

The research satellite account

The research satellite account is annual. Its purpose is to describe the funding and expenditure flows of research and development (R&D) activity using an approach consistent with national-accounting methods and concepts. The account provides the uses-and-resources balance of the market research product. The table is reproduced in the central framework. The satellite account also analyzes flows not recorded in the central framework. The purpose of that analysis is to show the full range of research-related expenditures and funding, in particular the valuation of research for own account.

Michel Braibant and Jean-François Minder summarize the stages of preparation of the research satellite account, with figures for 1990.

The research satellite account is compiled in several stages.

The first stage is to analyze research resources in the national-accounting classifications of activities and institutional sectors (tables 1a and 1b). Data on inter-unit research transactions are disregarded.

The measurement variables used are domestic expenditures and human resources. These yield two sets of tables: **Gross domestic expenditure on R&D (GERD) by institutional sector** performing the expenditure (table 1a) and **GERD by research industry** (total R&D expenditure in table 1b) and **activity industry** (total activity expenditure in table 1b).¹

The account applies two classifications to research-unit work. The first is based on the type of product to which the research is devoted; the second, on the use of the product and hence on the industrial activities that benefit from the research.

The satellite account classifies research expenditures by means of two economic criteria: by **research industry**, using a description of

beneficiary activities; and by the **activity industry** of the units of homogeneous production where the research is performed. The second approach is consistent with the national-accounting analysis by industry. The two classifications coincide for the units that engage in research for their own account.

Each unit of homogeneous research surveyed thus receives two code numbers: one specifies its research industry in a format compatible with the French classification of activities and products (Nomenclature d'Activités et de Produits: NAP), while the other indicates the industry of the unit of homogeneous production to which the unit belongs.

The research-industry classification selects the industry that directly benefits from the research. Accordingly, the research work benefiting activity A but performed by a firm in industry B will be placed under activity A in the research-industry classification and under activity B in the activity-industry classification.

Gross domestic expenditure on R&D (GERD)

GERD is defined as "all intramural R&D expenditure by units on national territory, regardless of the sources of funds, and thus

1a. GERD by institutional sector (1990, FF million)

Institutional sector	Expenditure		
	total	current	capital
Education	22,941	28,465	7,348
Government	35,811	20,806	2,135
Private institutions	724	617	107
Corporate and quasi-corporate enterprises (CQCs)	97,670	89,094	8,576
Total	157,146	138,982	18,164

1b. GERD by industry (1990, FF million)

Industry	Expenditure			
	total R&D	total activity	R&D capital	activity capital
Market (excl s83)	97,670	85,008	8,576	7,253
Market research (s83)	0	12,662	0	1,323
Non-market research (T38)	59,476	59,476	9,588	9,588
Total	157,146	157,146	18,164	18,164

Source: Ministry of Higher Education and Research

1. The terminology used in this article is broadly based on the OECD Frascati Manual, 1990 revision.

provides a measurement, without double counting, of all expenditures on R&D carried out in France during a given year. Intramural expenditures incurred by producers comprise current expenditures and capital expenditures (capital expenditures in tables 1a and 1b) such as acquisitions of fixed assets.

Uses-and-resources balance for market research

The second stage largely consists in analyzing the flows of research between units and between the institutional sectors in which the units are classified. Resources and uses are compiled for the flows in each sector, yielding the market research uses-and-resources balances in the national accounts (tables 2 and 3).

Resources notably comprise "research transfers." These are sales of research services by units of homogeneous research incorporated into units of homogeneous production in manufacturing or other industries.

Such research units occasionally sell their research activity or, more generally, receive external funding for it. In the central framework of the national accounts, their sold output is kept aggregated with the actual output of the unit of homogeneous production to which they belong, but it is reallocated to market research services in order to calculate distributed output.

Funding and performance

The third stage merges the results of the first two stages through two breakdowns of expenditure funding and performance, one by institutional sector, the other by activity industry. Both tabulations provide a bridge between GERD and gross national expenditure on R&D (GNERD), that is, between R&D performance and R&D funding.

This analysis yields two summary tables shown below:

- R&D performance and R&D funding by institutional sector (table 5);

- R&D funding and performance by activity industry (table 6).

The "funding/performance" table—an extension of the uses-and-resources balances—is a crucial element in this step. The funding sectors are tabulated in columns and the performing sectors in rows. The amount shown in a cell represents the funding of the row by the column. The sum of each row constitutes the research performed by the institutional sector, that is, its intramural expenditures. Total intramural expenditures equal GERD. Total funding represents GNERD.

To obtain the funding-performance table from the uses-and-resources balance of market research, **two corrections are required.**

The first is the addition of **funding items** other than intermediate consumption, such as subsidies, refundable advances, and funding granted to international organizations (table 4).

The second correction involves incorporating **own-account expenditures.** These expenditures are calculated, for each institutional sector, as the balance of total GERD (see table 1a) minus funding of research performed on behalf of third parties (see table 4).

Next, the account calculates **national expenditure (GNERD).** This aggregate consists of **total R&D funding by national economic agents during the year.** It is calculated not directly from the amounts reported by the funding units but indirectly from GERD, minus non-resident funding of intramural domestic expenditure, plus funding to non-residents for research work performed on national territory.

This yields the basic equality in the research satellite account:

$$\begin{aligned} \text{GNERD} &= \text{GERD} \\ &+ \text{R\&D funding to the rest of the world} \\ &- \text{R\&D funding from the rest of the world.} \end{aligned}$$

2. Research performed on behalf of third parties

Resources	Uses							Total resources
	Education	Govt.	Priv.inst.	CQCs	Total intramural	Rest of world		
Education	112	961	36	1,157	2,266	136	2,402	
Government	57	1,974	39	1,030	3,100	1,067	4,167	
Private institutions	9	29	14	43	95	11	106	
Corporate and quasi-corporate enterprises (research)	2	537	21	12,090	12,650	726	13,376	
Corporate and quasi-corporate enterprises (other)	7	14,507	14	7,721	22,249	9,905	32,154	
Rest of world	23	10	0	6,017	6,050	0	6,050	
Total uses	210	18,018	124	28,058	46,410	11,845	58,255	

Source: Ministry of Higher Education and Research

3. Market research uses-and-resources balance

Resources	58,255	Uses	58,255
Actual output	13,376	Exports	11,845
Research transfers	32,154	ICMG	28,058
Incidental sales	6,675	ICNMG	18,352
Imports	6,050		

ICMG = Intermediate consumption of market goods

ICNMG = Intermediate consumption of non-market goods

Source: Ministry of Higher Education and Research

4. Research performed on behalf of third parties and other funding not linked to production (1990, FF million)

Performance	Funding	Education	Financial correction for educ.	Government	Financial correction for govt.	Private institutions	CQCs	Total intramural	Rest of world	Total performance
Education		112	0	961	860	36	1,157	3,126	136	3,262
Government		57	0	1,974	0	39	1,030	3,100	1,067	4,167
Private institutions		9	0	29	249	14	43	344	11	355
Corporate and quasi-corporate enterprises		9	0	15,044	4,057	35	19,811	38,956	10,631	49,587
Rest of world		23	199	10	5,234	0	6,017	11,483	0	11,483
Total funding		210	199	18,018	10,400	124	28,058	57,009	11,845	68,854

Source: Ministry of Higher Education and Research

5. R&D funding and performance by institutional sector (1990, FF million)

Performance	Funding	Education	Government	Private institutions	CQCs	Total intramural	Rest of world	Total performance
Education		*19,791	1,821	36	1,157	22,805	136	22,941
Government		57	33,618	39	1,030	34,744	1,067	35,811
Private institutions		9	278	*383	43	713	11	724
Corporate and quasi-corporate enterprises		9	19,101	35	*67,894	87,039	10,631	97,670
Total intramural		19,866	54,818	493	70,124	145,301	11,845	157,146
Rest of world		222	5,244	0	6,017	11,483		
Total funding		20,088	60,062	493	76,141	156,784		

Note: figures preceded by * are calculated as balancing items

Source: Ministry of Higher Education and Research

6. R&D funding and performance by activity industry (1990 FF million)

	Intramural expenditure (GERD)	+ Intermediate consumption	= Research budget	- Sales and transfers	- Subsidies and advances	+ Funding to rest of world	= National expenditure (GNERD)
Market research (not including s83)	85,008	26,476	111,484	32,154	3,419	0	75,911
Market research (s83)	12,662	1,582	14,244	13,376	638	0	230
Non-market research (T38)	59,476	18,352	77,828	6,675	- 4,057	5,433	80,643
Total	157,146	46,410	203,556	52,205	0	5,433	156,784

Source: Ministry of Higher Education and Research

The final table (table 6) classifies research funding and performance by activity industry. The net funding of each industry measures the financial contribution of the industry's units to the national research effort, i.e., GNERD. This aggregate is defined as GERD plus external research expenditures or intermediate consumption of the "market research" product. **The resulting aggregate is the "research budget"—that is, the sum of intramural and external research expenditures.**

By construction, the research budget for a specified set of units double-counts the research cross-flows between the units, first as intramural expenditures and then as external expenditures under intermediate consumption.

To obtain national expenditure, the account subtracts funding received, i.e. sales of research services (actual output, research transfers, and incidental sales), and subsidies and refundable advances (tables 3 and 4). But funding of international

organizations is added in (table 4). The accounting-correction item is added as a resource to imports of research services, which become funding to the rest of the world.

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