UIS/RD/2012M

United Nations
Educational, Scientific and
Cultural Organization

Survey 2012
Data Collection on Research and Experimental Development (R&D)

INSTRUCTION MANUAL FOR COMPLETING THE QUESTIONNAIRE ON RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D) STATISTICS

CONTENTS

LIST OF DEFINITIONS

Technical notes for the completion of the tables

1) Notes on the coding of missing data

The correct use of coding for missing data is essential for ensuring the integrity of the data. The reasons why there are no data in a particular instance need to be distinguished in statistical analyses and reports.

Do not leave any cell blank in the tables. Each cell for which there is no valid data value must be assigned one of the following four missing codes:

i) Category not applicable = **a**

If a certain category or cell in the tables does not apply to the Science and Technology system(s) in your country, then assign the code "**a**" to all cells referring to this category (or cross-classification of categories). This implies that data for these categories do not even hypothetically exist.

ii) Data missing (or not available) = **m**

Sometimes data are not available for certain classification categories and are not included in any other cells of the table (even though these data could, in principle, be collected). In such cases, you should assign the code "**m**" to all cells referring to the corresponding classification categories.

iii) Quantity nil = **n**

If a data value is nil or negligible, assign the code "**n**" to the corresponding cell. If a category is not applicable and therefore the data value would be zero for a cell, then do not use the code "**n**" but use the code "**a**" for "category not applicable" instead. Do not use the value 0 (zero) to indicate that a value is nil.

iv) Data included in another category = **x**

If data cannot be disaggregated to fit into certain cells in the tables, please use the "**x**" code in the cell where data are unavailable. **Please use a footnote to specify** where the data have been included.

2) Note on provisional or estimated data = *

Please indicate any provisional or estimated figures with an asterisk (*).

INTRODUCTION

The UNESCO Institute for Statistics (UIS) survey on Research and Experimental Development (R&D) Statistics forms part of the Institute's strategy to improve its statistical programme and to develop and deliver timely, accurate and policy-relevant statistics. The objective of this questionnaire is to collect the most recent data on science, technology and innovation (STI), specifically on resources devoted to R&D.

This questionnaire aims to collect data for the year **2011** and prior. This year's questionnaire incorporates a section seeking information on the availability of additional data on R&D which will be used to evaluate the feasibility of extending future data collections.

The data collected from this questionnaire will be used to update the UIS STI database which can be accessed on-line at the UIS Data Centre at http://stats.uis.unesco.org and will be published in reports prepared by UNESCO, other UN agencies, and public and private institutions or individuals worldwide. This instruction manual has been prepared to help data producers in Member States to complete the questionnaire **UIS/RD/2012.**

The definitions and classifications presented in this manual are based on the Recommendation concerning the *International Standardization of Statistics on Science and Technology* (UNESCO, 1978) and the *Frascati Manual* (OECD, 2002).

Submission of questionnaires

The UIS strongly encourages the use of the electronic form available at http://survey.uis.unesco.org. If you experience problems accessing this site or submitting the questionnaire electronically, please contact the UIS at uis.survey@unesco.org, by fax at (1 514) 343-5740, telephone at (1 514) 343-6880 or mail at:

UNESCO Institute for Statistics
P.O. Box 6128, Succursale Centre-Ville
Montreal, Quebec H3C 3J7
CANADA

1. COVERAGE OF THE QUESTIONNAIRE

The questionnaire is designed to include data on all institutions carrying out R&D activities in your country. These include the four sectors as defined by the *Frascati Manual:*

- Business enterprises;
- Government;
- Higher education; and
- Private non-profit organizations.

Definition 1: Sectors

The **business enterprise** sector includes:

- All firms, organizations and institutions whose primary activity is the market production of goods or services (other than higher education) for sale to the general public at an economically significant price.
- The private non-profit institutions mainly serving them.

The **government** sector is composed of:

- All departments, offices and other bodies which furnish, but normally do not sell to the community, those common services, other than higher education, which cannot otherwise be conveniently and economically provided, as well as those that administer the state and the economic and social policy of the community. (Public enterprises mainly engaged in market production and sale of goods and services are included in the business enterprise sector.)
- Non-profit institutions controlled and mainly financed by government, not administered by the higher education sector.

The **higher education** sector is composed of:

- All universities, colleges of technology and other institutions providing tertiary education (i.e. ISCED 5A, 5B or 6 courses), whatever their source of finance or legal status.
- It also includes all research institutes, experimental stations and clinics operating under the direct control of or administered by or associated with higher education institutions.

The **private non-profit** sector includes:

- Non-market, private non-profit institutions serving households (i.e. the general public).
- Private individuals or households.

For more detailed definitions and for guidelines on their application, please refer to the OECD *Frascati Manual* (OECD, 2002).

Only one questionnaire per country should be completed, filled in either by the institution responsible for science and technology (S&T) policy or STI statistics (i.e. Ministry of Science and Technology, Ministry of Research and Higher Education, or National S&T Council) or the National Statistical Office.

2. INSTRUCTIONS FOR COMPLETING THE QUESTIONNAIRE

General considerations

The reported data should cover all sectors (described in Definition 1), even if some institutions fall under the authority of other ministries or data are collected by various institutions. Additionally, the **UIS encourages all countries to make their own estimations of missing or incomplete data**, since the UIS does not always have all the necessary elements for making the most accurate estimations. To signal that a cell contains estimated or partially estimated data, please put an asterisk * in front of the number, i.e. *68794. Do not leave a space between the symbol and the figure. If, despite these efforts, some data are not available or are incomplete, this should be clearly explained in a footnote or in an accompanying letter.

The tables in this questionnaire refer mainly to resources devoted to **R&D**, as stated in Definition 2.

Definition 2: Research & experimental development (R&D)

R&D comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of humanity, culture and society, and the use of this stock of knowledge to devise new applications. The term R&D covers three activities: basic research, applied research and experimental development.

Basic research is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view.

Applied research is also original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective.

Experimental development is systematic work, drawing on existing knowledge gained from research and/or practical experience, which is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed. R&D covers both formal R&D in R&D units and informal or occasional R&D in other units.

RESPONDENT INFORMATION

This page identifies the person responsible for completing the questionnaire, as well as information related to the head of the institution. This information will be used to update the UIS database of "National Institutions Responsible for R&D Statistics". Therefore, **it is very important to complete this section**, even if your country has no new information to provide. The person identified as being responsible for completing the questionnaire will act as liaison should the UIS need further clarification on responses.

Section 1. GENERAL INFORMATION

Since national STI statistics fall under the responsibility of various institutions throughout the world, Section 1.1 identifies your country's institutional arrangement. The questions cover areas, such as the type of the institution (public organization, higher education institution, private enterprise or private non-profit organization), the primary activities of the institution (such as official statistics, S&T policy, R&D, higher education, technology transfer or S&T services), and the type of responsibility the institution has over STI statistics (i.e. national coordination of data producers, sectorial coordination only (e.g. for higher education statistics), or institutional data producer with no responsibility for collecting statistics from other institutions). If your institution is not in charge of the national coordination of STI statistics, please provide the contact details of the institution which has such responsibility.

Section 1.2 covers the basic methodologies used to collect the data. This information will be incorporated into a database of metadata and will aid in the assessment of data comparability and quality. If the methodologies for collecting data on R&D personnel and R&D expenditure *(please see Definitions 4 and 9 of this manual)* are different within the same sector, please indicate R&D personnel with a "P" and R&D expenditure with an "E" under the respective methodologies. Any additional information on methodologies used should be written in the "Notes" section.

Definition 3: Sources for budgetary data

Although details of the budgetary procedure vary from country to country, different broad stages can be identified.

- Budget proposal (figures presented to the parliament for the coming year).
- Initial budget appropriations (figures as voted by the parliament for the coming year, including changes introduced in the parliamentary debate).
- Final budget appropriations (figures as voted by the parliament for the coming year, including additional votes during the year).
- Obligations (money actually committed during the year).
- Actual outlays (money paid out during the year).

If surveys (both census and sample) are used to obtain data, please provide more details such as target population, sampling techniques, etc. Similarly, in the case of budgetary information, please indicate which stage of budgetary information is used to obtain data *(please see Definition 3 for different stages of budgetary information)*. Please send to the UIS the latest survey instruments (questionnaires, instruction manuals, etc.) used to collect R&D statistics from the respective institutions in each sector. These survey instruments will be included in the database on "R&D Survey Questionnaires" which will be accessible through the UIS website with a view to sharing the survey tools among other countries.

To identify the scope of the responses provided, please identify whether the data provided cover the whole country or only a limited number of sectors or parts of sectors (i.e. some or all of the following: business enterprises, government institutions, higher education or private non-profit organizations). If coverage of some sectors is partial, please give details in the "Notes" section (i.e. which institutions or sub-sectors are included and which are not). If coverage of data related to R&D personnel and R&D expenditure is different within the same sector, please provide details.

Furthermore, please indicate whether your country has conducted innovation surveys in the period 2007-2011. If so, please send to the UIS the latest publication on innovation statistics released by your country. Also provide the contact information of the institution responsible for innovation statistics.

Section 2. HUMAN RESOURCES IN R&D

This section seeks detailed information on human resources devoted to R&D, especially researchers.

Definition 4: R&D personnel

R&D personnel are all persons employed directly on R&D, as well as those providing direct services such as R&D managers, administrators, and clerical staff. Persons providing an indirect service, such as canteen and security staff, should be excluded.

Headcounts (HC) and full-time equivalents (FTE): Data for this section should be reported in headcount (HC) and full-time equivalent (FTE) respectively. These are two different methods of accounting for human resources. HC are data on the total number of persons who are mainly or partially employed in R&D. This includes staff employed both "full-time" and "part-time". FTE data are a measure of the actual volume of human resources devoted to R&D and are especially useful for international comparisons.

Definition 5: Measurement units of R&D personnel

Headcount data reflect the total number of persons employed in R&D, independently from their dedication. These data allow links to be made with other data series, such as education and employment data, or the results of population censuses. They are also the base for calculating indicators analysing the characteristics of the R&D workforce, with respect to age, gender or national origin.

One **full-time equivalent** may be thought of as one person-year. Thus, a person who normally spends 30% of his/her time on R&D and the rest on other activities (such as teaching, university administration and student counselling) should be considered as 0.3 FTE. Similarly, if a full-time R&D worker is employed at an R&D unit for only six months, this results in an FTE of 0.5. However, for reporting purposes, the total sum of FTEs should be rounded to the next integer, avoiding the reporting of decimals.

A number of restrictions apply to the actual measurement of FTE. It is therefore impossible to avoid differences in the methodology used for different countries and sectors. The most precise method, which is applied in some OECD countries in the higher education sector, involves carrying out time-use surveys for each individual researcher. However, more approximate methods are often used in practice. One method often used consists of counting the number of positions for each category of personnel, then multiplying by appropriate R&D coefficients. In some cases, the R&D coefficients used are founded on survey data of some sort, while in others they are simply based on assumptions made by those who compile the statistics. To improve international comparability regardless of the measurement methods used, the details of the methods employed should be made public in the "Notes" section. In particular, when R&D coefficients are used, information such as the value of coefficients, how they were obtained and how they are used in FTE calculations should be reported with the data.

The following formula can be used to calculate R&D personnel in FTE:

FTE: (dedication to the employment: full-time/part-time) x (portion of the year active on R&D) x (time or portion spent on R&D)

For example:

· A full-time employee spending 100% of time on R&D during a year: (1 x 1 x 1) = 1 FTE

· A full-time employee spending 30% of time on R&D during a year: (1 x 1 x 0.3) = 0.3 FTE

· A full-time R&D worker who spends 100% of time on R&D and is employed at an R&D institution for only six months: (1 x 0.5 x 1) = 0.5 FTE

· A full-time employee spending 40% of time on R&D during half of the year (person is only active for 6 months per year): (1 x 0.5 x 0.4) = 0.2 FTE

· A part-time employee (working 40% of the year) engaged only in R&D (spending 100% of time on R&D) during a year: (0.4 x 1 x 1) = 0.4 FTE

· A part-time employee (working 40% of the year), spending 60% of time on R&D during half of the year (person is only active for 6 months per year): (0.4 x 0.5 x 0.6) = 0.12 FTE

· 20 full-time employees spending 40% of time on R&D during a year: 20 x (1 x 1 x 0.4) = 8 FTE

If data are collected by only one of these methods (HC or FTE), please indicate in the "Notes" section if both methods are planned to be used in the near future. If FTEs are estimated, please describe the methodology in the "Notes" section or in an attached document.

Reference year: Since this survey seeks to update and complete the UIS database, **Sections 2.1** and **2.2** request data for the last five years (2007 to 2011). If data for previous years are available, please attach them in a separate document and indicate if they replace data submitted to the UIS in previous questionnaires.

However, all tables from **Sections 2.3 to 2.8** request data for only the **latest available year**. If data for 2009 are not available, then please provide data for the latest year in the period 2007-2011. The reference year must be stated in the space provided above the table. If you have detailed data for other years in this period, please attach them in a separate document.

Each table in the questionnaire includes a "Not specified" column or row or both. If some of the data requested in a particular table cannot be listed by the categories given, please include such data in the "Not specified" column or row or both (depending on the table) and describe the nature of these data using a comment in the electronic form or in the "Notes" section.

TOTAL R&D PERSONNEL

In Sections 2.1, 2.2, 2.3 and 2.4, please report data on R&D personnel by occupation, sex and sector of employment.

2.1 R&D personnel by occupation

Tables 2.1.1 and 2.1.2: R&D personnel by occupation (headcounts and full-time equivalents)

These tables measure the total number of R&D personnel and its breakdown by occupation, based on the classification provided in the *Frascati Manual.*

Definition 6: R&D occupations

Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned. Postgraduate students at the PhD level (ISCED level 6) engaged in R&D should be considered as researchers.

Technicians and equivalent staff are persons whose main tasks require technical knowledge and experience in one or more fields of engineering, physical and life sciences (Technicians) or social sciences and humanities (Equivalent staff). They participate in R&D by performing scientific and technical tasks involving the application of concepts and operational methods, normally under the supervision of researchers.

Other supporting staff includes skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects or directly associated with (or providing services to researchers involved in) such projects.

2.2 R&D personnel by sex

Tables 2.2.1 and 2.2.2: R&D personnel by sex (headcounts and full-time equivalents)

These tables measure the total number of R&D personnel[1] and researchers, broken down by sex.

Definitions for these tables can be found in the section above describing Tables 2.1.1 and 2.1.2.

2.3 R&D personnel by sector of employment and occupation

Tables 2.3.1 and 2.3.2: R&D personnel by sector of employment and occupation (headcounts and full-time equivalents)

These tables measure the sectoral distribution of the total number of R&D personnel, researchers, technicians and equivalent staff, and other supporting staff.

Definitions for the different sectors can be found in Definition 1. Other pertinent definitions for these tables can be found in the section above describing Tables 2.1.1 and 2.1.2.

2.4 R&D personnel by sector of employment and sex

Tables 2.4.1 and 2.4.2: R&D personnel by sector of employment and sex (headcounts and full-time equivalents)

These tables measure the sectoral distribution of the total number of R&D personnel and researchers broken down by sex.

Definitions for the different sectors can be found in Definition 1.

RESEARCHERS

Data requested in Sections 2.5 to 2.8 seek information on **researchers** instead of R&D personnel.

2.5 Researchers by formal qualification and sector of employment

Tables 2.5.1 and 2.5.2: Researchers by formal qualification and sector of employment (headcounts and full-time equivalents)

These tables reflect the educational qualifications of researchers (ISCED level of the **highest level of education** attained), broken down by the sector in which they develop their R&D activities. Please note that it applies to researchers only, and not technical and other staff.

1. Total personnel includes researchers, technicians and equivalent staff, and other supporting staff. Additionally, data on researchers are requested separately.

The breakdown by level of qualification is designed to classify researchers according to the highest education level completed: PhD or Doctorate level degree (ISCED 6), university degree at the first (e.g. Bachelor's) or second (e.g. Master's) level (ISCED 5A), other non-university tertiary diplomas (ISCED 5B) and all other types of diplomas or qualifications, including other post-secondary non-tertiary diplomas (ISCED 4), secondary diplomas (ISCED 3), etc. If some of the data cannot be listed by the given education levels, please include such data in the "Not specified" row and describe in the "Notes" section.

2.6 Researchers by formal qualification and sex

Tables 2.6.1 and 2.6.2: Researchers by formal qualification and sex (headcounts and full-time equivalents)

These tables reflect the distribution of researchers with different educational qualifications (ISCED level of the **highest level of education** attained), broken down by sex.

Definitions for these tables can be found in the section above describing Tables 2.5.1 and 2.5.2.

Please note that definitions for ISCED levels are based on the ISCED 1997 classification, available at: http://www.uis.unesco.org/publications/ISCED97
(Although ISCED 2011 has been recently adopted by Member States, it will not be implemented in UIS surveys until 2014.)

2.7 Researchers by field of science and sector of employment

Tables 2.7.1 and 2.7.2: Researchers by field of science and sector of employment (headcounts and full-time equivalents)

These tables reflect the distribution of researchers by field of science of their main R&D activity, broken down by the sector in which they are employed.

The classification of **fields of science** follows the guidelines specified by UNESCO in the Recommendation of 1978, adopted by OECD in the *Frascati Manual* (and *Revised Fields of Science and Technology Classification,* 2006) *(see Definition 8: Fields of science and technology)* and, in this survey, is limited to the first level.

2.8 Researchers by field of science and sex

Tables 2.8.1 and 2.8.2: Researchers by field of science and sex (headcounts and full-time equivalents)

These tables reflect the distribution of researchers by field of science of their main R&D activities, broken down by sex.

Definitions for these tables can be found in the section above describing Tables 2.7.1 and 2.7.2.

Definition 7: ISCED levels

ISCED 6 programmes are tertiary programmes leading to the award of an advanced research qualification. The programmes are therefore devoted to advanced study and original research and are not based on course-work only. They typically require the submission of a thesis or dissertation of publishable quality which is the product of original research and represents a significant contribution to knowledge. They usually prepare graduates for faculty posts in institutions offering ISCED 5A programmes, as well as research posts in government, industry, etc.

ISCED 5A programmes are tertiary programmes that are largely theoretically based and are intended to provide sufficient qualifications for gaining entry into advanced research programmes and professions with high skills requirements. They must satisfy a sufficient number of the following criteria:

- a minimum cumulative theoretical duration (at tertiary) of three years' full-time equivalent, although typically they are of 4 or more years;
- faculty with advanced research credentials;
- may involve completion of a research project or thesis;
- provide the level of education required for entry into a profession with high skills requirements (theoretically based/research preparatory, such as history, philosophy, mathematics, etc., or giving access to professions with high skills requirements, e.g. medicine, dentistry, architecture, etc.) or an advanced research programme.

This level includes all the research programmes which are not part of a doctorate, such as any type of Master's degree.

ISCED 5B programmes are tertiary programmes typically shorter than those in 5A and focus on occupationally specific skills geared for entry into the labour market, although some theoretical foundations may be covered in the respective programme. The content of ISCED level 5B programmes is practically oriented/occupationally specific and is mainly designed for participants to acquire the practical skills, and know-how needed for employment in a particular occupation or trade or class of occupations or trades - the successful completion of which usually provides the participants with a labour-market relevant qualification.

ISCED 4 programmes are post-secondary non-tertiary education programmes that straddle the boundary between upper-secondary and post-secondary education from an international point of view, even though they might clearly be considered as upper-secondary or post-secondary programmes in a national context. ISCED 4 programmes cannot, considering their content, be regarded as tertiary programmes. They are often not significantly more advanced than programmes at ISCED 3 but they serve to broaden the knowledge of participants who have already completed a programme at level 3. Typical examples are programmes designed to prepare students for studies at level 5 who, although having completed ISCED 3, did not follow a curriculum which would allow entry to level 5, i.e. pre-degree foundation courses or short vocational programmes. Second cycle programmes can be included as well.

ISCED 3 programmes are (upper) secondary education programmes typically beginning at the end of full-time compulsory education for those countries that have a system of compulsory education. The entrance age to this level is typically 15 or 16 years. The educational programmes included at this level typically require the completion of some 9 years of full-time education (since the beginning of level 1) for admission or a combination of education and vocational or technical experience and with as minimum entrance requirements the completion of level 2 or demonstrable ability to handle programmes at this level.

Definition 8: Fields of science and technology

Recommendation concerning the International Standardization of Statistics on Science and Technology (UNESCO, 1978) and *Frascati Manual* (OECD, 2002 and *Revised Fields of Science and Technology Classification*, 2006)

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 Health biotechnology
- 3.5 Other medical sciences

4. AGRICULTURAL SCIENCES
- 4.1 Agriculture, forestry and fisheries
- 4.2 Animal and dairy science
- 4.3 Veterinary sciences
- 4.4 Agricultural biotechnology
- 4.5 Other agricultural sciences

5. SOCIAL SCIENCES
- 5.1 Psychology
- 5.2 Economics and business
- 5.3 Educational sciences
- 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
- 6.1 History and archaeology
- 6.2 Languages and literature
- 6.3 Philosophy, ethics and religion
- 6.4 Art (arts, history of arts, performing arts, music)
- 6.5 Other humanities

Section 3. EXPENDITURE ON R&D

This section seeks detailed information on the actual expenditure on R&D in order to better understand the activities carried out by countries. These data also describe the environment in which researchers conduct their work.

Definition 9: R&D expenditure

R&D expenditure includes all expenditure for R&D performed within a sector of the economy, including both:

- *current costs* (labour costs – annual wages and salaries and all associated costs of researchers, technicians and supporting staff – and other current costs, such as non-capital purchases of materials, supplies and R&D equipment, i.e. water, fuel, gas, electricity; books, journals, reference materials, subscriptions to libraries, scientific societies; materials for laboratories); and
- *capital expenditure* (annual gross expenditure on fixed assets used in the R&D programmes of statistical units, i.e. expenditure on land and buildings, instruments and equipment, and computer software. It should be reported in full for the period when it took place and should not be registered as an element of depreciation).

The full **procedure for measuring R&D expenditure** (adapted from the *Frascati Manual*) is as follows:

- Identify the institutions (statistical units) that perform R&D in the different sectors.
- Identify (survey) the intramural expenditure on R&D (this is, the expenditure carried out within the boundaries of an institution, i.e. not out-contracted) performed by each statistical unit.
- Identify the sources of funds for these R&D expenditure as reported by the performer.
- Aggregate the data by sectors of performance and sources of funds to derive significant national totals.

This section includes seven tables (Tables 3.1 to 3.7), requesting the total expenditure on R&D and its breakdown by sector of performance, source of funds, field of science, type of costs and type of R&D activity.

Reference year: Since this survey seeks to update and complete the UIS database, Tables 3.1 to 3.7 request data for the last five years (2007 to 2011). If data for previous years are available, please attach them in a separate document and indicate if they replace data submitted to UIS in previous questionnaires.

Table 3.1: Total expenditure on R&D

This table measures the **total amount of expenditure on R&D** over the various years. If the data on actual amounts spent on R&D are not available, please provide estimated data calculated using budget allocations for R&D or other methodologies and explain in the "Notes" section.

Please also indicate the **monetary unit** used for reporting data for each of the years ('millions', 'thousands', 'hundreds' or units). In addition, state the currency in which data are reported for each year. Data are expected to be reported in **current national currency** (this is expenditure at current prices in national currency) for each year, without adjusting to constant currency and without using exchange rates.

In **Section 3.1.1** please indicate whether the time period reported is by calendar year or fiscal year. If a fiscal year unit is used, mention the starting month (e.g. September).

Table 3.2: Total expenditure on R&D by sector of performance

This table measures the amounts spent on R&D over the various years by institutions corresponding to each of the different sectors (business enterprise, government, higher education, private non-profit organizations), independent of the source of funds. If the sectors in which certain R&D was performed are unknown, include the relevant R&D expenditure in the "Not specified" column and describe in the "Notes" section.

Definitions for the different sectors can be found in Definition 1.

Table 3.3: Total expenditure on R&D by source of funds

This table measures the amounts spent on R&D over the various years financed by different sectors of the economy (business enterprise, government, higher education, private non-profit organizations), as well as from abroad. If the source for some financing of R&D is not available, include such data in the "Not specified" column and describe in the "Notes" section.

Definition 10: Sources of funds

Definitions for institutional coverage for different sectors (business enterprise, government, higher education, private non-profit organizations) which financed R&D can be found in Definition 1. In addition to these sectors, funds from 'Abroad' should be considered.

Abroad consists of:
- All institutions and individuals located outside the political borders of a country; and
- All international organisations (except business enterprises), including facilities and operations within the country's borders.

For the correct identification of a **flow of funds between institutions,** two criteria must be fulfilled:
- There must be a direct transfer of resources; and
- The transfer must be both intended and used for the performance of R&D.

Table 3.4: Total expenditure on R&D by field of science

This table measures the amounts spent on R&D over the various years in the main fields of science (natural sciences, engineering & technology, medical & health sciences, agricultural sciences, social sciences, humanities). If the fields in which certain R&D was performed are unknown, include relevant R&D expenditure in the "Not specified" column and describe in the "Notes" section.

Definitions for the different fields of science can be found in Definition 8.

Table 3.5: Total expenditure on R&D by type of costs

This table measures the amounts spent on R&D over the various years by type of cost (i.e. current costs and capital expenditure). If the type of cost for certain R&D is unknown, include relevant R&D expenditure in the "Not specified" column and describe in the "Notes" section.

Definitions for the different types of cost can be found in Definition 9.

Table 3.6: Total expenditure on R&D by type of R&D activity

This table measures the amounts spent on R&D over the various years in different types of R&D activities (i.e. basic research, applied research, experimental development). If the types in which certain R&D was performed are unknown, include relevant R&D expenditure in the "Not specified" column and describe in the "Notes" section.

 **Definitions** for the different types of R&D activities can be found in Definition 2.

Table 3.7: Current costs on R&D by type of R&D activity

This table measures the current costs on R&D over the various years in different types of R&D activities (i.e. basic research, applied research, experimental development). If the type in which certain R&D was performed is unknown, include relevant R&D expenditure in the "Not specified" column and describe in the "Notes" section.

 **Definitions** for the different types of R&D activities can be found in Definition 2.

Section 4. AVAILABILITY OF ADDITIONAL DATA ON R&D AND RELATED ACTIVITIES

The UIS is considering the extension of its data collection to obtain statistics that better reflect the status of R&D and related activities. This section requests information about the availability of data for several indicators ('available now', 'planned for 2013', 'planned for 2015', and 'not foreseen').

Definition 11: Citizenship/residence status

- **Citizenship:** Citizenship is defined as the particular legal bond between an individual and his/her State, acquired by birth or naturalization, whether by declaration, option, marriage or other means according to the national legislation. A citizen is therefore a person with the legal nationality of a country.
- **Residence status:** Country of permanent or usual residence is the country where the person usually resides; this may be the same as, or different from, the place where he/she actually is at the time of the survey; or it may be his/her legal residence.

Source: Recommendations for the 2000 censuses of population and housing in the Economic Commission for Europe (ECE) region, United Nation Recommendations on International Migration, and UIS/OECD/EUROSTAT (UOE) data collection on education systems 2005 manual.

Definition 12: Major socio-economic objective (SEO)

This classification allows data on R&D expenditure to be classified according to the ultimate aim or purpose for which these activities are carried out. The distribution list for SEO presented in the *Frascati Manual, 2002* is given below for reference.

· Exploration and exploitation of the Earth
· Infrastructure and general planning of land use
· Control and care of the environment
· Protection and improvement of human health
· Production, distribution and rational utilisation of energy
· Agricultural production and technology
· Industrial production and technology
· Social structures and relationships
· Exploration and exploitation of space
· Research financed from general university funds
· Non-oriented research
· Other civil research
· Defence

Definition 13: Government budget appropriations or outlays for R&D (GBAORD)

These are all allocations to R&D in the government budget and, therefore, refer to budget provisions not to actual expenditure. This involves identifying all the budget items involving R&D and measuring or estimating their R&D content in terms of funding. *(Please see Definition 3 for sources of budgetary data)*.

Definition 14: Industry/branch of economic activity

The human and financial resources for R&D activities in the business enterprise sector can be subdivided by industry/branch of economic activity in accordance with the International Standards Industrial Classification (ISIC Rev 3.1), (UN, 2002). Major industry groupings are:

· Agriculture, hunting, forestry and fishing
· Mining and quarrying
· Manufacturing
· Electricity, gas and water supply
· Construction
· Services sector

Definition 15: Scientific and technological activities (STA)

Scientific and technological activities (STA) are systematic activities which are closely concerned with the generation, advancement, dissemination and application of scientific and technical knowledge in all fields of science and technology. These include such activities as R&D, scientific and technological education and training (STET), and scientific and technological services (STS).

S&T education and training (STET): All activities comprising specialized non-university higher education and training, higher education and training leading to a university degree, post-graduate and further training, and organized lifelong training for scientists and engineers. These activities correspond broadly to ISCED levels 5A, 5B and 6, and may include some ISCED level 4 programmes.

Scientific and technological services (STS): Activities concerned with research and experimental development and contributing to the generation, dissemination and application of scientific and technical knowledge.

Examples of scientific and technological services include:

- S&T services provided by libraries, archives, information and documentation centers, reference departments, scientific congress centers, data banks and information-processing departments.
- S&T services provided by museums of science and/or technology, botanical and zoological gardens and other S&T collections (anthropological, archaeological, geological, etc.).
- Systematic work on the translation and, editing of S&T books and periodicals (with the exception of textbooks for school and university courses).
- Topographical, geological and hydrological surveying; routine astronomical, meteorological and seismological observations; surveying of soils and of plants, fish and wildlife resources; routine soil, atmosphere and water testing; the routine checking and monitoring of radioactivity levels.
- Prospecting and related activities designed to locate and identify oil and mineral resources.
- The gathering of information on human, social, economic and cultural phenomena, usually for the purpose of compiling routine statistics, e.g. population censuses; production, distribution and consumption statistics; market studies; social and cultural statistics, etc.
- Testing, standardization, metrology and quality control: regular routine work on the analysis, checking and testing, by recognized methods, of materials, products, devices and processes, together with the setting up and maintenance of standards and standards of measurement.
- Regular routine work on the counselling of clients, other sections of an organization or independent users, designed to help them to make use of scientific, technological and management information. This activity also includes extension and advisory services organized by the State for farmers and for industry but does not include the normal activities of project planning or engineering offices.
- Activities relating to patents and licences: systematic work of a scientific, legal and administrative nature on patents and licences carried out by public bodies.

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