

This document is a supplement to the R&D questionnaire sent out to all Government Ministries, Departments, Entities and Local Councils. The aim of this document is to serve as a guideline and solve any difficulties encountered whilst filling in the questionnaire. It provides a brief explanation on the fields of science and their sub-fields, the socio-economic objectives and on transnationally coordinated research.

If this document hasn't solved your problem, kindly send us an email on publicfinance.nso@gov.mt or call directly on 25997245.

FIELDS OF RESEARCH AND DEVELOPMENT

The source of this classification is the Frascati Manual, 2015 edition

1. Natural sciences

- 1.1 Mathematics
- 1.2 Computer and information sciences
- 1.3 Physical sciences
- 1.4 Chemical sciences
- 1.5 Earth and related environmental sciences
- 1.6 Biological sciences
- 1.7 Other natural sciences

2. Engineering and technology

- 2.1 Civil engineering
- 2.2 Electrical engineering, electronic engineering, information engineering
- 2.3 Mechanical engineering
- 2.4 Chemical engineering
- 2.5 Materials engineering
- 2.6 Medical engineering
- 2.7 Environmental engineering
- 2.8 Environmental biotechnology
- 2.9 Industrial biotechnology
- 2.10 Nano-technology
- 2.11 Other engineering and technologies

3. Medical and health sciences

- 3.1 Basic medicine
- 3.2 Clinical medicine
- 3.3 Health sciences
- 3.4 Medical biotechnology
- 3.5 Other medical science

4. Agricultural and veterinary sciences

- 4.1 Agriculture, forestry, and fisheries
- 4.2 Animal and dairy science

- 4.3 Veterinary science
- 4.4 Agricultural biotechnology
- 4.5 Other agricultural sciences

5. Social sciences

- 5.1 Psychology and cognitive sciences
- 5.2 Economics and business
- 5.3 Education
- 5.4 Sociology
- 5.5 Law
- 5.6 Political science
- 5.7 Social and economic geography
- 5.8 Media and communications
- 5.9 Other social sciences

6. Humanities and the arts

- 6.1 History and archaeology
- 6.2 Languages and literature
- 6.3 Philosophy, ethics and religion
- 6.4 Arts (arts, history of arts, music)
- 6.5 Other humanities

The source of these definitions is the Frascati Manual, 2015 edition

1: Exploration and exploitation of the Earth

- The exploration of the earth's crust and mantle, seas, oceans and atmosphere, and their exploitation.
- Climatic and meteorological research, polar exploration and hydrology
- Mineral, oil and natural gas prospecting
- Exploration and exploitation of the sea-bed
- Earth's crust and mantle excluding sea-bed
- Atmosphere sea and oceans

Does not include R&D related to pollution (SEO 2), soil improvement (SEO 4), and land-use and fishing (SEO 8).

2: Environment

- The control of pollution, aimed at the identification and analysis of the sources of pollution and their causes, and all pollutants, including their dispersal in the environment and the effects on man, species (fauna, flora, microorganisms) and biosphere;
- Development of monitoring facilities for the measurement of all kinds of pollution;
- The elimination and prevention of all forms of pollution in all types of environment.
- Protection of atmosphere and climate, ambient air and water, soil and groundwater, species and habitats and against natural hazards
- Radioactive pollution, noise and vibration and solid waste.

3: Exploration and exploitation of space

- Civil Space (scientific exploration of space, applied research programmes, launch systems and space laboratories and space travel).

Does not include corresponding R&D in the defence field (included in Chapter 14).

4: Transport, telecommunication and other infrastructures

- Infrastructure and land development, including the construction of buildings;
- The general planning of land-use;
- Protection against harmful effects in town and country planning.

This SEO also includes R&D related to, transport systems, telecommunication systems, general planning of land-use, construction and planning of building, civil engineering and water supply.

It does not include R&D related to other types of pollution than harmful effects in town (SEO 2).

5: Energy

- The production, storage, transportation, distribution and rational use of all forms of energy;
- Processes designed to increase the efficiency of energy production and distribution;
- The study of energy conservation.

This SEO also includes R&D related to, Energy efficiency, CO₂ capture and storage, Renewable energy sources, Nuclear fission and fusion, Hydrogen and fuel cells, and, Other power and storage technologies.

Does not include R&D related to prospecting (SEO 1) and, vehicle and engine propulsion (SEO 6).

6: Industrial production and technology

- The improvement of industrial production and technology
- Industrial products and their manufacturing processes

This SEO also includes R&D related to, increasing economic efficiency and competitiveness, all manufactures, and, recycling waste.

It does not include R&D related to industrial products and their manufacturing processes where they form an integral part of other objectives (e.g. defence, space, energy, agriculture).

7: Health

- Protecting, promoting and restoring human health – broadly interpreted to include health aspects of nutrition and food hygiene. It ranges from preventative medicine, including all aspects of medical and surgical treatment, both for individuals and groups, and the provision of hospital and home care, to social medicine and paediatric and geriatric research.
- Prevention, surveillance and control of communicable and non-communicable diseases
- Monitoring the health situation
- Health promotion
- Occupational health
- Public health legislation and regulations
- Public health management
- Specific public health services
- Personal health care for vulnerable and high risk populations

8: Agriculture

- The promotion of agriculture, forestry, fisheries and foodstuff production
- Chemical fertilizers, biocides, biological pest control and the mechanization of agriculture
- The impact of agricultural forestry activities on the environment
- The field of developing food productivity and technology
- Agriculture, forestry, and fishery
- Animal and dairy science
- Veterinary science and other agricultural sciences

This SEO does not include R&D related to the reduction of pollution (SEO 2), the development of rural areas, the construction and planning of buildings, the improvement of rural rest and recreation amenities and agricultural water supply (SEO 4), energy measures (SEO 5) and the food industry (SEO 6).

9: Education

- Education in general, including training, pedagogy, didactics
- Subsidiary services to education.

10: Culture, recreation, religion and mass media

- The social phenomena of cultural activities, religion and leisure activities so as to define their impact on life in society;
- Racial and cultural integration and on socio-cultural changes in these areas. The concept of "culture" covers the sociology of science, religion, art, sport and leisure and also comprises inter alia R&D on the media, the mastery of language and social integration, libraries, archives and external cultural policy.

11: Political and social systems, structures and processes

- The political structure of society,
- Public administration issues and economic policy;
- Regional studies and multi-level governance;
- Social change, social processes and social conflicts;
- The development of social security and social assistance systems;
- The social aspects of the organization of work.
- Gender-related social studies including discrimination and familiar problems;
- The development of methods of combating poverty at local, national and international level;
- The protection of specific population categories on the social level, on the sociological level, i.e. with regard to their way of life and on the economic level.
- Methods of providing social assistance when sudden changes (natural, technological or social) occur in society.

This SEO does not include R&D related to Industrial health, the health control of communities from the organisational and socio-medical point of view, pollution at the place of work, prevention of industrial accidents and the medical aspects of the causes of industrial accidents (SEO 07).

12: General advancement of knowledge

- R&D financed from General University Funds (GUF)

13: General advancement of knowledge

- R&D financed from other sources than General University Funds (GUF)

14: Defence

- Military purposes
- Basic, nuclear and space R&D financed by Ministries of Defence.

This SEO does not include for example R&D financed by Ministries of Defence in the fields of meteorology, telecommunications and health, should be classified in the relevant SEOs.

CONCEPTS AND DEFINITIONS

NATIONAL PUBLIC FUNDING TO TRANS-NATIONALLY COORDINATED RESEARCH is defined as the total of budget funded by the government (state, federal, provincial), as measured by GBAORD directed to trans-national public R&D performers and trans-national public R&D programmes. This indicator comprises three sub-categories: national contributions to trans-national public R&D performers; national contributions to Europe-wide trans-national public R&D programmes and national contributions to bi- or multi-lateral public R&D programmes established between Member States' governments.

Trans-national public R&D performers are inter-governmental or European Commission bodies that carry out R&D activity with own dedicated research facilities. They have as regular members EU Member States, although other European countries (as Switzerland and Norway in CERN) or non-European countries (as Israel in EMBL) might also be their members. Those international institutions can be located inside or outside EU geographical boundaries (like CERN in Switzerland).

Europe-wide trans-national public R&D programmes include two sub-categories:

1/ Trans-nationally co-funded public R&D programmes/schemes with cross-border flows of funds involve cross-border flows of funding by member countries usually into a common central budget. Such programmes disburse funding to research activities conducted at national level using national R&D facilities. However, they typically involve some form of trans-national coordination (common objectives/research agenda, trans-national project consortia, etc.).

2/ Trans-nationally coordinated public R&D programmes/schemes (with no cross-border flows of funds involve the cross-border coordination of research agendas, objectives, and so on, but do not involve cross-border flows of funding. National authorities coordinate activities with other participating countries, but disburse funds from their own budgets to R&D performers on their own territory (i.e. each country funds its own research teams).

Bi- or multi-lateral public R&D programmes established between MSs governments, include non-EC funded public R&D programmes jointly undertaken by at least two MSs' governments, although other non-EU countries could also participate in them. They may or may not involve cross-border flows of funds (so that the two sub-categories identified above for Europe-wide trans-national public R&D programmes can be considered here as well).

List with examples of trans-national public R&D performers and trans-national public R&D programmes

The current list contains the main publicly-funded mechanisms in Europe for trans-national cooperation in research. It is not exhaustive, but covers the largest and best-known mechanisms. Therefore the smaller performers and programmes are missing from the list.

The examples for bi- or multi-lateral public R&D programmes established between MSs' governments are based on a study carried out by the Institute for Prospective Technological Studies (IPTS) through the ERAWATCH Network in 7 MSs (Austria, Finland, Germany, Italy, the Netherlands, Poland and the United Kingdom).

Trans-national public R&D performers with own dedicated R&D facilities:

- The European Organization for Nuclear Research (**CERN**)
- The Institute Laue-Langevin (**ILL**)
- The European Synchrotron Radiation Facility (**ESRF**)
- European Molecular Biology Laboratory (**EMBL**)
- The European Southern Observatory (**ESO**)
- Joint Research Centre of the European Commission (**JRC**)

Europe-wide trans-national public R&D programmes:

- ERA-NETs
- ERA-NETs +
- European Space Agency (ESA)
- European Fusion Development Agreement (EFDA)

- EUREKA
- COST
- EUROCORES
- European Collaborative Research Projects in the social sciences (ECRP)
- Article 169 initiatives: EDCTP (Europe-Developing Countries Clinical Trials Platform), Eurostars (for research-performing SMEs) and AAL (Ambient assisted living for the elderly)
- Joint Technology Initiatives (public funding part): ENIAC (Embedded Computing Systems), ARTEMIS (Nanoelectronics)
- Seventh Framework Programme for Research and Technological Development.
- Horizon 2020

Bi- or multi-lateral public R&D programmes established between MSs governments

- German-Austrian-Swiss cooperation agreement between national funding agencies D-A-CH
- Finnish-Swedish Wood Material Science and Engineering Research Programme
- Nordic joint research funding programmes (NordForsk, Nordic Energy and NICE)
- Polish-French research programme on cancer
- NERC Rapid Climate Change Programme
- French-German-Spanish-Portuguese joint programme genomics plant-KBBE (FR-DE-ES-PT)
- Executive Programme for scientific and technological cooperation between Italy and Hungary
- Franco-German programme inter-Carnot and Fraunhofer (PICF)
- UK and India Education and Research Initiative (UKIERI)
- French-German DEUFRAKO agreement in the transport area