- Industrial Leadership: 17 Billion Euro
- Societal Challenges: 29.7 Billion Euro

Further information on the Horizon 2020 Programme is available on the European Commission's website at: http://ec.europa.eu/programmes/horizon2020/en

8. Examples of successful projects in scientific field

Pixel was and is involved as coordinator or partner in the following projects funded in the field of scientific research and science education:

- **ZOE - Zoonoses Online Education**
  The ZOE European project funded by the European Commission in the framework of the Erasmus+ Programme, KA2 Strategic Partnership in the field of Higher Education aims to create teaching resources in the field of veterinary medicine focusing in particular on the identification, monitoring and control of malaria.
- **E-Learning from Nature**
  The E-Learning From Nature project funded by the European Commission in the framework of the Erasmus+ Programme, KA2 Strategic Partnership in the field of School Education aims to improve secondary school students' basic skills in scientific subjects.
  Website: http://enature.pixel-online.org/
- **Softis-Ped - Softskills for Children's Health**
  The Softis-Ped project funded by the European Commission in the framework of the Erasmus+ Programme, KA2 Strategic Partnership in the field of Higher Education is addressed to medicine university lecturers in the pediatrics field. The project aims to provide them with relevant soft-skills as far as communication, transparency, organization, intercultural issues are concerned.
  Website: http://softis-ped.pixel-online.org/

- **Learning for Life**
  The Learning for Life project funded by the European Commission in the framework of the Erasmus+ Programme, KA2 Strategic Partnership in the field of School Education aims to promote Problem Based Learning and Multiple Intelligences based teaching methodologies for scientific subjects

- **Med&Lang Palliative Care**
  The Med&Lang Palliative Care project, funded by the European Commission in the framework of the Erasmus+ Programme- KA2 Strategic Partnership focuses on communication skills in a foreign language for supporting the teaching processes of the medical lecturers at higher education level, with a specific focus on the palliative cares.
  http://www.medlang.eu/

- **Health Friendly Nutrition**
  The Health Friendly Nutrition European project, funded by the European Commission in the framework of the Erasmus+ Programme, KA2 Strategic Partnership in the field of School Education, is aimed at improving the healthy nutrition habits of children and families also promoting healthy lifestyle principles in the community
  http://healthedu.emundus.eu/

- **Chemistry Is All Around Network**
  The Chemistry is All around Network project funded by the European Commission in the framework of the Lifelong Learning programme Comenius Subprogramme aims at stimulating the interest of pupils towards the study of Chemistry. It also intends to create a network of science education institutions.
  Website: http://chemistrynetwork.pixel-online.org/

- **Chemistry is All Around Us Project**
  The Chemistry is All Around Us European funded by the European Commission in the framework of the Life Long Learning Programme KA 1 Subprogramme aims to identify the best strategies to implement Lifelong Learning of scientific subjects, with a focus on Chemistry identified as an exemplary case study.
  Website: http://chemistry.pixel-online.org/index.php