

# Measuring R&D Expenditure

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# R&D expenditure - general issues

- Basic measure: “intramural expenditures”
- Another measure: “extramural expenditures”
  - covers payments for R&D performed outside the statistical unit or sector of the economy
- Current costs and capital expenditures are measured
- Depreciation costs are excluded

# R&D expenditure – general issues (*cont*)

- R&D involves significant transfers of resources among units, organisations and sectors
  - In particular between government and other performers
  - Important information for science policy
- R&D expenditure = resources actually spent on R&D activities, rather than only budgeted.
- For sound data → rely on responses of R&D performers rather than funding agencies

# Measuring R&D expenditure

- A statistical unit may have intramural and extramural expenditures on R&D
- The full procedure for measuring expenditures:
  - Identify intramural expenditure on R&D performed by each statistical unit
  - Identify the sources of funds as reported by the performer
  - Aggregate the data by sectors of performance and sources of funds to derive significant national totals
  - *Optional:* Identify the extramural R&D expenditures of each statistical unit

# R&D expenditure: current costs

- Current costs are composed of:
  - **labour costs of R&D personnel**
    - annual wages and salaries
    - all associated costs or fringe benefits
  - **other current costs**
    - materials, supplies and equipment (incl. water, gas and electricity);
    - books, journals, reference materials, subscriptions;
    - materials for laboratories;
    - costs for on-site consultants;
    - administrative and other overhead costs;
    - costs for indirect services;
    - labour costs of non-R&D personnel.
- Current costs may be prorated if necessary to allow for non-R&D activities within the same statistical unit.

# R&D expenditure: capital expenditure

- **Capital expenditures:** annual gross expenditures on fixed assets used in the R&D programmes of statistical units
  - land and buildings
  - instruments and equipment
  - computer software
- Expenditure should be reported **in full for the period** when it took place
- All **depreciation** provisions, whether real or imputed, should be **excluded**
- Share of R&D in '**Other current costs**' and '**Capital expenditure**': could be estimated (by the institutes) on the basis of intended use. If intended use is not feasible as a criterion, the same distribution coefficients as for labour costs may be used.



# Sources of R&D expenditure

## *Criteria for identifying flows of R&D funds*

- There must be a direct transfer of resources
- The transfer must be both intended and used for the performance of R&D

# Public general university funds (GUF)

Universities draw on three types of funds to finance R&D

- R&D contracts and grants from government and other outside sources → **credited to their original source**
- **Universities' "own funds"**
  - Income from endowments, shareholdings and property
  - fees from individual students
  - subscriptions to journals
  - sale of serum or agricultural produce
- General grant from the ministry of education (or corresponding) in support of their overall research/teaching activities. The R&D content of these **public general university funds** should be credited to government as a source of funds.



# Institutional classification

## ➤ **Business enterprise**

- Includes private non-profit institutions mainly serving business
- Includes public enterprises

## ➤ **Government**

- Includes private non-profit institutions mainly serving government
- Excludes public enterprises

## ➤ **Higher education**

- Includes clinics operating under the direct control of or administered by or associated with higher education institutions

## ➤ **Private non-profit**

- Includes private individuals or households

## ➤ **Abroad (only as source of fund)**

- Includes international organisations (except business enterprises) within the country's borders

# Classifications

- Institutional classification
- Type of activity
- Fields of Science
- Socio-Economic Objective

# Type of activity

- Basic research
- Applied research
- Experimental development



# Fields of Science (FoS 2007)

## 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 sc.
- 1.6 Biological sciences
- 1.7 Other natural sciences

## 2. Engineering and Technology

- 2.1 Civil engineering
- 2.2 Electrical, electronic, information eng.
- 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 tech.

## 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

## Agricultural Sciences

- 4.1 Agriculture, forestry, and fishery
- 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
- 6.5 Other humanities

# Socio-economic objectives (SEO) (based on NABS 2007)

1. Exploration and exploitation of the earth
2. Environment
3. Exploration and exploitation of space
4. Transport, telecommunication and other infrastructures
5. Energy
6. Industrial production and technology
7. Health
8. Agriculture
9. Education
10. Culture, recreation, religion and mass media
11. Political and social systems, structures and processes
12. General advancement of knowledge
13. Defence

Thank you!

