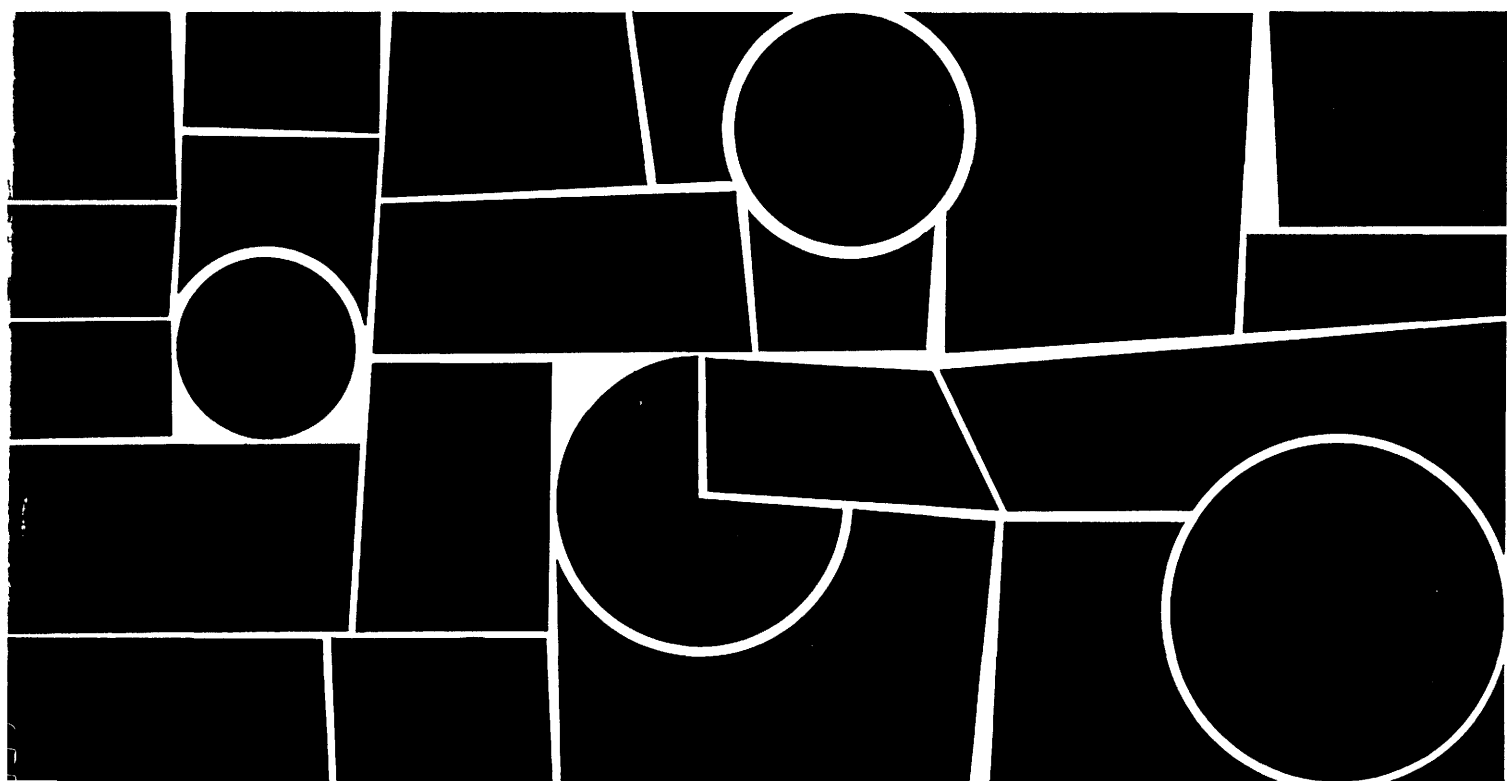


**COMMISSION OF THE EUROPEAN COMMUNITIES**

# research and development

## **PUBLIC FINANCING OF RESEARCH AND DEVELOPMENT IN THE COMMUNITY COUNTRIES 1967 - 1970**

Analysis by objectives



1 - SEPTEMBER 1970



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Analysis by objectives

Report by the Statistical Experts Group to the  
Working Group on Scientific and Technical Research Policy

The "Research and Development" Collection comprises the publications of the European Communities relating to the organization and programming of scientific and technological research. It is run jointly by the departments of the Commission which deal with research and development problems.

#### NOTES

The English version of the nomenclature which appears in Annex I of this document is an OECD translation of the CEC French language original.

The figures in the tables in this document follow the Continental system, i.e., numbers from one thousand upwards written with full stops, decimal points denoted by commas, etc. e.g., 1.234,567 Continental = 1,234.567 Anglo-Amer.

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## Preface

The present study represents a first attempt at a systematic analysis of research and development expenditure in the European Community countries. It mainly concerns the appropriations included in central public administration budgets, which finance the majority of R&D activities in the Six. The study is the result of close cooperation between the national bodies responsible for scientific and technical research inventories and the specialized departments of the Commission of the European Communities, as embodied in the work of the Working Group on Scientific and Technical Research Policy of the Medium-Term Economic Policy Committee.

The statistical analysis of R&D appropriations has been rendered possible by the drawing-up of a practical Community nomenclature which does not classify activities by the institutions responsible for them, but rather breaks them down into homogeneous categories of socio-economic objectives on the basis of which international comparisons can be made. The various states of development of the national research classifications and inventories posed problems when the series were being prepared and in certain cases estimates have had to be used instead of actual data; care has nevertheless been taken to ensure that the breakdowns and calculations take account of actual situations as far as possible. Although it reflects the current concerns of Community scientific policies, the nomenclature is not regarded as a fixed system; on the contrary, it aims to remain open and is subject to periodic revision, depending on the evolution of the activities to which it relates. Moreover, it conforms to the international conventions of the OECD, implementation of which was recently recommended by that body.

After approval by the Medium-Term Economic Policy Committee, and in order to ensure the widest possible distribution, the present report, which will appear annually, has also been published in the series "Statistical Studies and Surveys" and "Research and Development", issued by the Commission of the European Communities.

**Part I: REPORT**

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## I. Introduction

At its meeting of 9 July 1969, the PREST Group<sup>(1)</sup> had instructed the Statistical Experts Group to assemble information on the funds allocated to research and development by the governments of the Member States, with the object of critically comparing the research budgets as required by the Council of Ministers' Decision of 31 October 1967. The remit to the experts made it clear that the work should aim not so much at a precise description of the programmes as at a statement of the scientific and technical objectives pursued by each country. In this connection the PREST Group expressed the hope that a comparison of the information collected would reveal any gaps in the individual countries' efforts and enable convergences and divergences in the apportioning of funds to be determined.

On completion of its work, the Experts Group, fulfilling its instructions, prepared the present Report, which compares the budget appropriations assigned to R&D by the various central public administrations (including the German Länder)

during the period 1967-70. The Group acknowledged that these appropriations did not necessarily reflect considered programmes or overall science policies. The basic elements (nomenclature, comments on the preparation of the statistical tables, numerical data, statistical indicators, graphs and international contributions) are given in Annexes I-VI. The Report proper sums up the Group's findings, setting them out in the following order:

- preliminary remarks on the methodology
- analysis of total R&D appropriations
- analysis of appropriations by main categories of objectives
- analysis of appropriations by objectives
- contributions to international projects.

In its conclusions, the Group incorporates a set of proposals for subsequent organization and improvement of its work.

## II. Preliminary Remarks on the Methodology

Before starting on a detailed examination of the statistical tables, we should call attention to the following points:

— The information is set out under the NASB<sup>(2)</sup> nomenclature, which permits breakdown of the expenditure into groups of research goals divided into twelve major goals. The Group has taken care that the concepts and definitions in this nomenclature tally as closely as possible with

those in the revised Frascati Manual now under discussion at the OECD.

— In contrast to OECD practice, the sums considered usually relate to the research appropriations. Hence it was possible, for the most recent financial years, to give figures which in principle reflect the Member States' political intentions more clearly than do those relating to the actual execution of research work. Other points of

(1) Working Group on Scientific and Technical Research Policy, appointed by the Medium-Term Economic Policy Committee.

(2) NASB: Nomenclature for the Analysis and Comparison of Science Programmes and Budgets.

difference compared with the OECD standards are shown in Annex II.

— In the breaking-down of the credits under the nomenclature headings, it was possible to achieve sufficient precision at the level of the “major goals” and “sub-groups”. The data provided under “items” are often of an illustrative nature only.

— The figures obtained exclude as far as possible such divergences as may result from different statistical methods or lay-outs. The data can be regarded as satisfactory for the purpose of comparing the various budgets. In certain cases the available elements were calculated and entered under nomenclature headings on the basis of coefficients extracted mainly from lists of completed R&D, or else by other evaluation methods which are explained in Annex II. These calculations, made necessary by the present state of documentation, show the true situation as nearly as possible; they could be improved and cut down during the forthcoming financial years.

— In the tables included in the body of the Report and also in the Annexes, the values expressed in

units of account, for the purpose of international comparison, were based on the official rates of exchange. For 1969, the year in which the currency parities of France and Germany were respectively decreased and increased, the rates adopted for those countries are weighted averages of the rates in force before and after adjustment; for 1970, only the new parity values were taken into account. The official rates of exchange do not necessarily reflect the currencies' real purchasing power, or any differences that may exist between the various countries as regards research cost factors.

It should also be pointed out that research by the corporation sector has been taken into account only on occasion. This remark applies more especially to public corporations, of major importance in Italy, for instance, which might finance R&D work from funds derived from general subsidies granted by the government and not specifically earmarked for research. The scope of the analysis is likewise restricted by the fact that the period covered by the Report is really too short to allow of assessing the long-term trends, and also by the limitations inherent in a mainly quantitative survey.

### III. Analysis of the Total R&D Credits Appropriated by Central Governments

In 1969 these appropriations totalled roughly 4,200 million u.a. <sup>(1)</sup>, or 22 u.a. per head and 1% of the Community GDP; from 1967 to 1969 they increased by about 9% a year at current prices (Table 1).

Since no integrated science policy exists so far in the Community, this total must be arrived at by adding up five national aggregates.

In this context it is important to note from the outset that the share of each country in the Com-

munity's public R&D effort is not the same as its share in macro-economic aggregates such as population or GDP.

France accounts for nearly half the public R&D expenditure, although its share in the Community GDP amounts to only one-third. In Italy, however, R&D expenditure is less than 10% of the total, whereas the Italian GDP is about 20% of the Community GDP. If the civil appropriations alone are taken into consideration, the gaps are narrower but still exist.

<sup>(1)</sup> u.a. = European Monetary Agreement unit of account;  
1 u.a. = 1 United States dollar.

TABLE 1

## Central government expenditure on R &amp; D

	G	B	F	I	N	EEC
1. 1969 expenditure (in 10 <sup>6</sup> u.a.)						
— total	1 439	106	2 008	334	271	4 158
— civil	1 166	103	1 391	320	256	3 236
— international contributions	144	15	247	50	17	473
2. Average annual rate of variation in expenditure						
1967-69 (%)	8,0	9,5	8,5	8,0	15,3 <sup>(1)</sup>	8,7
1969-70 (%)	13,0	16,8	- 5,8	37,2	13,7	6,0
3. Per capita expenditure 1969 (in u.a.)						
— total	24	11	40	6	21	22
— civil	19	11	28	6	20	17
4. Expenditure 1969 (in % of GDP)						
— total	1,0	0,5	1,4	0,4	1,0	1,0
— civil	0,8	0,5	1,0	0,4	0,9	0,8
5. R & D expenditure, as % of total central government expenditure						
1969	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
(1967)	(3,8)	(1,7)	(6,9)	(1,9)	(3,7)	(4,3)

<sup>(1)</sup> See note <sup>(1)</sup> page 13

Source: data collected by the Group

(\*) General note concerning Tables 1-23.

The annual rates of variation in expenditure per country shown in the tables in the text of the Report were calculated from values expressed in national currencies, i.e., without taking account of the parity changes introduced in 1969. The rates shown for the Community are averages of these rates per country, weighted by the expenditures for the initial years expressed in units of account and calculated at the exchange rates in force during those years.

TABLE 2

## Breakdown by country of the population, GDP, public R &amp; D appropriations and total expenditure (public and private) on R &amp; D

in %

Country	Population (1969)	GDP (1969)	Publ R & D approps (1969)		Total R & D expend. (publ. and private) (1967)
			Total	Civil	
Germany	32	36	35	36	38
Belgium	5	5	3	3	3
France	27	33	48	43	42
Italy	29	19	8	10	8
Netherlands	7	7	6	8	9
<b>Community</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Sources: Statistical Office, European Communities

Table 1

Replies to OECD questionnaire for 1967

This preliminary observation suggests that the various Community countries' public R&D appropriations should be compared on the basis of the following three criteria:

- absolute size of the various economies in the Community
- intensity of the overall (public and private) R&D effort
- proportions of the financing of the overall effort borne by the public sector (State and higher education) and the private sector (firms, non-profit-making institutions) respectively.

### 1. Absolute size of the economies

The size effect alone determines the public R&D funding potential which, measured in terms of GDP, differs, for instance, by as much as a factor of 1 to a factor of 7 in the case of Belgium and

Germany (1). This size effect is seen in the absolute amounts of R&D expenditure but ceases to operate if the figures are related to the GDP. Qualitatively it also has repercussions on the method applied in the funding of public R&D. The very size of their economy enables France and Germany to attain certain minimum thresholds beyond which research in certain fields becomes technically and financially feasible at the single-country level. Consequently, these two countries' international contributions are proportionately smaller (about 10%) than those from Belgium and Italy, where in a number of fields an effort has been made in the past to mitigate the national limitations by relatively large contributions to international programmes (about 15% of the public R&D expenditure) (see Table 1, line 1).

### 2. Intensity of the public and private research effort

TABLE 3

Community countries' overall R & D effort in 1967  
(excluding social sciences and humanities)

	G	B	F	I	N	EEC
1. <i>In 10<sup>6</sup> u.a.</i>						
Public financing (State and higher educon )	1 056	77	1 731	227	211	3 302
Private financing (firms and non-profit instns )	1 195	114	796	258	307	2 670
<b>Total effort</b>	<b>2 251</b>	<b>191</b>	<b>2 527</b>	<b>485</b>	<b>518</b>	<b>5 972</b>
2. <i>In %</i>						
Public financing	47	40	69	47	41	55
Private financing	53	60	31	53	59	45
<b>Total effort</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
3. <i>In % of GDP</i>						
Public financing	0,9	0,4	1,5	0,3	0,9	0,9
Private financing	1,0	0,6	0,7	0,4	1,4	0,8
<b>Total effort</b>	<b>1,9</b>	<b>1,0</b>	<b>2,2</b>	<b>0,7</b>	<b>2,3</b>	<b>1,7</b>

Source: Replies to OECD questionnaire for 1967

(1) The reference here is to economic size, comprehensively expressed by the GDP, and not to demographic size. It will be noted in this connection that the figures for R&D expenditure per capita vary more widely from country to country than the figures per unit of GDP.

Listed by intensity of public effort  

$$\frac{\text{(public R\&D expenditure)}}{\text{GDP}},$$

the countries stand as follows:

- Belgium, Italy < 0.5% of GDP
- Germany, Netherlands  $\simeq$  1 % of GDP
- France  $\simeq$  1.5% of GDP

Table 3 shows that apart from the case of France, these differences are only slightly related to the public funding/total effort ratio, which is always between 40 and 50%.

On the other hand, the differences in intensity of public financing are reflected in the differences in overall research effort

$$\frac{\text{(public and private R\&D expenditure)}}{\text{GDP}},$$

which is only 0.7% of the GDP in Italy but amounts to 2.3% in the Netherlands.

Thus one may conclude that, to a large extent, the differences which emerge here in public R&D financing are not due to the proportion of financing contributed by the public and the private sector respectively, but reflect the total research effort in each of the various countries.

### 3. Ratio between public and private financing and programmes

In France, however, the magnitude of the public effort cannot be assessed solely in terms of the intensity of the total effort. In this particular case we find a far larger proportion of public funding than elsewhere (70%) and a marked difference as regards the breakdown of the total financing between the public and the private sector.

As already mentioned, this breakdown is considerably more even in the other countries, though there are minor differences between Belgium and the Netherlands on the one hand, where the proportion

of public financing is around 40%, and Germany and Italy on the other hand, where it is as much as 47%.

The differences with respect to the extent of public financing are intimately bound up with the greater or lesser concentration of the research effort in fields more specifically embraced by government responsibilities. This aspect is more closely analysed further on in this Report.



The trend of the total expenditure in recent years and the estimated figure for 1970 should be considered in the structural framework just described.

During the period 1967-69, the growth rates were very much the same in the different countries (8-9% per year), the Netherlands being the only exception, with a rate of 15% <sup>(1)</sup> (Table 1, line 2).

This relative uniformity is particularly striking since the curve fluctuated from year to year in several countries and is, as will be seen further on, the net result of varying expenditure for very dissimilar objectives in the different countries.

The present estimates for 1970 bear witness to these fluctuations, even at the total expenditure level; they include retrenchment in absolute terms in France, and an increase of nearly 40% in Italy. These differences become less significant, however, when viewed in the light of the fact that in France the actual expenditure for 1969 will probably be less than the budget estimates given in the present Report. In Italy, the 1970 prospects include the launching of new programmes the final decisions on which have not been taken yet.

Be that as it may, a study of the time curve for these data shows that:

- except in Germany, the rate of growth of public R&D expenditure has not in recent years exceeded the rate for all government expenditure. In general, the fraction shown for

(1) It will be noted that this high rate is strongly influenced by the trend of the funds earmarked for higher education. As is shown in the section dealing with analysis by major goals, the Dutch authorities consider that this trend has ceased to reflect the true situation, in view of the calculating methods employed. They point out that the exclusion of the university appropriations substantially reduces the annual growth rate of R&D expenditure in the Netherlands.

R&D expenditure in Table 1, line 5, has scarcely altered since 1967 (see the graph in Annex IV to the present Report);

— in real terms, i.e., after deducting the effects of rising prices and wage costs, this rate expresses a very moderate overall growth in research expenditure (some 4% per year);

— except in France, and to a lesser extent in the Netherlands, the 1970 estimates do indicate a far higher growth rate, however. According to these estimates, the country at the lowest initial level (Italy) will record the steepest rises, whilst the reverse will occur in the country at the highest initial level (France).

#### IV. Analysis of Appropriations by Main Category of Objectives

Before going on to a detailed analysis by objectives, it is worth while to study public expenditure at the intermediate level of the broad research aims. For this purpose the twelve NABS major goals have been grouped into five main categories:

0 defence appropriations

I appropriations for advanced technologies (nuclear, space, dataprocessing)

II appropriations for social purposes (in the widest sense of the term)

III appropriations for agricultural and industrial purposes (excluding those relating to the advanced technologies, grouped under I)

IV appropriations for the general promotion of knowledge (principally in the universities)

The observations relate essentially to the share of each of these groups in the total public R&D expenditure (Table 4) and to the level and trend of per capita expenditure for categories I-IV (see graph on page 16).

TABLE 4  
Central government appropriations for R & D breakdown  
by main category of objectives  
1969

N°	Main category	NABS major goal	in %					
			G	B	F	I	N	EEC
0	Defence	3	19	3	30	4	5	22
I	Advanced technologies (nuclear, space, data processing)	1+2+9	25	30	25	36	14	25
II	Social purposes	4+5+6+10	6	8	7	8	13	7
III	Agricultural and industrial purposes	7+8	7	16	15	8	16	12
IV	General promotion of knowledge	11+12	43	43	23	44	52	34
	<b>Total</b>		<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: data collected by the Group

The facts emerging from this table are clear:

- only Germany and, particularly, France devote a large fraction of their expenditure to defence;
- the share allotted to the advanced technologies — the nucleus around which most of the countries' scientific policy is built — is still 25-35% of the total, except in the Netherlands;
- apart from France, almost half the public appropriations go to the general promotion of knowledge, in particular at the universities;
- R&D for industrial, agricultural and especially social purposes is still in a secondary position as regards financing, except perhaps R&D for agricultural and social purposes in the Netherlands.

It should be noted, however, that the R&D expenditure for defence and advanced technologies partly concerns industrial research. The data in Table 4 only show the internal breakdown of a public R&D effort which varies greatly from country to country, and do not show the differences in intensity and growth of this effort. These factors are dealt with in the graph below, plotted in terms of *per capita civil expenditure* for 1967-70.

Two comparisons can be drawn from this graph.

The first concerns the countries where the intensity of the public effort is relatively high — France, Germany and the Netherlands.

It is apparent that although per capita public R&D expenditure is higher in France for advanced

technologies and for industrial and agricultural purposes, this is not the case with the promotion of knowledge, for which the level and recorded increases are lower than in Germany and the Netherlands. In these two countries, scientific policy is developing, in financial terms, mainly along the lines of public aid for university and para-university research. In France, under the pressure of the higher education problems, this type of research has practically escaped the axe that is falling on other categories of public R&D expenditure.

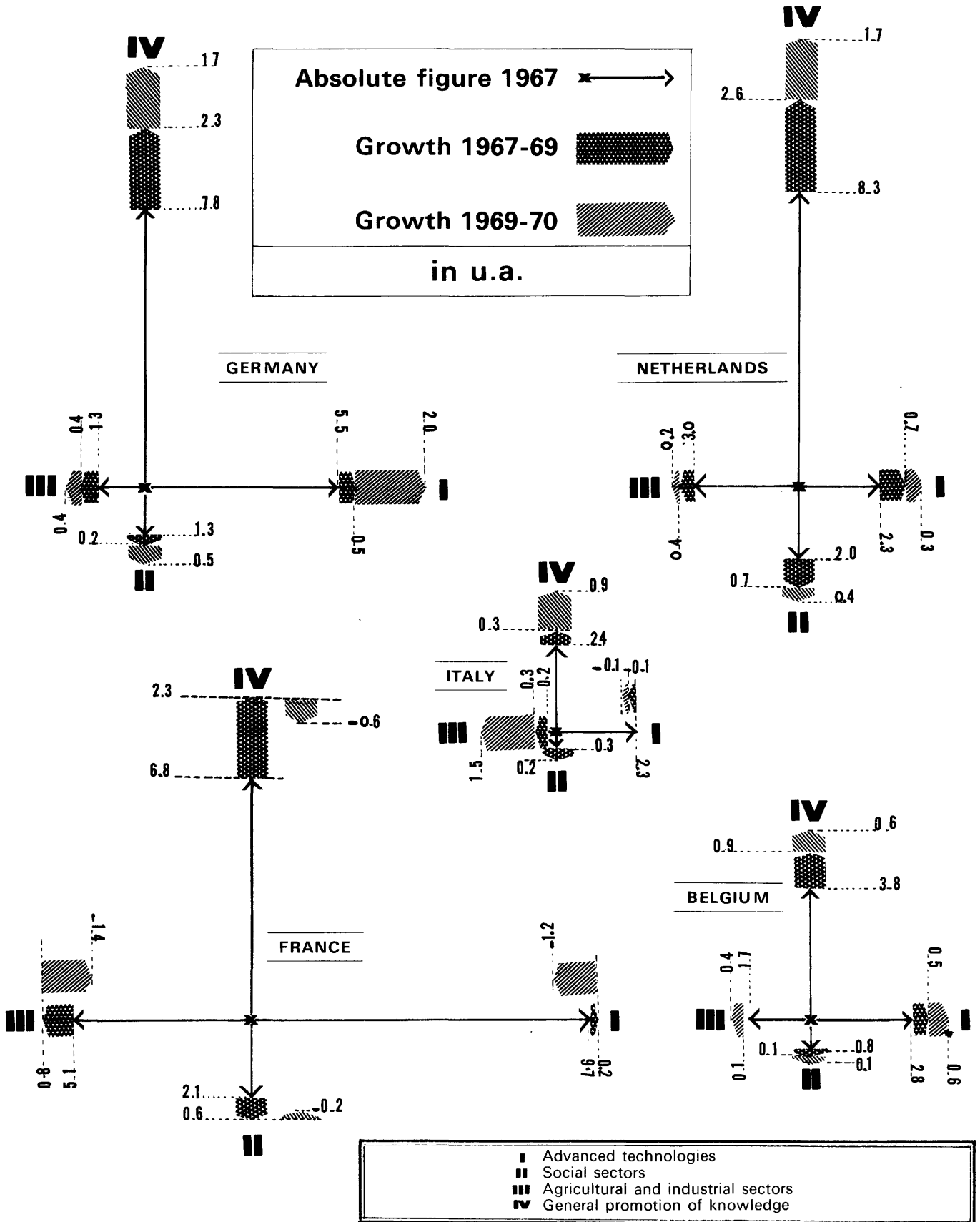
The second comparison concerns Italy and Belgium, where the public effort is relatively weak and yet the promotion of advanced technology is of considerable relative importance. The growth figures show a distinct resolve steadily to increase R&D spending for industrial purposes, particularly in Italy. In addition, the 1970 drive for general promotion of knowledge is stronger than in 1968 and 1969.

Thus, under the influence of university expansion, there is seen to be a virtually general tendency to increase expenditure on the general promotion of knowledge. This trend is especially marked in the countries (Germany and the Netherlands) where the level of effort had already been high in the past.

The promotion of research for industrial purposes is gathering strength in Italy and Belgium.

Nowhere, except perhaps in the Netherlands, is there any substantial expansion of the appropriations allocated to research for social purposes.

# Public expenditure on civil R & D per capita and per main group of objectives





## V. Analysis of Appropriations by Objectives

We have assembled here the principal indicators for each of the major goals in the nomenclature, and tried to indicate briefly the salient points revealed by a comparison of the various Community countries' expenditure. With this kind of method it is not really possible to go further than a general assessment, or to enter into details of the scientific subject matter of each country's projects, if only by reason of the general nature of the goals defined by the nomenclature.

This may suffice for certain major goals because they are already the target of European-scale cooperative schemes (nuclear research, space

research) or will probably not be adopted comprehensively as fields for cooperation (general promotion of knowledge), but it will not do for the others.

In regard to five major goals, therefore, the Group has additionally analysed the available documentation on the actual direction followed by the research efforts. The fact of giving more detailed comments on only a certain number of the goals detracts a little from the uniformity of the lay-out, but this blemish could not be avoided in an initial report drawn up for the attention of the PREST Group.

### Major Goal 1: Nuclear Research and Development (civil only)

TABLE 5

	G	B	F	I	N	EEC
1. Public R &D expenditure 1969 in 10 <sup>6</sup> u.a.	237,7	24,5	341,1	100,7	26,7	730,7
<i>of which</i> : international contributions	46,9	8,5	31,6	32,3	8,7	128,0
2. Public R &D expenditure 1969, as % of total public R &D expenditure	16,5	23,1	17,0	30,2	9,9	17,6
3. Average rate of variation in public R &D expenditure						
1967-69 (%)	- 0,6	10,7	- 0,7	0,8	8,8	0,1
1969-70 (%)	23,5	23,2	- 9,5	- 8,8	20,0	3,5
4. Per capita public R &D expenditure 1969, in u.a.	3,9	2,5	6,8	1,9	2,1	3,9
5a. Public R &D expenditure 1969 per 10,000 u.a. of GDP	15,8	10,7	24,4	12,2	9,6	17,3
5b. Ditto Community average = 100	91	62	141	71	55	100

Source: data collected by the Group

— After the general promotion of knowledge in higher education, nuclear energy is in all the Community countries the civil goal to which the largest fraction of public R&D funding has been devoted. With the exception of Belgium, and the Netherlands in 1970, these fractions are tending to shrink.

— The relative share of appropriations for nuclear research is particularly high in Italy and Belgium. Some 80% of the total Community appropriations are accounted for by France and Germany; in 1970 the German public appropriations will be higher than the French for the first time.

- In the Netherlands, the proportion of appropriations earmarked for activities under Major Goal 1 out of the total public R&D expenditure is lower than elsewhere (10% against a Community average of 17.6%). But the Netherlands is the only country besides Belgium where the amounts allocated to this major goal have shown a fairly substantial annual growth.
- Because of Euratom's situation, all the countries' contributions to international programmes fell off between 1967 and 1969. On the other hand, all the national programmes

tended to escalate during that period, with a particularly striking rise in Belgium (+186%). The result of these trends was that in every case the international contributions formed a smaller — sometimes considerably smaller — fraction of the total expenditure for Major Goal 1; they now amount to one-third of the total expenditure for this goal in Italy, the Netherlands and Belgium, about one-fifth in Germany and less than one-tenth in France. By way of comparison, Belgium's contribution was still about two-thirds of its total expenditure in 1967.

**Major Goal 2: Exploration and Exploitation of Space (civil)**

TABLE 6

	G	B	F	I	N	EEC
1. Public R & D expenditure 1969, in 10 <sup>6</sup> u.a.	92,4	7,1	126,7	16,6	10,5	253,3
<i>of which</i> : international contributions	46,1	6,1	30,9	15,0	7,0	105,1
2. Public R & D expenditure 1969, as % of total public R & D expenditure	6,4	6,7	6,3	5,0	3,9	6,1
3. Average rate of variation in public R & D expenditure						
1967-69 (%)	9,5	1,1	11,6	-13,0	23,8	8,5
1969-70 (%)	19,1	7,1	0,6	19,0	-14,5	8,1
4. Per capita public R & D expenditure 1969, in u.a.	1,5	0,7	2,5	0,3	0,8	1,4
5a. Public R & D expenditure 1969 per 10,000 u.a. of GDP	6,2	3,1	9,1	2,0	3,8	6,0
5b. Ditto						
Community average = 100	103	52	152	33	63	100

Source: data collected by the Group

- The heaviest expenditure on this major goal is centred in France and Germany (87% of the total Community expenditure), the second country being likely to catch up the first by the end of 1970.
- This situation is essentially due to Italy's cutback in expenditure during 1967-69; but changes can be expected in 1970, as this country is to have a new national programme which

will help to step up its expenditure by 19% in relation to 1969.

- International contributions amount to 90% of the total expenditure in Italy, indicating that from 1967 to 1969 that country's activities came almost entirely under the head of cooperative schemes; the launching of the new national programme mentioned above should bring the percentage down to about 55% in

1970. In Belgium and the Netherlands, international projects still account for a considerable fraction of the total expenditure in spite of a tendency to fall off (85 and 66% respectively).

The percentage is stable in Germany (about 50%) whilst in France, where the largest amount is devoted to space research, it was nearly 25% in 1969.

**Major Goal 3: Defence** (including military nuclear and space)

TABLE 7

	G	B	F	I	N	EEC
1. Public R & D expenditure 1969, in 10 <sup>6</sup> u.a.	273,5	2,5	617,7	13,8	14,7	922,2
<i>of which</i> : international contributions	49,8	0,1	28,9	—	0,1	78,9
2. Public R & D expenditure 1969, as % of total public R & D expenditure	19,0	2,4	30,8	4,1	5,4	22,2
3. Average rate of variation in public R & D expenditure						
1967-69 (%)	1,3	51,0	3,6	- 1,8	37,8	3,2
1969-70 (%)	2,9	10,3	- 6,3	- 7,3	- 3,6	- 3,5
4. Per capita public R & D expenditure 1969, in u.a.	4,5	0,3	12,3	0,3	1,1	4,9
5a. Public R & D expenditure 1969, per 10,000 u.a. of GDP	18,2	1,1	44,2	1,7	5,3	21,8
5b. Ditto Community average = 100	83	5	203	8	24	100

Source: data collected by the Group

— Military research is very largely concentrated in France and Germany, who together account for some 97% of Community expenditure. This situation has not been altered by the considerable growth rate in Belgium and the Netherlands. The relatively large share assigned to this goal in the Community's total R&D expenditure has declined steadily from 1967 to 1970.

— Contributions under the head of multilateral and bilateral projects are fairly substantial in Germany (18% of the total expenditure for this goal, or about 35% of this country's participations in international projects). France's contributions to such projects represent 5% of the country's appropriations for Major Goal 3, which are, incidentally, very much higher in terms of absolute value.

**Major Goal 4: Exploration and Exploitation of the Earth and its Atmosphere**

— Germany holds first place as regards effort expressed in absolute value and per capita expenditure. Under the latter head the figures are fairly close, except that Italy lags rather far behind in spite of a high annual growth rate.

— This major goal's share in the total R&D expenditure rose from 1.2 to 1.4% between 1967 and 1970. The scatter around these mean values is slight and only Belgium is further away on the plus side than the other countries.

Major Goal 4 : Exploration and Exploitation of the Earth and its Atmosphere

TABLE 8

	G	B	F	I	N	EEC
1. Public R &D expenditure 1969, in 10 <sup>6</sup> u.a.	23,1	2,6	18,4	5,0	4,5	53,6
<i>of which</i> : international contributions	0,3	0,1	0,6	0,1	—	1,1
2. Public R &D expenditure 1969, as % of total public R &D expenditure	1,6	2,5	0,9	1,5	1,7	1,3
3. Average rate of variation in public R &D expenditure						
1967-69 (%)	1,2	4,6	27,4	54,3	6,3	11,7
1969-70 (%)	10,2	15,6	15,5	12,9	13,4	12,8
4. Per capita public R &D expenditure 1969, in u.a.	0,4	0,3	0,4	0,1	0,4	0,3
5a. Public R &D expenditure 1969 per 10 000 u.a. of GDP	1,5	1,1	1,3	0,6	1,6	1,3
5b. Ditto						
Community average = 100	115	85	100	46	123	100

Source : data collected by the Group

— Major Goal 4 includes, generally speaking, only a modest percentage of participation in international projects; Belgium devotes a slightly higher proportion of its resources to them than other countries. As for research expenditure concerning the developing countries, only France has a budget for this, and even that is extremely small.

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In 1968, the last financial year for which itemized appropriations are available, the three principal objectives (soil and substratum, seas and oceans, atmosphere) represented 45, 34 and 16% respectively of the Community total for this Major Goal. Nevertheless, country-by-country analysis of the expenditure reveals quite considerable differences in the component items.

TABLE 9

Breakdown by sub-groups of appropriations for Major Goal 4

	% in 1968				
	G	B	F	I	N
soil and substratum	47	62	47	13	35
seas and oceans	43	3	22	70	43
atmosphere	2	30	30	17	22
other R &D	8	5	1	—	—

Source : data collected by the Group

It should be noted that after 1968 the sub-group "seas and oceans" rose steeply (by 100% in Belgium and the Netherlands, and by 50% in Ger-

many), largely on account of the launching of oceanographic programmes in four countries.

Except in Italy, which started from a low level, the appropriations for *soil and substratum* research are rising steadily and in quite a number of cases relate to geological cartography (Geologische Landesämter in Germany, Stichting voor de Bodemkartering in the Netherlands). The distribution shows a wide scatter or decentralization in Belgium and Germany, and a far higher degree of concentration in France and Italy. In the last-named country, the R&D work is closely bound up with the implementation of the CNR national programmes concerning water supplies and soil conservation.

Belgium still devotes only relatively small amounts to research on *seas and oceans*. The Netherlands, on the other hand, spends substantial amounts in this field and as early as 1967 the Netherlands Instituut voor Onderzoek der Zee was allocated Fl. 9.1 million.

In Germany, the increased funding is mainly due to a new Ministry of Science programme, which relates to the exploitation of under-water biological and mineral resources, coastal protection, prevention of water pollution, and conditions conducive to marine transport. With the setting-up of the CNEXO in 1967, France acquired an instrument for exploration and a coherent oceanography programme; expenditure by this body was still on a limited scale in 1968 but will mount rapidly, the Fifth Plan having initially provided for programme authorizations amounting to F.Fr. 150 million. In Italy CNR launched in 1965 a six-year national programme built around the surveying and exploitation of the marine fauna and mineral resources and backed up with basic

oceanographic studies. The cost of the "marine resources" programme alone was originally assessed at over 2,000 million lire, a sum which will probably be exceeded.

Analysis of the public funds devoted to *atmosphere* research shows that meteorology accounts for the major part (about 50% in France, 80% in Italy, 95-100% in the other countries). For this subgroup as a whole France is well ahead of the other countries, both in absolute figures and in figures related to population or GDP; this situation reflects the new National Meteorology Programmes (more especially, upper-air observations), the concerted "atmospheric research" project of the DGRST (General Delegation for scientific and technical research) and the pursuit of major geophysical research in the southern hemisphere (TAAF); the requirements of the national aerospace programme are probably not unconnected with the size of these different projects. Belgium and the Netherlands devote practically the whole of their appropriations, which incidentally are comparable in absolute value, to the research activities of their national meteorological institutes; these appropriations are following a steady upward trend. Italy, by reorganizing its principal atmospheric research laboratory in 1968, evidenced its awakened interest in this field, and the launching of a large-scale five-year programme for thorough-going study of perturbations and warning systems (PREMETEO) will doubtless act as a decisive spur in the future. As regards Germany, the limited and fragmented appropriations for atmospheric research contrast with the importance attached in that country to the two other main objectives under this major goal.

#### ***Major Goal 5: Protection and Promotion of Human Health***

— Although in terms of absolute value it is France which allocates the highest amount to this major goal, the Netherlands comes first for population- and GDP-related expenditure. As is shown in the detailed commentary on this group of objectives, when the figures for Major Goal 5 are combined with those for the medical disciplines comprised under Major

Goals 11 and 12 a rather different picture of the situation emerges, France then coming after Germany, which itself takes second place to the Netherlands.

— Medical research in the broad sense (subgroups 5.0, 5.1 and 5.9) obviously makes up the main part of the major goal; public expenditure

Major Goal 5 : Protection and Promotion of Human Health

TABLE 10

	G	B	F	I	N	EEC
1. Public R &D expenditure 1969, in 10 <sup>6</sup> u.a.	28,4	3,7	42,2	9,4	11,4	95,1
<i>of which</i> : international contributions	0,2	—	0,4	1,8	—	2,4
2. Public R &D expenditure 1969, as % of total public R &D expenditure	2,0	3,5	2,1	2,8	4,2	2,3
3. Average rate of variation in public R &D expenditure						
1967-69 (%)	5,7	11,1	18,3	49,3	29,4	16,4
1969-70 (%)	24,7	19,6	0,7	10,1	4,1	10,0
4. Per capita public R &D expenditure 1969, in u.a.	0,5	0,4	0,8	0,2	0,9	0,5
5a. Public R &D expenditure 1969 per 10,000 u.a. of GDP	1,9	1,6	3,0	1,1	4,1	2,2
5b. Ditto						
Community average = 100	86	73	136	50	186	100

Source : data collected by the Group

allocated to this item accounts for at least 65% of the total, and this proportion amounts to 90% or more in Belgium, France and the Netherlands.

- During the period under review, the growth in expenditure devoted to Major Goal 5 varied considerably from one country to another. This expenditure, amounting to just over 2% of the total, is in eighth position in the breakdown by major goal.
- With the exception of Italy, where they are slightly higher, contributions to international health research projects maintain a fairly low level and generally do not exceed 0.2% of the amounts set apart by the countries concerned for this major goal.

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The detailed analysis for this major goal required two statistical adjustments. The first consisted in regrouping all the health R&D, i.e., the data in sub-groups 5.0, 5.1, 5.2 and 5.9 (R&D of a general nature, medical research, research on alimentary hygiene and nutrition and other R&D) and that relating to the medical disciplines falling under the major goals devoted to the general pro-

motion of knowledge (items 11.1.3 and 12.1.3); this adjustment was made with the aim of widening the area of examination and comparability of the health R&D schemes carried out by networks of organizations whose structures, whether centralized or not, may differ from one group of countries to another. The second adjustment was necessary because of the rather unsatisfactory breakdown in medical research proper (sub-group 5.1) and involved combining, for the purposes of analysis, all the figures for public expenditure in sub-groups 5.0, 5.1 and 5.9 of the major goal. Separate comments are given for sub-groups 5.2 (alimentary hygiene and nutrition) and 5.3 (research on noxious phenomena).

a) *Overall health research* (5.0, 5.1, 5.2, 5.9, 11.1.3 and 12.1.3)

Viewed against those in Table 10, the figures above show that through its universities and university clinics Germany is financing an extensive scientific effort which gives it first place in the Community in terms of absolute value of total expenditure. At the same time, the Netherlands takes first place in terms of per capita expenditure, also because of the amount of health R&D being funded in the field of higher education.

TABLE 11

## a) Overall health research (5.0, 5.1, 5.2, 5.9, 11.1.3 and 12.1.3)

1969

Public R & D expenditure	G	B	F	I	N	EEC
1. In 10 <sup>6</sup> u.a.	139,6	12,4	91,6	26,2	33,3	303,1
2. In % of total public R & D expenditure	9,7	11,7	4,6	7,9	12,3	7,3
3. Per capita, in u.a.	2,3	1,3	1,8	0,5	2,6	1,7
4. Per capita : Community average = 100	135	76	106	29	153	100

Source : data collected by the Group

France allocates considerably less to research in the universities but has a very important central institute, namely INSERM, and comes in third place, followed by Belgium and Italy. The gap between Italy and the other countries is tending to narrow and will do so even more when the forthcoming four-year SAGO programme (automatic hospital management system) gets under way.

## b) Medical research (5.0, 5.1 and 5.9)

It should first of all be pointed out that expenditure in these three sub-groups, in relation to the amounts analysed in the preceding paragraph, is 55% in France, 34% in the Netherlands, 26% in Belgium, 24% in Italy and 16% in Germany. An examination of these figures reveals that official financing is relatively scattered in Belgium, Germany and Italy, and much more centralized in France and the Netherlands.

Almost half of the government-funded medical research in France is carried out at the Institut national de la Santé et de la Recherche médicale (INSERM), the remainder being shared out for the most part between the various hospital authorities and certain specialized laboratories working on behalf of the higher education system. In addition to the more traditional fields of work, new avenues of medical research in France have recently been opened; among these are the treatment of the major diseases now responsible for death (cancer, leukemia, cardio-vascular and kidney diseases, diseases of the nervous system), the problems of organ transplantation and those

inherent in applying data processing to medicine. On the basis of the documentation which the Group now possesses, it is rather difficult to find any definite guidelines being followed by public funding of medical research in Germany. It should nevertheless be noted that in 1969 Germany appropriated more than 10% of the public funds allocated to the three sub-groups under consideration for cancer research (at the Deutsches Krebsforschungszentrum), a proportion which is due to increase even more. After a slow growth in previous years, the increase in total expenditure planned for 1970 will be fairly high. In the Netherlands, about 80% of public money appropriated for medical research goes to two major institutions, the TNO Health Research Organization and the State Institute of Public Health. The aim of the former, by far the larger of the two (60% of the relevant public funds), is to transfer the more important results of research in the natural sciences to the field of public health. In the last few years a great deal of its work has been concerned with preventive medicine and radiology, although this has not led to neglect of the basic disciplines, such as medical physics and chemistry. In 1969, a year in which public expenditure increased very markedly, the Dutch government set aside quite a large contingency reserve to be used for research on drug control.

The detailed breakdown provided by Belgium shows that in this country about three-quarters of the official appropriations goes through two apportionment funds and is used mainly to finance a number of small-scale projects concerned with

the basic medical disciplines. Other more specific aims are not neglected, however, a case in point being the expenditure allocated to cancer and radiobiology in 1969, namely, an estimated 15% of the total for the three sub-groups under consideration.

Medical expenditure in Italy has increased sharply since 1968; this is the result of putting into operation three new CNR laboratories (cybernetics, organ transplantation, clinical physiology) and a special new programme at this institution (biomedical engineering) which has been added to the earlier programme on biopathology and virology. Italian R&D now seems to be particularly concerned with the medical applications of electronics and data processing, which form the subject matter of the SAGO project.

c) *Research on alimentary hygiene and nutrition* (5.2)

It was not possible to pinpoint public expenditure in this field in France and the Netherlands, although in the former country institutions such as INRA and INSERM are known to be involved in research of this nature and in the latter the TNO has a nutrition research centre.

With the above-mentioned reservation, it would appear that Germany earmarks the largest amounts for this goal, in that it finances the specific activities of several national laboratories

and a specialized Max Planck Institute. Germany is followed by Italy, where the work of the National Institute for Nutrition Studies, the Higher Institute for Health and a new CNR programme on protein utilization take up some 25% of the total amount set apart for Major Goal 5. Belgium devotes only a fairly low amount to this type of research, and much of it apparently goes to food quality control.

d) *Research on noxious phenomena* (5.3)

Generally speaking, the appropriation of public funds for such research is still unsatisfactory. Of the total expenditure figure for Major Goal 5 in France and the Netherlands, it has been possible to single out only a small proportion as being allocated to this sub-group. In view of this, Germany seems to be in a strong position here, with large sums of public money going to various programmes for combating air and water pollution. After being relatively stagnant, the amount of public expenditure for these schemes should increase by a further 50% in 1970. In Italy, priority is now being given to research on water pollution, funding for which more than trebled between 1967 and 1969. Much less attention is paid to the other nuisances, but a programme dealing with atmospheric pollution is planned by the CNR. For the countries concerned as a whole, there is seen to have been a rapid increase in public spending on noise abatement research.

### **Major Goal 6: Planning the Human Environment**

— France spends the highest amount in this sector, both in terms of absolute value and in relation to the GDP and population. Its expenditure is more than three times that of any of the other countries, with the exception of the Netherlands, which also allocates relatively large sums to this group of goals.

— France's strong position is to a great extent the result of the appropriations for research on telecommunications systems. It should, however, be noted that in this case the supplementary budget for posts and telecommunications is included as a whole, which is not

always the case with the other countries, particularly Germany and the Netherlands, where important work is nevertheless being carried out.

— With the exception of Belgium, whose contribution is on the decline, all the countries concerned have increased their expenditure on such activities. During the period 1967-70, this major group occupied ninth place in the classification by group with a share of about 2% in total figures for public expenditure on research.



Major Goal 6 : Planning the Human Environment

TABLE 12

	G	B	F	I	N	EEC
1. Public R &D expenditure 1969, in 10 <sup>6</sup> u.a.	15,1	1,9	53,0	6,9	8,3	85,2
<i>of which</i> : international contributions	—	...	0,1	0,1	—	0,2
2. Public R &D expenditure 1969, as % of total public R &D expenditure	1,0	1,8	2,6	2,1	3,1	2,0
3. Average rate of variation in public R &D expenditure						
1967-69 (%)	22,2	- 2,2	11,5	10,9	21,9	13,5
1969-70 (%)	14,5	- 9,4	2,0	0,2	21,1	5,7
4. Per capita public R &D expenditure 1969, in u.a.	0,3	0,2	1,1	0,1	0,7	0,5
5a. Public R &D expenditure 1969 per 10,000 u.a. of GDP	1,0	0,8	3,8	0,8	3,0	2,0
5b. Ditto Community average = 100	50	40	190	40	150	100

Source : data collected by the Group

— The planning of the human environment does not involve any allocation to developing countries; only Italy, France and Belgium contribute to international schemes — and on a very small scale at that.

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France earmarks large amounts for research on telecommunications systems, civil engineering and building. The Netherlands' high position is also traceable in some measure to the last named objective but even more to the research financed by the Dutch government in the field of civil engineering.

TABLE 13

Breakdown by sub-groups of appropriations for Major Goal 6

% in 1968

	G	B	F	I	N
R &D of a general nature	37	2	8	—	14
Construction and planning of buildings	15	18	14	53	29
Civil engineering	21	51	21	5	33
Transport systems	26	16	7	—	13
Telecommunications systems	1	—	48	14	—
Other research	—	13	2	28	11
<b>in %</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Total</b> <b>in 1000 u.a.</b>	<b>10 495</b>	<b>1 530</b>	<b>52 643</b>	<b>7 384</b>	<b>6 817</b>

Source : data collected by the Group

In Germany and the Netherlands, public expenditure is high with regard to *R&D of a general nature*, these two countries being particularly concerned with research on both the development and renewal of conurbations and the conservation of natural areas and national parks. There is a tendency towards developing this type of research in France and to a lesser extent in Belgium and Italy.

Public funding of research on *building and civil engineering* is on a very large scale in all the Community countries and accounts for 35-70% of the total resources for this major goal. A prominent aspect as regards building is that substantial amounts are devoted to rationalization and industrialization. In the civil engineering sector, the first feature to be noted is the considerable amount of work assigned by the Dutch authorities to recovery, protection and development of land once covered by the sea. Germany is also making substantial efforts, although of a more limited nature, in the field of hydraulic engineering, while France, faced with a different type of problem, is directing a good deal of attention to research on road construction, particularly motorways. Belgium is spending large amounts of money on hydrological research and study projects, while the Italian figures are to a very great extent evidence of the special programmes started in 1969 by the CNR on soil conservation and agricultural technology.

Research on *transport systems* is given priority by the German, Dutch and French governments. In Germany, where public funding has increased substantially compared with 1969 (partly as the result of a better statistical classification), the bulk of the work is on road and airway systems. The same applies to France, whereas the Netherlands seems to be more concerned with transport safety in general.

Belgium is carrying out work on water transport systems; in Italy, however, such research is done mainly by public corporations whose activities are not analysed in this Report.

France occupies a leading position with regard to the financing of research on *systems of telecommunications*; this situation is primarily the result of the scientific programme pursued by the CNET (National Centre for Telecommunications Studies), the broad guidelines of which cover electronic switching systems, data processing, high-speed numerical transmission and space telecommunications. This programme is to a certain extent linked with national programmes on space research and data processing. Work in this field is also being undertaken in Italy, through the budget of the CNR, which launched a major electronics programme in 1969, and also through the budget of those institutions operating under the sponsorship of the Ministry of Posts and Telecommunications. The same situation exists in Belgium, where various firms have recently embarked on a state-aided scheme. In Germany and the Netherlands, the reason for the meagreness of official appropriations for research on telecommunications systems apparently lies in the extent of the scientific programmes carried out by private industry and particularly in the fact that this research is the responsibility of bodies (posts and telecommunications authorities) which are not considered as public authorities by the NASB.

It should furthermore be pointed out that Italy devotes more than a quarter of the total resources for this major goal to sub-group 6.9 (other research). The latter consists of schemes organized successively by the Cassa per il Mezzogiorno and the CNR on the provision of water and more particularly on desalination processes for sea and underground water.

**Major Goal 7: Promotion of Agricultural Productivity and Technology**

TABLE 14

	G	B	F	I	N	EEC
1. Public R &D expenditure 1969, in 10 <sup>6</sup> u.a.	29,2	6,0	92,1	12,2	25,4	164,9
<i>of which</i> : international contributions	—	...	8,4	0,2	0,4	9,0
2. Public R &D expenditure 1969, as % of total public R &D expenditure	2,0	5,6	4,6	3,6	9,4	4,0
3. Average rate of variation in public R &D expenditure						
1967-69 (%)	2,4	15,7	11,6	64,8	11,3	11,6
1969-70 (%)	3,3	18,7	- 3,6	2,6	13,0	1,5
4. Per capita public R &D expenditure 1969, in u.a.	0,5	0,6	1,8	0,2	2,0	0,9
5a. Public R &D expenditure 1969 per 10,000 u.a. of GDP	1,9	2,6	6,6	1,5	9,2	3,9
5b. Ditto Community average = 100	49	67	169	38	236	100

Source : data collected by the Group

- There are two countries here whose activities are particularly extensive — France and, even more so, the Netherlands, the latter's expenditure, the result of a long tradition in this field, having practically the same absolute value as that of Germany but in terms of the GDP being almost five times as high. The large scale of agricultural research in the Netherlands also emerges from the high proportion allocated to this major goal in the country's total R&D expenditure (9.4% as against the Community average of 4%).
- If the items comprised in this major goal are considered as a whole, Germany comes low down in the ranking. If, however, the decentralized structure of agricultural research in

Germany is taken into consideration and the expenditure of all the Community countries on this major goal is then combined with that expenditure on Major Goals 11 and 12 which is devoted to agriculture, the values obtained for four of the countries are fairly similar in relation to the GDP. The Netherlands stands out here, with expenditure approximately twice that of any of the other countries.

- Contributions to international programmes are not particularly high, with the exception of France, where they account for about 9% of the expenditure on this major goal. Furthermore, a large proportion of this amount (about a quarter) is set apart for work affecting the developing countries.

**Major Goal 8: Promotion of Industrial Productivity and Technology**

- France takes first place here for effort both expressed in terms of absolute value and related to population and GDP. The Netherlands comes second with a relative expenditure about half that of France. There is little to choose between Germany and Belgium; they are followed by Italy, whose relative effort was about one-seventh that of France in 1969.

Italy's position might, however, be completely modified in 1970 following the launching of the IMI industrial research aid fund, and the country might move up into second place, with a relative effort fairly close to the Community average.

- In some cases there were considerable increases in expenditure on this major goal between 1967

Major Goal 8 : Promotion of Industrial Productivity and Technology

TABLE 15

	G	B	F	I	N	EEC
1. Public R &D expenditure 1969, in 10 <sup>6</sup> u.a.	73,8	11,4	204,1	16,6	18,2	324,1
<i>of which</i> : international contributions	...	0,1	144,8	—	0,1	145,0
2. Public R &D expenditure 1969, as % of total public R &D expenditure	5,1	10,7	10,1	5,0	6,7	7,8
3. Average rate of variation in public R &D expenditure						
1967-69 (%)	21,8	- 0,8	10,3	98,9	4,5	13,1
1969-70 (%)	19,6	26,4	- 24,3	484,9	0,6	1,5
4. Per capita public R &D expenditure 1969, in u.a.	1,2	1,2	4,1	0,3	1,4	1,7
5a. Public R &D expenditure 1969 per 10,000 u.a. of GDP	4,9	5,0	14,6	2,0	6,6	7,7
5b. Ditto Community average = 100	64	65	190	26	86	100

Source : data collected by the Group

and 1969. With the exception of Belgium, which intends to step up its allocation considerably in 1970, and the Netherlands, at present preoccupied with the methods of financing aid to industrial research, the EEC countries have increased appropriations for the promotion of industrial productivity and technology more than proportionally to their overall expenditures. Italy, having started from a very low level, has almost quadrupled its effort, while Germany and France have raised theirs by 49% and 22% respectively. Because of general budgetary restriction, France's contribution will be about 20% down for 1970; Germany, on the other hand, plans to increase its contribution by a similar percentage in that year, and Italy will no doubt attain a level much more compatible with its size and potentialities.

— In the breakdown by major goals, Group 8 is seen to have occupied fifth position throughout the relevant period, but its share in the total R&D expenditure rose from 7.2 to 8.4% between 1967 and 1970. The scatter of the various countries around these Community averages is

small. The only significant contribution to international projects in the context of this major goal is France's participation in the bilateral Concorde programme.

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Under this major goal one finds only part (about one third for the Community as a whole) of the funds allotted by governments to industrial enterprises. The remainder appears mainly under the major goals relating to advanced technology (1, 2 and 9) and also Major Goal 3 (defence), to which the public authorities often give particular attention. In this connection it should be emphasized that the national economic structure, the part played by the public sector in production and the size of the country itself exercise an appreciable influence on the volume and orientation of the funds allotted by the various governments to industrial research activities in general and to those comprised by Major Goal 8 in particular.

A reservation must be made as regards the comparability of the figures relating to sub-group 8.0 of the major goal (research of a general nature) (1).

(1) This statistical reservation is prompted mainly by the insufficiency of detail in the figures for certain countries. The Netherlands, for example, has not yet divided up the scientific activities of the TNO Industrial Organization among the other sub-groups of the major goal, having lumped them entirely under sub-group 8.0. Italy has done the same for an important CNR technological programme, while France has not listed any expenditure under 8.0.

Official appropriations by *France* to Major Goal 8 show a clear predominance of funds allocated to civil aviation research, consisting almost entirely in the country's participation in the Concorde programme, which represented more than 70% of the total spending on this major goal during the period 1967-69. The remainder is distributed in descending order among miscellaneous industries, electronics, chemicals, metallurgy and other means of transport. Public expenditure on electronics research relates mainly to components and other work financed by the Ministry of Posts and Telecommunications; the expenditure on behalf of the chemical industry consists for the most part of allocations to the Institute of Applied Chemical Research. Research on metallurgy, other means of transport and miscellaneous industries is funded to a particularly large extent by appropriations from the DGRST and the Ministry of Industry. It will be noted that in France public financing of industrial research carried out in the interests of Major Goal 8 is done chiefly by means of funds transferred to enterprises. These transfers take the following three main forms:

- a) study and prototype contracts consisting in the purchase of research services by technical ministries in the context of their specific activities; these may relate to programmes of particular importance;
- b) grants usually accorded by the Ministry of Industry to research organizations;
- c) measures to stimulate DGRST research, consisting in coordinated projects and especially development aid (loans repayable if the project is successful).

Having regard to the reservation expressed in the foregoing footnote concerning the classification of TNO's activities, the *Netherlands* government's share in the work in connection with Major Goal 8 is also characterized by the importance accorded to civil aeronautics research. Through direct participation and a substantial grant to a private foundation, this branch of activity absorbed 35 and 20% of the total public funds allocated to this major goal in 1967 and 1969 respectively, the drop being due to the non-utilization of some previous

appropriations. Among the other branches, the food industries also occupy a privileged position, absorbing almost half the appropriations for item 8.2.9. Among the various ways of providing official aid for industrial research, the *Netherlands* authorities have hitherto shown a preference for direct and indirect grants to firms and research associations. Almost half these transfers pass through the TNO Industrial Organization, whose budget is very largely financed by the government through the quasi-automatic acceptance of responsibility for part of the work done under contract on behalf of industry. These forms of subsidy have lately been criticized as insufficiently selective and the *Netherlands* Science Council has advocated limiting them while at the same time encouraging other methods of stimulating research.

*In Germany*, public funding of industrial research has greatly increased, as is evidenced by the substantial growth in all the sub-groups under Major Goal 8. Only a partial breakdown by items was possible, since some funds were allotted to an overall aim. Incidentally, this explains why there are no figures for items such as chemicals or electronics. The aeronautics industry, which receives substantial aid for the development of civil aircraft, is by way of being a privileged R&D sector. The amounts reported included those allocated to international cooperation projects. From 1967 to 1970, appropriations for this industry have more than doubled, and at present account for about 35% of the total for Major Goal 8.

Related to the population and the gross domestic product, the public sector's effort in *Belgium* in support of industrial research is of the same order of that of Germany. Despite a weakening in 1968, this effort will show a 22% increase for the period from 1967 to 1970, which will be found to have occurred in the last year of this period. The Belgian authorities have hitherto paid more attention to the research activities of the conventional industries (chemicals, metallurgy, manufactures, food industries, etc.) than to those of the new-technology sectors. The share of the former in the total allocations to this major goal has steadily increased during the period under consideration,

namely, from 80 to more than 95%. Among new activities, it will be noted that public funds earmarked for electronic research have been maintained at higher levels than those appropriated for research on means of transport. More than nine-tenths of the Belgian effort is channelled through two institutions, the IRSIA, whose aid may be equated with direct or indirect subsidies, and the Prototypes Office, which gives assistance in the form of loans repayable in the event of the project's proving a success.

Starting from the lowest level in the Community, public funds allotted by *Italy* to Major Goal 8 almost quadrupled between 1967 and 1969, exceeding in absolute value the level for Belgium and approaching that for the Netherlands. With the exception of sub-group 8.1 (non-nuclear energy), all the items comprised in this major goal have shared in this upswing, but it is electronics and miscellaneous industries which have made the greatest progress in terms of absolute value. Despite this remarkable advance, the Italian public sector's effort has still not achieved a significant level, except in electronics, where it approximates to the French effort, and miscellaneous industries and metallurgy, where it amounts to almost half the German effort. The bulk of the relevant funds

in Italy has been supplied by the National Research Council, whose aid has increased by more than 6,000 million lire during the past two years. Among the most recent projects is the CNR's new electronics programme, which relates particularly to switchgear, high-speed numerical transmission and electronic components; under the heading of miscellaneous industries there are also three of this institution's special programmes (automation of mechanical engineering industries, construction of a light-weight storage battery, agricultural technology and mechanization), together with a large-scale Cassa per il Mezzogiorno project in favour of industrial research in the south of Italy. At all events, Italian public funding will in future evolve along quite new lines. A law passed at the end of 1968 has created within the IMI a special public fund for industrial research back-up; the aid from this fund totals 100,000 million lire and takes the form of participation in research companies' capital and also of low-interest loans or advances, repayable in the event of the project's succeeding, to enterprises conducting the research. On the basis of the numerous applications submitted in 1969 and the proposal for increasing the IMI funds by 50%, official aid to R&D along these new lines in 1970 may be estimated at 50,000 million lire.

#### *Major Goal 9: Promotion of Computer Science and of Automation*

— France and Germany account for about 95% of the Community effort under this head during the period considered. Population- and GDP-related expenditure shows that these two countries' contributions were about equal up to 1969, but that in 1970 Germany will move ahead to some extent. Italy has greatly increased its effort since 1968, but does not yet have a systematic programme of aid to the computer science industry.

— Despite the interest shown in research under Major Goal 9 during the last four years, this group will in 1970 still account for only 2% of the total public R&D expenditure in the

Community. It will be noted that the relevant figure for 1967 was only 0.8%, and that the group has risen from twelfth to tenth position in the breakdown by major goals.

— Major Goal 9 does not involve any significant international contribution.

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Between 1967 and 1969, public funds devoted to Major Goal 9 more than doubled in the Community as a whole, and the estimates suggest that the initial figure will show virtually a factor-of-three increase for 1970. This rapid advance

Major Goal 9 : Promotion of Computer Science and of Automation

TABLE 16

	G	B	F	I	N	EEC
1. Public R &D expenditure 1969, in 10 <sup>6</sup> u.a.	29,9	0,1	27,8	2,4	1,1	61,3
<i>of which</i> : international contributions	—	—	0,1	—	—	0,1
2. Public R &D expenditure 1969, as % of total public R &D expenditure	2,1	0,1	1,4	0,7	0,4	1,4
3. Average rate of variation in public R &D expenditure						
1967-69 (%)	31,5	—	59,8	73,3	—	43,7
1969-70 (%)	70,6	21,4	18,1	- 1,2	47,5	43,5
4. Per capita public R &D expenditure 1969, in u.a.	0,5	—	0,6	0,1	0,1	0,3
5a. Public R &D expenditure 1969 per 10,000 u.a. of GDP	2,0	—	2,0	0,3	0,4	1,4
5b. Ditto Community average = 100	143	—	143	21	29	100

Source : data collected by the Group

reflects the growing awareness among governments of Europe's considerable leeway in the field of computer science, and the will to make it good by creating scientific and technological structures designed to further the development of autonomous computer production. This will has found its main expression—hitherto, at least—in France and Germany, which in 1969 together accounted for 94.1% of the Community public-sector effort. These two countries are also the only ones to have drawn up coherent plans for computer science; it will be noted, however, that in Italy the special CNR electronics programme includes appropriations for such research.

In France, an integrated programme has been progressively worked out since 1963, and in October 1966 led to the setting-up of the Computer Plan (Plan Calcul), based on the idea that computer science would henceforward play a decisive part in the development of modern nations. In creating a special agency for this field ("Délégation Générale à l'Informatique"), France has set itself three major aims : firstly, to establish the conditions for the autonomous development of a national data processing industry; secondly, to organize the installation and putting into operation of the

necessary equipment in the country's public sector; and thirdly, to promote the training and instruction of personnel in data processing techniques. In order to pursue the first aim, a major programme of collective study, research and development aid contracts was scheduled as early as 1967 in order to encourage the regrouping of the national industries concerned and to initiate the production of modern computers using original techniques. In 1968, this programme was supplemented by two framework contracts concerning peripherals and components and in 1969 by a programme of specific projects relating particularly to the study of the automated structure of the tertiary sector. In the same context, an official data processing and automation research institute (IRIA) was set up at the end of 1967 in order to promote the development of the necessary scientific and manpower infrastructure (research and dissemination of information on numerical, economic and applied data processing, on computer language, software, etc.). The funds initially earmarked for the study and research contracts alone (excluding components and peripherals) amounted to 450 million francs for the 1967-70 period; these sums, like those assigned later, are intended to cover approximately half

the private sector's expenditure. Despite the budgetary retrenchment laid down for 1970, the appropriations for the official computer science agency (Délégation à l'Informatique) have not been reduced this year; on the contrary, they have been raised by 18%.

The first measures taken by Germany were in April 1967, when the Ministerial Committee on Science adopted the computer science promotion programme for 1967-1971 drawn up by the Federal Research Ministry. This programme strongly resembles the French Computer Plan as to the aims pursued — to encourage the national computer industry to free itself gradually from dependence on foreign licences and to introduce data processing in public administration. An overall sum of DM 300 million has been assigned for the period in question and it seems that this will have to be apportioned with a fairly high degree of accuracy. The money is distributed principally in the form of subsidies to private firms' research centres and in a lesser degree to university institutes. These subsidies are granted on the basis of 50% of the cost of the research projects, and the use made of them is subject to regular audit. The operations financed relate particularly to data processing systems and their programming, circuit technique, digital stores, input and output software and data transmission. This programme will be followed in 1971 by another whose broad lines have already been laid down and whose cost has been estimated at DM 750 million for the 1971-75 period. At the same time the Federal Ministry for Economic Affairs continues to sti-

mulate the computer industry's routine production by making available to firms in this sector repayable loans ranging up to 25% of the cost of the proposed development projects, DM 170 million having been set aside for this purpose for the 1967-1971 period. These two complementary programmes represent more than 80% of the sums devoted to Major Goal 9 by the public authorities, the remainder being spread over a number of smaller-scale projects. It will be noted that in 1970, with estimates of DM 200 millions, German appropriations will exceed French and will account for more than 3% of the Federal Republic's entire scientific budget, as against 1.4% in 1967.

Public expenditure by the other countries on the promotion of computer science and automation represented only 5.9% of the total Community appropriations in 1969. The computer science part of the Italian CNR electronics programme launched in 1967 allocated almost 1,000 million lire for 1969 to research carried out mainly in public organizations on digital systems, applied computer science and data transmission. The initiatives taken by the Belgian and Dutch authorities have been on a modest scale, and usually concerned with research of a general nature. In 1970 the Netherlands government intends to step up its appropriations to 6,000,000 florins, consisting mainly of subsidies to organizations specializing in software research and funds for the creation of a foundation to promote the processing and dissemination of scientific and technical information.

#### ***Major Goal 10: Promotion of Research in the Social Sciences and Humanities***

— Here the Netherlands occupies first place. Its expenditure, which represents one-sixth of that of the entire Community in absolute value, is following an upward trend and its share in the total expenditure on R&D is appreciably above the average (3.7% as against 1.4%).

— In relation to the GDP and the population, appropriations by Germany and France for this major goal are about half those in the Nether-

lands and slightly exceed the Community average. In the total research and development appropriations, the social sciences occupy a larger place in Germany than in France, where, as in Italy and Belgium, their relative shares are very small.

— In comparison with the other countries, the Netherlands devotes more than twice as much



*Major Goal 10: Promotion of Research in the Social Sciences and Humanities*

TABLE 17

	G	B	F	I	N	EEC
1. Public R &D expenditure 1969, in 10 <sup>6</sup> u.a.	23,9	0,8	21,6	4,2	10,0	60,5
<i>of which</i> : international contributions	...	0,1	0,2	0,8	0,6	1,7
2. Public R &D expenditure 1969, as % of total public R &D expenditure	1,7	0,8	1,1	1,2	3,7	1,4
3. Average rate of variation in public R &D expenditure						
1967-69 (%)	6,4	8,5	16,9	-10,6	9,9	8,7
1969-70 (%)	7,0	8,9	-10,7	3,5	28,0	3,9
4. Per capita public R &D expenditure 1969, in u.a.	0,4	0,1	0,4	0,1	0,8	0,3
5a. Public R &D expenditure 1969 per 10,000 u.a. of GDP	1,6	0,4	1,6	0,5	3,6	1,4
5b. Ditto						
Community average = 100	114	29	114	36	257	100

Source: data collected by the Group

in absolute value to this field as Italy, and about ten times as much as Belgium.

— In the Netherlands and France, about 10% of the appropriations are for research concerning the developing countries.

*Major Goal 11: General Promotion of Knowledge*  
(except for Higher Education)

TABLE 18

	G	B	F	I	N	EEC
1. Public R &D expenditure 1969, in 10 <sup>6</sup> u.a.	119,2	11,4	177,6	38,0	14,2	360,4
<i>of which</i> : international contributions	0,3	—	—	—	0,4	0,7
2. Public R &D expenditure 1969, as % of total public R &D expenditure	8,3	10,8	8,8	11,4	5,2	8,7
3. Average rate of variation in public R &D expenditure						
1967-69 (%)	19,8	11,7	15,9	2,2	20,3	15,3
1969-70 (%)	5,9	12,6	-2,2	93,7	6,0	11,3
4. Per capita public R &D expenditure 1969, in u.a.	2,0	1,2	3,5	0,7	1,1	1,9
5a. Public R &D expenditure 1969 per 10,000 u.a. of GDP	7,9	5,0	12,7	4,6	5,1	8,5
5b. Ditto						
Community average = 100	93	59	149	54	60	100

Source: data collected by the Group

- An analysis of the expenditure on this major goal carried out independently of that relating to appropriations classified under Major Goal 12 brings out in particular the structural differences in the apportionment of general research as between university and non-university research organizations.
- Thus the limited importance attached to this major goal in the Netherlands results largely from the high degree of concentration of general research in the university sector in that country. The reverse is true in the case of France, which with the work of the CNRS occupies a dominant position in respect of Major Goal 11, but a decidedly inferior position in respect of Major Goal 12.
- The extent of the increase in Italy's appropriations in 1970 (94%) is striking, and compensates for the very slow progress in previous years (2% on the average). The apportionment clearly favours the large non-university research bodies as against those of the universities; the funding ratio between Major Goals 12 and 11 increased from 3:1 to about 2:1 in 1970. Italy is thus moving towards a distribution similar to that in France.
- Belgium has maintained the ratio between Major Goals 12 and 11 at 3:1, whereas in Germany the predominance of university research over that of the other large general research organizations (4:1 ratio up to 1969) will be still greater in 1970, the rate of increase being only 6% for Major Goal 11 as against 10% for Major Goal 12. Germany nonetheless falls far short of the ratio recorded in the Netherlands (9:1).
- Belgium is the only country in which Major Goal 11 includes allocations in favour of developing countries, although they form only a small percentage of the total funding under this heading (about 2.5%). In the other countries they are slight or are classified differently. Contributions to international projects are on a modest scale in every case.

**Major Goal 12: General Promotion of Knowledge (Higher Education)**

TABLE 19

	G	B	F	I	N	EEC
1. Public R &D expenditure 1969, in 10 <sup>6</sup> u.a.	493,1	34,0	282,9	108,0	125,5	1 043,5
<i>of which</i> : international contributions	—	—	—	—	—	—
2. Public R &D expenditure 1969, as % of total public R &D expenditure	34,3	32,0	14,1	32,4	46,4	25,1
3. Average rate of variation in public R &D expenditure						
1967-69 (%)	12,1	11,9	21,2	10,5	14,7	14,5
1969-70 (%)	10,0	13,9	2,4	11,9	17,4	9,2
4. Per capita public R &D expenditure 1969, in u.a.	8,2	3,5	5,6	2,0	9,8	5,6
5a. Public R &D expenditure 1969 per 10,000 u.a. of GDP	32,8	14,9	20,2	13,1	45,2	24,7
5b. Ditto Community average = 100	133	60	82	53	183	100

Source: data collected by the Group

- In all the countries concerned, the data on university research have been evaluated by applying coefficients to the general appropriations for higher education. Since these coefficients differ from one country to another and their application serves to link the figures

obtained closely with the general expansion of the funds assigned to the universities, the data which appear here are less rigorous and less comparable than those assembled under the other major goals. For these reasons the Group has set them apart under a special heading in the Nomenclature.

— This explains to some extent the appreciable differences observed between the various Community countries. At the same time, these differences also reflect the structural factors mentioned under Major Goal 11, together with the governments' specific ways of orienting their research funding.

— A comparison between the figures for the Netherlands and France is instructive in this respect. In terms of absolute value, the former's appropriations are almost half the latter's; allowing for the differences in size, this gives a proportion of two to one in the Netherlands' favour. The share of university research in the total funds (46 %), together with its high rate of growth, confirms the importance attributed to Major Goal 12 in the Netherlands (1).

— The only country which accords university research an importance comparable to that in the Netherlands is Germany, although the degree of priority is less pronounced in the latter country.

## VI. Contributions to Multilateral and Bilateral R & D Projects

These contributions have been systematically recorded in the analysis by objectives whenever this has been found necessary. It is, however, worth while to assess quantitatively the overall situation in this field.

Let us first consider the share of each country in Community participation in multilateral or bilateral projects.

TABLE 20

**Contributions to multilateral and bilateral projects  
and total public R & D expenditure**  
(In absolute amounts and as a % of the Community total in 1969)

	G		B		F		I		N		EEC	
	10 <sup>6</sup> u.a.	%	10 <sup>6</sup> u.a.	%	10 <sup>6</sup> u.a.	%	10 <sup>6</sup> u.a.	%	10 <sup>6</sup> u.a.	%	10 <sup>6</sup> u.a.	%
— international contributions	144	30,3	15	3,2	247	52,2	50	10,6	17	3,7	473	100,0
— total public appropriations	1 439	34,6	106	2,6	2 008	48,3	334	8,0	271	6,5	4 158	100,0

Source: data collected by the Group

(1) It should be noted, however, that the Dutch methods of evaluation, as against those used in France, are based on obsolescent codes which have been judged inappropriate to the present situation of university research by the Netherlands Council. It will be necessary to await the results of the new enquiry at present being conducted in that country before drawing final conclusions from comparisons of this kind.

This table shows the very large contribution made by France, which is more than proportional to this country's share in the total Community research effort; the Concorde programme and cooperation with overseas countries are the main factors in this situation. In the case of Italy and Belgium too, international contributions are seen to be more than proportional to the share in the total research effort, but here this is due mainly to the limited size of the national programmes, which the authorities have sought to offset by expenditure on international cooperation.

In Germany, where certain data were unobtainable, and also in the Netherlands, contributions to international projects are less than proportional to the relative size of the total research effort. Even so, the share of these countries in the Community's international cooperation effort has shown a tendency to rise, whereas a tendency in the other direction has been noticeable in Italy and Belgium, with France's share remaining stationary.

A similar impression is derived from a study of the part which international contributions play in each country's total research effort.

TABLE 21

Share of international contributions in the various countries' total effort

(as % of total)

Year	G	B	F	I	N	EEC
1967	11,5	23,9	14,3	20,9	7,4	13,7
1969	10,0	14,1	12,3	15,1	6,4	11,4

Source : data collected by the Group

The salient trait is the general downward tendency of these relative data. An examination of the absolute figures for the period between 1967

and 1969 prompts a more circumspect appraisal.

TABLE 22

Rate of variation 1967-69 in contributions to international projects

(as % on the basis of data expressed in national currencies)

	G	B	F	I	N	EEC
national expenditure	+ 18,6	+ 35,1	+ 20,5	+ 25,2	+ 34,3	+ 21,3
international expenditure	+ 1,1	- 29,0	+ 1,1	- 15,7	+ 15,1	- 1,8
<b>Total</b>	<b>+ 16,6</b>	<b>+ 19,8</b>	<b>+ 17,7</b>	<b>+ 16,7</b>	<b>+ 32,8</b>	<b>+ 18,2</b>

Source : data collected by the Group

The distribution of the international contributions over the various objectives shows marked differences from country to country, and the factors under-

lying this situation are by no means all political. France concentrates 60% of its contributions to international projects on Major Goal 8 (Concorde);

most of the remainder is divided in almost equal parts between Major Goals 1 (nuclear research), 2 (space research) and 3 (defence). In Germany, Major Goals 1, 2 and 3 absorb almost all the funds appropriated for international contributions. In the other three countries, the bulk of the international contributions is assigned to Major Goals 1 and 2, with a two-to-one ratio in favour of nuclear research. In the Netherlands,

significant percentages are also devoted to agricultural and social research.

To sum up, it is clear that in all the countries concerned Major Goals 1 and 2 constitute very important objectives of international cooperation, space projects tending to overhaul in terms of funding those relating to nuclear research. Major Goal 3 occupies a leading place in France and Germany, and Major Goal 8 in France only.

## VII. Conclusions

The Group could not conclude its report without reviewing the results obtained and indicating what it considers to be possible ways of supplementing and improving on them in future.

### 1. Importance of the study carried out

The most practical result of the work probably consists in the fact that for the first time it has been possible to use substantial documentary material to carry out the comparison of research budgets as laid down in the Council's decision of 31 October 1967. The nomenclature adopted has enabled a satisfactory classification to be made of the various countries' research activities in accordance with a functional plan which, while based on the present orientation of the Member States' research policies, could nonetheless be easily adapted to future developments. Thus it has been possible for the first time to assemble extensive statistical data permitting a detailed comparison of national research policies *in so far as these policies can be expressed in a series of budgets*.

The main points emerging from this comparison are the following:

*a.* The public R&D effort in the Community now amounts to 4,200 million u.a., or 1% of the GDP. The country-to-country differences are considerable. France, Germany and the Netherlands form a group in which this effort is higher than in the other countries.

*b.* Apart from France, where the proportion accounted for by public funding in the total is large (approx. 70%), the gaps between countries are not due fundamentally to different breakdowns as between public and private financing, but to higher or lower levels of *overall* research effort.

*c.* In the last few years, public expenditure on R&D has increased by about 9% per annum in all the countries concerned, with the exception of the Netherlands, where this rate has been exceeded. In the majority of countries, this rate of increase has scarcely been higher than that of the total public expenditure.

*d.* The estimates for 1970 reveal divergent tendencies. France, which is the country with the highest level, has decided to cut down, whereas Italy, the country with the lowest level, plans an increase of almost 40%.

*e.* Under the influence of university expansion, there is an almost general tendency towards a rapid increase in expenditure on the general promotion of knowledge. The promotion of industrial aims is assuming significant proportions in Italy and Belgium. Apart possibly from the Netherlands, there are no signs of a major financial effort to back up research for social purposes.

*f.* With the exceptions of university and military research, the *nuclear* objective is the most important in financial terms in all the Com-

- munity countries. Except in Belgium, however, its share in funding is on the downgrade, owing to the reduction in contributions to international programmes (Community average 3.9 u.a. per capita in 1969).
- g. The bulk of the public financing of *space* research is accounted for by France and Germany, which are developing programmes of their own as well as making major contributions to international projects. These countries are also the only ones to have significant research programmes for *defence* purposes (Community averages per capita in 1969 : 1.4 u.a. for space and 4.9 u.a. for defence).
  - h. In the majority of countries, research expenditure on exploration and exploitation of the *earth and its atmosphere* is relatively modest (Community average 0.3 u.a. per capita in 1969). The components of this major goal (soil and sub-soil, seas and oceans, atmosphere) vary quite appreciably from country to country.
  - i. The Netherlands and Germany devote proportionally greater sums than the other countries to the promotion of *human* health (Community average 1.7 u.a. per capita in 1969, if university research is included).
  - j. Except in France and the Netherlands, the level of research expenditure on the planning of the *human environment* is relatively low (Community average 0.5 u.a. per capita).
  - k. The Netherlands is devoting a particularly large amount of public expenditure to *agricultural research* (Community average 0.9 u.a. per capita in 1969).
  - l. Appropriations for *industrial research* are in many cases increasing more than proportionally to the total expenditure. In France, where spending on this major goal is highest, aviation funding predominates. There is also a marked interest in this field in Germany and the Netherlands. In Belgium, resources are directed preferentially to conventional branches of activity, while Italy accords priority to electronics (Community average 1.7 u.a. per capita in 1969).
  - m. Most of the spending on *computer science* is still being done by France and Germany, which are the only countries to have drawn up coherent programmes in this field. The relevant expenditure doubled between 1967 and 1969 (Community average 0.3 u.a. per capita in 1969).
  - n. Expenditure in the field of *social sciences* is concentrated in Germany, France and above all the Netherlands, where funding in relation to the GDP and the population is twice as high as in the other two countries (Community average 0.3 u.a. per capita in 1969).
  - o. Public expenditure on *general promotion of knowledge* is rapidly increasing, particularly in the university sector. The highest rates of growth under Major Goal 12 are recorded by the Netherlands, where the initial level was already the highest in relative terms (Community averages per capita in 1969 5.6 u.a. for the university sector and 1.9 u.a. for the extra-university sector).
  - p. The proportion of contributions to multilateral and bilateral projects in the public research effort at present averages 11% and is decreasing in every Community country. In each case nuclear and space cooperation absorbs a large amount of these contributions, as also does aeronautics in France and defence in Germany and France.
- Under its terms of reference, the Group therefore considered on completion of its task to what extent the body of observations performed enabled it to make a useful assessment of the *convergences and divergences* in the breakdown of appropriations, and of possible *gaps and deficiencies* in the various national research efforts.
- To this end, the Group has systematically noted and indicated in the Report itself a certain number of points of similarity and difference between countries; they concern mainly the level of expenditure in particular fields, the rate of increase of such expenditures and the structure by major goals of public R&D expenditure.
- The Group has also made a more systematic analysis with the object of more accurately defin-

ing the problems at the level of Nomenclature sub-groups. It has been agreed to consider as convergent those situations which start from a comparable level of GDP-related expenditure and which show a similar evolution in time. It has also compared the performances of the various countries vis-à-vis those of the Community in regard to the items considered with the corresponding performances at major goal level and at total public effort level.

From all these analyses the following two salient facts emerge:

- a) public funding of research for social purposes (Major Goals 4 : The Earth and its Atmosphere; 5: Human Health; 6: Human Environment; and 10: Social Sciences) represent a modest proportion of the total Community expenditure;
- b) convergences can be observed quite clearly in the expenditures on four of the seven priority programmes referred to in the Luxembourg Resolution (meteorology, pollution, transport systems, seas and oceans); they are now less marked in four other sub-groups of the Nomenclature (soil and substratum, construction and planning of buildings, civil engineering, training and readaptation).

The Group is well aware of the very modest scope of these observations and has considered the nature of the restraints which inhibit its assessment. These can be divided into two categories. Those in the first category are statistical, and could be reduced in time. They relate to the shortness of the reference period, the lack of refinement which still characterizes analysis techniques and the restricted field of observation. Those in the second category are inherent in the phenomenon studied — public funding of R&D — and particularly limit the scope of whatever judgments can be made. Since research costs vary considerably from one field to another, it is not possible for simple statistical comparisons of budgetary appropriations to provide an unambiguous answer to the question whether the resources allotted for the various research purposes are or are not adequate. Furthermore, the fact that a situation is convergent does not necessarily mean that it is satisfactory, nor does the fact that it is non-convergent mean that it must be modified. It

is not necessary for scientific budgets to be similar in composition and trend in countries whose economic structures and size differ, and which, moreover, form part of a Community within which specialization is no doubt one of the means of attaining desired growth targets. Hence it is necessary to evaluate needs, analyse work undertaken and obtain a better knowledge of specific means required. For this reason the Group arrived at the conclusion that in order to discern and assess the convergences in the apportionment of resources and the gaps or deficiencies in the estimates of public expenditure, it was necessary to make a comparison of the scientific content and the concrete aims of the programmes financed, taking as a basis the general quantitative structures employed in this Report. It is nonetheless suggested that the PREST Group should examine as a matter of priority Major Goals 4, 5, 6 and 10, raising where appropriate the question of reinforcing collective efforts.

## **2. Proposals concerning the improvement of statistical enquiries and their utilization**

This Report describes the results of a first experiment in the comparison of research budgets. As such, it contains inevitable imperfections and cannot yet meet all the requirements. The reservations formulated in the Report and its annexes prompt a series of proposals on data collection and utilization which the statistical experts recommend to the PREST Group for adoption. These proposals can be summarized as follows:

### *— Structure of national budgets*

During its statistical enquiries the Group has found that comparison of public expenditures on R&D would be appreciably facilitated if in all the Member States the research appropriations were easily distinguishable in the public authorities' budgets. It makes a point of drawing the PREST Group's attention to this matter.

### *— Provision of earlier statistical series*

The statistical enquiries ought to cover a longer period in order to permit analysis of long-term trends. This would mean making them a regular

process. Thus instructions could be given to the Expert Group henceforward to submit a report to the PREST Group before the end of each year. From the angle of sector-by-sector comparison it would also be advisable to consider taking an earlier starting point for the statistical enquiries and going back to the year 1963, which was when the OECD enquiries began.

— *Broadening and improvement of the enquiries*

The quality of the statistical enquiries could be improved by coordinating them with the work done in national accounting systems and in the field of functional analysis of budgets. Similarly, economic categories could be introduced into the analysis of expenditure, and the scope of the enquiries could be extended to the entire range of public-sector budgets, including those of local authorities. Lastly, as part of the coordination with the statistics of research carried out, it would be useful to itemize further the breakdown of Major Goal 8 of the Nomenclature.

— *Improvement of the methods of collecting numerical data and of the degree of comparability of the results*

The basic machinery used for comparison purposes could be improved if each year account were also taken of the actual figures for the first year of the series and the adjusted estimates for the second year of the series. In order to improve the comparability of the figures, it would also be

helpful to study more thoroughly the coefficients used to evaluate university research activities and to analyse in separate tables what are termed "related" scientific activities.

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The aim of the present Report is to provide the PREST Group with an overall quantitative framework for a technique for the comparison of public R&D budgets. This is its principal contribution to the creation of broader-based European cooperation in the field of research policy.

This contribution is still limited, however, by the very fact of its quantitative character, which inhibits pinpointing of the real aims of various policies. It will also be noted that it has not been possible to relate the research activities to the quantitative data on the economic or social objectives pursued. Detailed sectorial studies would be necessary for this purpose.

Lastly, the present statistical study affords only a rather static view of the current situation in the Member States as regards research policy.

For a more comprehensive idea, it would be necessary to take into consideration the existing or projected medium-term programmes in the field of R&D. The Group deemed this to be outside its own terms of reference but within the province of the PREST Group itself as part of the subsequent critical comparison procedure.



TABLE 23

## Central Government R &amp; D Expenditure by Objective

1969

OBJECTIVE	Ger- many	Bel- gium	France	Italy	Nether- lands	Com- munity	OBJECTIVE
In national currencies							
	(DM 10 <sup>6</sup> )	(B.Fr. 10 <sup>6</sup> )	(F.Fr. 10 <sup>6</sup> )	(It.Lire 10 <sup>9</sup> )	(Fl. 10 <sup>6</sup> )		
1. Nuclear R&D	930.8	1 225.6	1 767.0	62.9	96.7		1. Nuclear R&D
2. Space	361.6	357.5	656.2	10.4	37.9		2. Space
3. Defence	1 070.7	125.7	3 200.0	8.6	53.0		3. Defence
4. Earth and its atmosphere	90.3	130.5	95.2	3.1	16.4		4. Earth and its atmosphere
5. Health	111.2	184.7	218.4	5.9	41.3		5. Health
6. Human environment	59.0	95.8	274.4	4.3	30.2		6. Human environment
7. Agricultural productivity	114.2	300.9	477.1	7.6	92.1		7. Agricultural productivity
8. Industrial productivity	289.1	570.4	1 057.3	10.3	65.8		8. Industrial productivity
9. Computer science and automation	117.2	4.3	144.0	1.5	4.0		9. Computer science and automation
10. Social sciences	93.7	42.8	112.0	2.6	36.1		10. Social sciences
<b>Sub-total (1-10)</b>	<b>3 237.8</b>	<b>3 038.2</b>	<b>8 001.6</b>	<b>117.2</b>	<b>473.5</b>		<b>Sub-total (1-10)</b>
11. General promotion of knowledge NES (except Higher Education)	466.4	571.1	920.2	23.8	51.4		11. General promotion of knowledge NES (except Higher Education)
12. General promotion of knowledge NES (Higher Education)	1 930.4	1 701.9	1 465.5	67.5	454.4		12. General promotion of knowledge NES (Higher Education)
Not itemized	—	—	17.3	—	—		Not itemized
<b>TOTAL</b>	<b>5 634.6</b>	<b>5 311.2</b>	<b>10 404.6</b>	<b>208.5</b>	<b>979.3</b>		<b>TOTAL</b>
(of which: developing countries)	(—)	(37.4)	(n.a.)	(—)	(6.5)		(of which: developing countries)
In <sup>o</sup> / <sub>o</sub>							
1. Nuclear R&D	16.5	23.1	17.0	30.2	9.9	17.6	1. Nuclear R&D
2. Space	6.4	6.7	6.3	5.0	3.9	6.1	2. Space
3. Defence	19.0	2.4	30.8	4.1	5.4	22.2	3. Defence
4. Earth and its atmosphere	1.6	2.5	0.9	1.5	1.7	1.3	4. Earth and its atmosphere
5. Health	2.0	3.5	2.1	2.8	4.2	2.3	5. Health
6. Human environment	1.0	1.8	2.6	2.1	3.1	2.0	6. Human environment
7. Agricultural productivity	2.0	5.6	4.6	3.6	9.4	4.0	7. Agricultural productivity
8. Industrial productivity	5.1	10.7	10.1	5.0	6.7	7.8	8. Industrial productivity
9. Computer science and automation	2.1	0.1	1.4	0.7	0.4	1.4	9. Computer science and automation
10. Social sciences	1.7	0.8	1.1	1.2	3.7	1.4	10. Social sciences
<b>Sub-total (1-10)</b>	<b>57.4</b>	<b>57.2</b>	<b>76.9</b>	<b>56.2</b>	<b>48.4</b>	<b>66.1</b>	<b>Sub-total (1-10)</b>
11. General promotion of knowledge NES (except Higher Education)	8.3	10.8	8.8	11.4	5.2	8.7	11. General promotion of knowledge NES (except Higher Education)
12. General promotion of knowledge NES (Higher Education)	34.3	32.0	14.1	32.4	46.4	25.1	12. General promotion of knowledge NES (Higher Education)
Not itemized	—	—	0.2	—	—	0.1	Not itemized
<b>TOTAL</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>TOTAL</b>
(of which: developing countries)	(—)	(0.7)	(n.a.)	(—)	(0.7)	( )	(of which: developing countries)
In 10 <sup>6</sup> u.a.							
1. Nuclear R&D	237.7	24.5	341.1	100.7	26.7	730.7	1. Nuclear R&D
2. Space	92.4	7.1	126.7	16.6	10.5	253.3	2. Space
3. Defence	273.5	2.5	617.7	13.8	14.6	922.1	3. Defence
4. Earth and its atmosphere	23.1	2.6	18.4	5.0	4.5	53.6	4. Earth and its atmosphere
5. Health	28.4	3.7	42.1	9.4	11.4	95.0	5. Health
6. Human environment	15.1	1.9	53.0	6.9	8.3	85.2	6. Human environment
7. Agricultural productivity	29.2	6.0	92.1	12.2	25.5	165.0	7. Agricultural productivity
8. Industrial productivity	73.8	11.4	204.1	16.5	18.2	324.0	8. Industrial productivity
9. Computer science and automation	29.9	0.1	27.8	2.4	1.1	61.3	9. Computer science and automation
10. Social sciences	23.9	0.9	21.6	4.2	10.0	60.6	10. Social sciences
<b>Sub-total (1-10)</b>	<b>827.0</b>	<b>60.8</b>	<b>1 544.6</b>	<b>187.7</b>	<b>130.8</b>	<b>2 750.8</b>	<b>Sub-total (1-10)</b>
11. General promotion of knowledge NES (except Higher Education)	119.1	11.5	177.6	38.0	14.2	360.4	11. General promotion of knowledge NES (except Higher Education)
12. General promotion of knowledge NES (Higher Education)	493.1	34.0	282.9	108.0	125.5	1 043.5	12. General promotion of knowledge NES (Higher Education)
Not itemized	—	—	3.3	—	—	3.3	Not itemized
<b>TOTAL</b>	<b>1 439.2</b>	<b>106.2</b>	<b>2 008.4</b>	<b>333.7</b>	<b>270.5</b>	<b>4 158.0</b>	<b>TOTAL</b>
(of which: developing countries)	(—)	(0.7)	(n.a.)	(—)	(1.8)	(—)	(of which: developing countries)

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**Part II : ANNEXES**



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**ANNEX I**

**Nomenclature for the Analysis and Comparison  
of Science Programmes and Budgets (NASB)**





## INTRODUCTION

1. On 9 October 1969, the statistical experts of the Working Group on Scientific and Technical Research Policy (PREST Group) of the Commission of the European Communities adopted the Nomenclature for the Analysis and Comparison of Science Programmes and Budgets (NASB).

The present note describes this Nomenclature and includes two annexes. The first gives the definition of the central government agencies whose budgets and programmes are analysed by the Nomenclature; this definition corresponds to that of the European system of integrated economic accounts (ESA), i.e. of European national accounts. The second annex is a reproduction of the questionnaire (Table A) that the European Community countries filled in at the request of the PREST Group.

The NASB is a special application of the OECD system (Frascati Manual) to the allocation of public funds to R&D in the Common Market countries. It accepts the basic concepts, definitions and classifications of the OECD system and makes no claim to any positive contribution, except in the particular context of government budgets.

## GENERAL PRINCIPLES OF THE SYSTEM

2. The Nomenclature enumerates a set of headings derived from a *functional breakdown* of the budgetary appropriations made by central governments to R&D activities in units under their jurisdiction (intramural allocations) and in units belonging to other sectors (extramural allocations).

This procedure differs from the institutional type of classification, where the R&D activities to be financed are analysed in terms of institutions, then by groups of institutions coming under, for example, the same ministry. In a functional type

of classification, on the other hand, the activities of each institute are divided into a number of "projects" which are then grouped in homogeneous categories. For the purpose of analysing actual R&D expenditures, the categories most frequently used are the product groups to which the R&D is relevant. R&D financed by public authorities could be treated likewise; however, the limitations imposed by data availability, plus the requirements of science and budget policy, make it preferable in this case to employ classification by *group of goals*. It should be added that this classification lends itself very well to international comparisons of forecasts.

3. By convention, the Nomenclature comprises 12 large one-digit classes called *major goals*, which are divided into a variable number of two-digit *sub-groups*. Certain sub-groups are further broken down into three-digit *items*, corresponding to significant fields of R&D, to breakdowns of R&D groups, or to subjects of particular concern to the PREST Group <sup>(1)</sup>.

4. The choice and content of the 12 *major goals* was not a matter of chance. They were largely inspired by the efforts of the OECD in this field (cf. Table B.1 of the OECD 1967 R&D questionnaire) and also took into account, as far as possible, actual organization and the main trends in European R&D. Similarly, delimitation of the coverage of the various major goals and problems of frontier demarcation were considered in the light of international classifications (ISIC, NACE, etc.) and of definitions commonly accepted in industrialized countries. Furthermore, based as it is on a decimal classification, the system is designed to be flexible, leaving room for extension or improvement.

5. Each major goal is broken down into a variable number of *sub-groups*. Two of these occur as a general rule in all the major goals. Sub-group X.0 (Research of a general nature) covers funds allocated to research projects overlapping two or more sub-groups in each major goal, which

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(1) Provision is also made in the 12 major goals for a horizontal analysis in order to pinpoint within each of them appropriations for R&D concerning developing countries. These appropriations are shown as *non-additive items* at the end of each major goal and after the grand total in the table.

cannot really be split up. Sub-group X.9 (Other research), on the other hand, is a residual and relates to funds for R&D whose aim is not clearly defined or which cannot be classified elsewhere as the Nomenclature stands at present; increasingly refined analysis of the destination of appropriations should logically lead to a progressive reduction of this sub-group and the subsequent establishment of new sub-groups of the various major goals.

6. Given the existence of headings X.0 and X.9, the sum of the sub-groups is in every case equal to the amount of the major goal. The sum of the *items*, however, is not necessarily equal to the sub-group, because the difficulty of assigning appropriations to a heading in the Nomenclature usually increases commensurately with the amount of detail required. It has thus been agreed that the items should be expositive rather than limitative. Every effort should be made, however, to fill in as many three-digit headings as possible, using estimates or extrapolations if necessary.

7. The objective is the principal concept used in this functional classification and the assignment of the different budgetary appropriations to their objectives, itemized on three levels by the Nomenclature, is the basic — and sometimes not altogether easy — operation in its application. In order to avoid wherever possible divergent interpretations which could distort the comparability of data thus expressed, it is important both to explain the main techniques and terminology of the system, and to set out some of the conventions relating to the coverage of each objective and on the problems of frontier demarcation.

#### TECHNIQUES AND TERMINOLOGY OF THE SYSTEM

8. Objectives (and groups of goals) are identified by *breaking down the activities* comprised in a programme or undertaken by an organization whose scope is generally wider. Analysis of

the activities of an institution, for example, can lead to the differentiation of a certain number of projects each of which corresponds to a different aim on the part of the public authorities who finance them. The same holds true of a programme of limited duration in which several objectives are being pursued. These different projects should be identified by means of as detailed a breakdown as possible from budgetary headings, and then regrouped under the headings given in the Nomenclature. In principle, the assignment of projects to one or more headings should be carried out at the lowest possible level of the system, i.e. the item or, failing this, the sub-group. Classification in a given item also connotes the relevant sub-group and major goal; similarly, assignment to a sub-group signifies inclusion in the corresponding major goal. Classification may occasionally be done directly at the major goal level; this form of assignment is limited, however, to Major Goal 3 (Defence), where no allowance has been made for any sub-group, and to other major goals when the objectives really cannot be identified with any greater accuracy <sup>(1)</sup>.

9. When the headings of budget items are specific, pinpointing of projects and their classification under one or more headings of the Nomenclature is generally easy — for example, if the objectives of the R&D activities are indicated clearly enough or if the recipient organizations are named and their aims are known. In other cases, analysis of the results of previous studies, or examination of surveys or of other material likely to help determine objectives, may provide sufficient information to permit satisfactory classification under the various headings.

10. The basic method of classifying is to examine a schedule of the various projects either undertaken by a given organization or involved in a given programme, and to assign a single dominant objective to each project. The *dominant objective* is that to which the project is most obviously

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(1) Note that in such cases, in order to maintain the logic of the system (cf. paras 5 and 6), an entry must also be made at sub-group 9 of the major goals in question (Other research).

relevant <sup>(1)</sup>. All the possible dominant objectives are listed in the Nomenclature. As far as possible, *dominant objectives should be appraised and determined on the basis of the intentions expressed by the governments concerned when establishing their national budgets*. Only where budgetary headings are vague or faulty must definite use be made of the other types of material mentioned in the previous paragraph. The classification by goals proposed in this system is thus directed to what is commonly known as central governments' *direct budgetary programming*. Such a programming procedure implies that governments know in advance the functional allocation of the appropriations shown in the budget. In this connection, it is worth pointing out that *Major Goals 11 and 12* (General Promotion of Knowledge) have a special role in the Nomenclature, being used for appropriations the institutional allocation of which is generally known but the functional breakdown of which cannot be ascertained from budgetary headings, or even, in some cases, from other information derived from ex-post studies, to enable them to be assigned with sufficient accuracy to any of the socio-economic objectives comprised in Major Goals 1-10. Major Goal 11 includes fund allocated to research with a very general aim, plus those set aside in the national budgets for research carried out in certain large establishments or financed by non-specialized distributing bodies <sup>(2)</sup>. Major Goal 12 groups appropriations which are allocated as lump sums, or sometimes by field of science, to universities and equivalent establishments for their R&D activities.

At the end of the list of the 12 major goals an additional heading "memorandum only : expenditure not itemized" will be found. This heading is

for appropriations which cannot be classified elsewhere, owing to insufficient information. Through progressive refinement of functional budgetary analysis it should in the normal course eventually be possible to achieve a complete breakdown of appropriations and to eliminate this heading.

11. When the flow of funds identified either under a budgetary heading or by the use of other information concerns a single project only (i.e. has a single objective) the problems of classification are as a general rule easily resolved. Let us take the example of a heading concerning the financing of contracts for cancer research or the allocation of operating funds to public institutions for cancer research. In both cases, the whole of the appropriation is entered in Major Goal 5 (Protection and Promotion of Human Health), sub-group 5.1 (Medical research).

12. On the other hand, difficulties may arise when two or more projects are included under a single budgetary heading. Where this occurs it is important to define the problems further, in particular by distinguishing between those appropriations for different projects which are also relevant to the same major goal and those which concern several projects classifiable under different major goals shown in the Nomenclature.

13. *In the first case*, a distinction must be made between those activities which can be and those which cannot be broken down among the sub-groups of the major goal. The latter, as noted in paragraph 5, are classified in each major goal under sub-group X.0 (Research of a general nature). This would be the case, for example, with those research projects in astronomy, referred to in Note (b) of Table A, reproduced in Annex 2, which cannot be assigned to the various sub-groups

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(1) The term "dominant" was here preferred to "principal", often used in functional classifications of activities. "Principal" implies the existence of secondary elements the sum of which may exceed on occasion the principal element. "Dominant", on the other hand, represents the greater part of a whole and corresponds more closely to the uniformity sought here, through application either of the facts themselves or of conventions in doubtful cases.

(2) Funds allocated to such organizations may be considered as "non-programmed" in terms of definition of "programming" as given above. It is not possible, in this case to speak of direct budgetary programming, as the public authorities know nothing (or little) of the functional use of their appropriations. This decentralization of decision-making, together with the very general nature of the task of these organizations, calls for classification of their funding in Major Goal 11. This is the case with such bodies as the DFG in Germany and the FNRS in Belgium. On the other hand, the financing of institutions such as the CNR in Italy, the CNRS in France and the IRSIA in Belgium, whose different activities are known beforehand or whose task is so specific as to be identifiable with prior knowledge on the part of the government authorities, must be spread over Major Goals 1-10.

of Major Goal 2, even though such research is obviously relevant to them. Those activities which can be broken down should be sub-divided into various projects and assigned to different sub-groups of the major goals. For instance, in the case of two separate research projects in astronomy, one undertaken as part of a programme for the launching of an applications satellite and the other for the launching of a sounding balloon, the funding of the former would be assigned to sub-group 2.1, the latter to sub-group 2.9. Another case which may arise is where the funding of research projects is mainly aimed at a specific objective at sub-group level and, accessorially, at one or more others comprised in the same major goal. A public institute for cancer research, for example, is commissioned to undertake research on the repercussions of urban air pollution on lung tumours. The institute in question will undoubtedly conduct special research into air pollution and its findings could be used by specialists in the latter field. Nevertheless, there is abundant evidence that the dominant objective here is the prophylactic treatment of pathological affections and that the funds should accordingly be wholly allocated to 5.1 (Medical research) and none of them should go to 5.3 (Research on noxious phenomena). Lastly, it should be noted that where serious problems of classification exist, use can be made of certain conventions; one of these is suggested for research on undersea plateaux (cf. notes (f) and (g), Table A, Annex 2) the financing of which has been assigned to sub-group 4.2 (Seas and oceans) rather than 4.1 (Soil and substratum) under Major Goal 4.

14. *In the second case*, in which a given appropriation is relevant to sub-groups of different major goals, the problems are often more difficult to solve, particularly where there are strongly competing or markedly overlapping aims (groups of goals). Although it is not possible to establish in advance rules for classification which could be

applied automatically to every individual case, certain general principles can be employed in order to eliminate a number of difficulties.

15. The first principle is that of *direct derivation*. Where a research project is *directly derived* <sup>(1)</sup> from another R&D programme, the funding of the former should be assigned to the same goal as the latter. Thus, the appropriations devoted to research on electronic welding processes for plastic structural materials for sounding balloons in a space programme would be classified under Major Goal 2 (Exploration and exploitation of space) and not under Major Goal 8 (Promotion of Industrial Productivity and Technology). Similarly, the original public funding of R&D concerned with building of a ship for oceanographic studies and equipping it with scientific instruments should be classified in 4.2 (Seas and oceans) rather than in 8.2.5 (Other means of transport), 8.2.3 (Electronics) or 8.2.9 (Miscellaneous industries). A reasonable corollary to this principle would be to assign, as a general rule, any public funding of subsequent work necessary for the industrial application of such initial research, i.e. the funding of its *indirect spin-off* <sup>(1)</sup>, to the major goal under which the beneficiary activities are normally classified. In the foregoing examples, the appropriations for subsequent development would be assigned in the first case to the promotion of the inflatable boat industry (8.2.5) and in the second case to ship-building (8.2.5.) and to electronic equipment producing units (8.2.3.) and to other scientific instruments (8.2.9.).

16. These two principles are not, however, applicable in exactly the same way to all types of public R&D funding and an important distinction has had to be made between certain groups of major goals given in the Nomenclature. *Major Goals 11 and 12*, which are, in principle, confined to funds for projects of a very general nature and for organizations whose research mission is highly

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(1) By *direct derivation* is meant derivation from special research, e.g., on structural materials or equipment, which is required as part of a comprehensive programme of other research. The effects of direct derivation are mainly of technical nature. *Spin-off*, on the other hand, consists in extensions, applications and improvements of a previously discovered process or product, and its effects are of an economic nature.

diversified and to appropriations for university research <sup>(1)</sup> have already been described in paragraph 10. It is very difficult to apply the principles of direct derivation and indirect spin-off to these two classes of goals because there is rarely any direct link with the R&D activities classified in Major Goals 1-10.

17. It has been necessary to divide the latter up in such a way that each comprises two main categories of projects, namely Major Goals 1-3 and Major Goals 4-10.

The R&D activities in the first group (*nuclear, space and defence programmes*) are reasonably coherent entities and are often performed in a limited number of facilities. They are highly organized and frequently operate in accordance with more or less mandatory multiannual plans. In these circumstances, the *direct derivation* principle is applied here rigorously and extensively, whereas that of *indirect spin-off* towards activities included in Major Goals 1-10 can at times only be applied partially. Thus in the case of R&D on the use of radiation in medicine, agriculture and industry, the initial phase (development of new isotopes, and the search for possible applications) is classified in Major Goal 1 (Nuclear research and development) and not in Major Goals 5, 7 or 8 <sup>(2)</sup>. It would, on the other hand, be highly desirable to apply the principle of indirect spin-off, as described above, to meteorological or telecommunications R&D undertaken by a space or military research institute, where the project in question is unrelated—or no longer related—to previous space or defence R&D. More difficult problems may arise when it is a question of choosing between Major Goals 1, 2 and 3. In this case, only the use of conventions can provide a practical solution. It was decided, for example, that the funds for nuclear or space R&D projects undertaken for military purposes would be clas-

sified in Major Goal 3, and also that funds for R&D on nuclear propulsion for civil use would be classified in Major Goal 1. A serious problem arises, however, in the case of nuclear propulsion of spacecraft, where there are two “rival” groups of important goals and choosing between them is not easy. It is proposed that nuclear propulsion of rockets be considered as being directly derived from space research and that appropriations for this purpose should thus be classified in Major Goal 2.

18. *Activities relating to Major Goals 4-10* are often, unlike nuclear, space or defence, R&D, made up of disparate and less comprehensive elements. The identification of a dominant goal raises problems here also, notably when the projects are relevant to several objectives classified under different major goals in the Nomenclature. Application of the direct derivation and the spin-off principle quite often enables a coherent breakdown to be made. However, a number of conventions are proposed in the system to resolve doubtful or difficult cases. These conventions, which deal principally with the coverage of the objectives and with demarcation problems, are given in the notes (a) to (p) attached to Table A, Annex 2. They are re-stated, clarified and, where necessary, expanded in paragraph 19.

#### COVERAGE OF GOALS AND PROBLEMS OF DEMARCATION

19. The lay-out of this paragraph is based on the scheme employed in Table A, Annex 2; the reference “of which: developing countries” in brackets at the end of each major goal is not, however, reproduced here. The annotations amplify or clarify the notes to Table A. The coverage of the various goals and the problems of demarcation are indicated in brackets.

(1) Where such appropriations (usually tied in with others which may be devoted to other scientific activities) are granted as *lump sums or by field of science*, with no possibility of a breakdown *a priori* by socio-economic objectives. If, on the other hand, the funds granted to a university laboratory are intended for a specific project in a given field, which is already known to the public authorities (e.g., contracts for medical research) they should be entered under Major Goals 1-10.

(2) On the other hand, the financing of R&D aimed at using previously perfected techniques of radiation in the specific fields of hygiene, agricultural and industrial activities is classified in Major Goals 5, 7 and 8.

## **1. Nuclear Research and Development**

(This major goal includes all civil nuclear R&D; defence R&D is classified in 3.)

### *1.0 Research of a general nature*

#### *1.1 Energy research*

(This sub-group includes, among other things, research on nuclear propulsion of non-military non-spatial engines.)

#### *1.9. Other research*

(This sub-group includes, notably, the initial phase (new isotopes, new applications) of research on the use of radiation in medicine, agriculture and industry.)

## **2. Exploration and Exploitation of Space**

(This major goal includes all civil space R&D; defence R&D is classified in 3.)

### *2.0 Research of a general nature*

(This sub-group includes, in particular, such R&D in astronomy undertaken to study space which cannot be classified separately in 2.1 or 2.9; it excludes R&D in astronomy for defence purposes (classified in 3) and with a very general aim (classified in 11.1.1 and 12.1.1)

#### *2.1 Research on launchers and satellites*

##### *2.1.1. Launching systems*

(This item includes, in particular, participation in the CECLES/ELDO programmes)

##### *2.1.2. Scientific exploration*

(This item includes, in particular, participation in the CERS/ESRO programmes)

##### *2.1.3. Systems of application*

(This item includes, notably, participation in bilateral and other international programmes)

#### *2.9 Other research*

(This sub-group includes research on sounding balloons and sounding rockets.)

## **I. 6**

## **3. Defence**

(Includes, nuclear and space R&D undertaken for defence purposes; sums spent on civil research by military institutions should, as far as possible, be distributed among the other classes of the Nomenclature, for example assigned to 4.3.3 and 6.4.)

## **4. Exploration and Exploitation of the Earth and its Atmosphere**

### *4.0 Research of a general nature*

#### *4.1 Soil and substratum*

(This sub-group does not include the exploration of undersea plateaux or the study of soils for agricultural purposes.)

##### *4.1.3. Prospecting for mines and petroleum.*

#### *4.2 Seas and Oceans*

(This sub-group includes, in particular, the exploration of undersea plateaux and the exploitation of under-water biological resources, excluding fishing; it does not include research on pollution of the seas, which is classified in 5.3.1.)

#### *4.3 Atmosphere*

(This sub-group does not include research on air pollution which is classified in 5.3.2.)

##### *4.3.3. Meteorology*

(This item should also include meteorological R&D resulting from a space or military programme, but whose purpose has little or no relationship with the said programme; cf. paragraph 17.)

#### *4.9 Other research*

## **5. Protection and Promotion of Human Health**

### *5.0 Research of a general nature*

#### *5.1 Medical research*

(This sub-group includes all R&D concerning

the diagnostic and curative and prophylactic treatment of pathological affections, including that undertaken by or for military institutions, but excluding R&D undertaken as part of nuclear and space programmes which is considered as being directly derived from and therefore classified in 1, 2, and, if necessary, 3.)

## 5.2 *Research on alimentary hygiene and nutrition*

(This sub-group includes R&D on the quality control of food products and the diatetics of a healthy individual; such R&D is, in general, totally financed by governments; similar R&D which might be undertaken on the initiative of agricultural firms or food industries with financial aid from the public authorities should be classified in 7 or 8.)

## 5.3 *Research on noxious phenomena*

(This sub-group includes, by convention, all R&D on water and air pollution, plus action against noise, excepting projects for which an aim other than health and welfare is specified, for example an agricultural aim (to be classified in 7); in the case of action taken against noise, research on special equipment for buildings is considered as being directly derived from, and therefore classified in 5.3.3.)

### 5.3.1. Water pollution

### 5.3.2. Air pollution

### 5.3.3. Action against noise

## 5.9 *Other research*

(This sub-group includes, in particular, R&D on public hygiene, the repression of fraud and industrial constraints which have not already been classified under 5.2 or 5.3.)

## 6. **Planning of Human Environment**

### 6.0 *Research of a general nature*

(This sub-group includes, notably, general R&D on urbanism and the planning of national parks.)

### 6.1. *Construction and planning of buildings*

(This sub-group excludes R&D on building materials which is classified, in principle, under 8.2.9; the construction and planning of buildings for agricultural use are included here and classified in 6.1.2; in general, R&D on construction and planning of buildings is not considered as being directly derived from other objectives, with the exception, however, of R&D undertaken for nuclear, space and defence programmes.)

#### 6.1.1. Residential

#### 6.1.2. Non-residential

### 6.2 *Civil engineering*

(This sub-group includes, in particular, research on the improvement of urban and rural property (road systems, canals, dams, aqueducts, irrigation, drainage); it excludes R&D on building materials classified, in principle, in 8.2.9; generally speaking, R&D in civil engineering is not considered as being directly derived from other objectives, with the exception of R&D undertaken for nuclear, space and defence programmes.)

### 6.3 *Transport systems*

(This sub-group includes R&D on all transport services, including auxiliary services such as electronic traffic aids, radar stations, plus R&D relevant to the planning and organization of transport networks; it excludes R&D on the material installation of the above (classified in 6.2) and on engines and motors and means of transportation which are classified in 8.)

### 6.4 *Systems of telecommunications*

(This sub-group includes R&D on traditional services and telecommunications by satellite (cf. paragraph 17), as well as R&D on the planning and organization of networks; it does not include either R&D on the material installation of the above (classified in 6.2) nor that on telecommunications equipment which is classified in 8.)

### 6.9 *Other research*

## 7. Promotion of Agricultural Productivity and Technology

(This major goal does not include R&D on food industries. The problems of demarcation for this case are explained in the different sub-groups.)

### 7.0 *Research of a general nature*

(This sub-group includes, notably, R&D on the environment (bioclimatology, the study of soils, etc.). R&D on the improvement of rural land or on the construction and layout of buildings for agricultural use are excluded and classified under 6.2 and 6.1.2 respectively.)

### 7.1 *Animal products: agriculture and hunt*

(Including R&D on breeding, care, milking and (for game and poultry only, slaughtering; R&D on the slaughtering of cattle is classified in 8.2.9, various industries.)

#### 7.1.3. Veterinary medicine

### 7.2 *Vegetable products (including forests) and wines*

(The R&D included here covers all R&D activities related to all processes from the preparation of the soil (after improving the land, classified under 6.2) to the harvest; R&D on later activities (drying, freezing, canning) are classified in 8.2.9.)

### *Remark relating to sub-groups 7.1 and 7.2*

R&D on agricultural machinery and mechanization is undertaken either by public (or quasi-public) institutions or by firms specialized in the construction of agricultural machines. Given the real difficulty of making a coherent choice in each case, it is here proposed that R&D undertaken on the initiative of public authorities should be attributed to 7 (position 7.1 or 7.2) and that research undertaken on the initiative of industrial firms be classified under 8.2.9. (various industries).

### 7.3 *Products of fishing and fish breeding*

(This R&D covers fishing, salting, drying and the first freezing of the products; preparation and canning are excluded and classified under 8.2.9.)

### 7.9 *Other research*

## I. 8

## 8. Promotion of Industrial Productivity and Technology

(This major goal includes all R&D on industrial products which has not already been classified to the preceding major goals. The proposed breakdown is provisional, as a more detailed project, based on the European Nomenclature of Economic Activities (NACE), should be approved in the future.)

### 8.0 *Research of a general nature*

(This sub-group includes, in particular, R&D on metrology, automation and general technological forecasting.)

### 8.1 *Products of the fuel industry—non-nuclear*

(The products in question are, basically, coal, lignite, coke, crude and refined petroleum, natural gas, steam, compressed air and electricity that is not nuclear in origin.)

### 8.2 *Products of other industries*

#### 8.2.1. Chemical

#### 8.2.2. Metallurgy

#### 8.2.3. Electronics

(This heading does not include computers, classified under 9.1, but does include electronic components.)

#### 8.2.4. Civil aeronautics

#### 8.2.5. Other means of transport

#### 8.2.9. Miscellaneous industries

### 8.9 *Other research*

## 9. Promotion of Computer Science and of Automation

(This major goal includes, in particular, research on the treatment of data but it excludes expenditure on the gathering of data, which is a related scientific activity.)

### 9.0 *Research of a general nature*

### 9.1 *Research on hardware*

### 9.2 *Research on software*

### 9.9 *Other research*



## **10. Promotion or Research in the Social Sciences and Humanities.**

(This major group includes research which has not been classified in the preceding chapters, as being directly derived from other objectives.)

### *10.0 Research of a general nature*

#### *10.1 Research on education, training and re-adaptation*

(The subject considered is not the financing of teaching activities, but the expenditure for research on educational methods.)

10.1.1. In the field of computer science

10.1.2. In the field of industry

10.1.3. In the field of agriculture

#### *10.2 Research on business administration*

(This sub-group covers research undertaken in all fields of business management, excepting those classified under 9.2.)

#### *10.9 Other research*

(Insofar as this research has not already been classified in 1-9.)

## **11. General Promotion of Knowledge NES (except Higher Education)**

(This major group includes credits allocated to the financing of R&D with a very general aim, which cannot be classified in major groups 1-10, as well as credits which are accorded to large research establishments and to distributing bodies whose mission is very diversified.)

### *11.0 Research of a general nature*

(This sub-group includes, in particular, R&D funds liable to go to both the natural sciences and the social sciences and humanities, where a division between the two is not possible.)

### *11.1 Research in the natural sciences*

11.1.0. Research of a general nature

11.1.1. Natural sciences

11.1.2. Engineering

11.1.3. Medical sciences

11.1.4. Agricultural sciences

11.1.9. Other fields

### *11.2 Research in the social sciences and humanities*

## **12. General Promotion of Knowledge NES (Higher Education)**

(This major group includes R&D credits allocated globally or by field of science to institutions of higher education in the context of their broad vocation. Funds for University research undertaken in specific fields, previously known to the public authorities who finance them by contracts or subsidies should be classified in major groups 1-10.)

### *12.0 Research of a general nature*

(This sub-group includes, in particular, R&D funds for both the natural sciences and the social sciences and humanities, where it is not possible to divide the two.)

### *12.1 Research in the natural sciences*

12.1.0. Research of a general nature

12.1.1. Natural sciences

12.1.2. Engineering

12.1.3. Medical sciences

12.1.4. Agricultural sciences

12.1.9. Other fields

### *12.2 Research in the social sciences and humanities*



## THE DEFINITION OF CENTRAL GOVERNMENT

(cf. ESA paragraphs 240, 241, 243)

The general government sector includes all institutional units <sup>(1)</sup> whose main function is to produce *non-market* services for the community and/or to redistribute the country's income and wealth. The main resources of these units come directly or indirectly from compulsory payments made by other institutional units (non-financial corporate and quasi-corporate enterprises, credit institutions, insurance enterprises, private non-profit institutions, households, the rest of the world).

The majority of these units are *government agencies* which administer, finance and account for services of a *non-market* nature (rendered to the community gratuitously or quasi-gratuitously); in addition, some *incorporated non-profit institutions* which pursue non-market activities and are mainly financed by government agencies are included.

*Central government* is a sub-sector of general government. It includes institutional units other than social security agencies whose competence extends to the whole economic territory.

This sub-sector comprises not only the traditional bodies included in the state budget (parliament, ministerial departments, linked agencies, etc.) but also other units, which may or may not be controlled by a state ministry, and which are financed from special budgetary or extra-bud-

getary resources (autonomous funds, administrative establishments, etc.). In the case of the Federal Republic of Germany, the central government agencies of the Länder are part of the central government sub-sector.

In general, these government units differ fundamentally from public enterprises. The latter are institutional units whose main function is either to make credit and insurance transactions or to produce goods and market services (which can be sold on the market). The actual nature of these units' activities calls for their classification in the credit institutions sector, in the insurance sector or in the non-financial corporate and quasi-corporate enterprises sector. Their public character results from the fact that they are entirely or partially owned by government agencies whose control is effective in all the main aspects of their management. Public enterprises may include joint stock companies and analogous incorporated units as well as autonomous public services whose pattern of behaviour is similar to that of financial and non-financial corporate enterprises.

It is particularly important to distinguish between government agencies and public enterprises in estimating total central government financial support of R&D and also in breaking down such support into intramural and extramural expenditures. If an R&D performing unit is included in the central government sector the funds made available to this unit from the State budget will be considered as intramural expenditure whilst similar payments to public enterprises will be considered as extramural expenditure.

<sup>(1)</sup> Institutional units are considered to be those units participating in the economic life which keep complete accounting records and enjoy autonomy of decision in the exercise of their main function. Units which do not possess these two characteristics are, in principle, integrated in the larger units which control them.

## ANNEX 2 — TABLE A

## Central Government R &amp; D Expenditure by Objective

Country:  
(in national currency)

OBJECTIVE	1967	1968	1969	1970	OBJECTIVE
	°o	°o	°o	°o	
<b>1. Nuclear Research and Development (a)</b> 1.0. R&D of a general nature 1.1. Energy R&D 1.9. Other R&D <i>(of which: developing countries)</i>					<b>1 Nuclear Research and Development (a)</b> 1.0. R&D of a general nature 1.1. Energy R&D 1.9. Other R&D <i>(of which: developing countries)</i>
<b>2. Exploration and Exploitation of Space (a)</b> 2.0. R&D of a general nature (b) 2.1. R&D on launchers and satellites 2.1.1. Launching systems (c) 2.1.2. Scientific exploration (d) 2.1.3. Systems of application (e) 2.9. Other R&D <i>(of which: developing countries)</i>					<b>2. Exploration and Exploitation of Space (a)</b> 2.0. R&D of a general nature (b) 2.1. R&D on launchers and satellites 2.1.1. Launching systems (c) 2.1.2. Scientific exploration (d) 2.1.3. Systems of application (e) 2.9. Other R&D <i>(of which: developing countries)</i>
<b>3. Defence (a)</b> <i>(of which: developing countries)</i>					<b>3. Defence (a)</b> <i>(of which: developing countries)</i>
<b>4. Exploration and Exploitation of the Earth and its Atmosphere</b> 4.0. R&D of a general nature 4.1. Soil and sub-stratum (f) 4.1.3. Prospecting for mines and petroleum 4.2. Seas and oceans (g) 4.3. Atmosphere 4.3.3. Meteorology 4.9. Other R&D <i>(of which: developing countries)</i>					<b>4. Exploration and Exploitation of the Earth and its Atmosphere</b> 4.0. R&D of a general nature 4.1. Soil and sub-stratum (f) 4.1.3. Prospecting for mines and petroleum 4.2. Seas and oceans (g) 4.3. Atmosphere 4.3.3. Meteorology 4.9. Other R&D <i>(of which: developing countries)</i>
<b>5. Protection and Promotion of Human Health</b> 5.0. R&D of a general nature 5.1. Medical R&D 5.2. R&D on alimentary hygiene and nutrition 5.3. R&D on noxious phenomena (h) 5.3.1. Water pollution 5.3.2. Air pollution 5.3.3. Action against noise 5.9. Other R&D <i>(of which: developing countries)</i>					<b>5. Protection and Promotion of Human Health</b> 5.0. R&D of a general nature 5.1. Medical R&D 5.2. R&D on alimentary hygiene and nutrition 5.3. R&D on noxious phenomena (h) 5.3.1. Water pollution 5.3.2. Air pollution 5.3.3. Action against noise 5.9. Other R&D <i>(of which: developing countries)</i>
<b>6. Planning of Human Environment</b> 6.0. R&D of a general nature (i) 6.1. Construction and the planning of buildings 6.1.1. Residential 6.1.2. Non-residential 6.2. Civil engineering (j) 6.3. Transport systems 6.4. Systems of telecommunications 6.9. Other R&D <i>(of which: developing countries)</i>					<b>6. Planning of Human Environment</b> 6.0. R&D of a general nature (i) 6.1. Construction and the planning of buildings 6.1.1. Residential 6.1.2. Non-residential 6.2. Civil engineering (j) 6.3. Transport systems 6.4. Systems of telecommunications 6.9. Other R&D <i>(of which: developing countries)</i>
<b>7. Promotion of Agricultural Productivity and Technology</b> 7.0. R&D of a general nature (k) 7.1. Animal products: agriculture and hunt 7.1.3. Veterinary medicine 7.2. Vegetable products (including forests) and wines 7.3. Products of fishing and fish breeding 7.9. Other R&D <i>(of which: developing countries)</i>					<b>7. Promotion of Agricultural Productivity and Technology</b> 7.0. R&D of a general nature (k) 7.1. Animal products: agriculture and hunt 7.1.3. Veterinary medicine 7.2. Vegetable products (including forests) and wines 7.3. Products of fishing and fish breeding 7.9. Other R&D <i>(of which: developing countries)</i>
<b>8. Promotion of Industrial Productivity and Technology</b> 8.0. R&D of a general nature (l) 8.1. Products of the fuel industry (non-nuclear) 8.2. Products of other industries 8.2.1. Chemical 8.2.2. Metallurgy 8.2.3. Electronics (m) 8.2.4. Civil aeronautics 8.2.5. Other means of transport 8.2.9. Miscellaneous industries 8.9. Other R&D <i>(of which: developing countries)</i>					<b>8. Promotion of Industrial Productivity and Technology</b> 8.0. R&D of a general nature (l) 8.1. Products of the fuel industry (non-nuclear) 8.2. Products of other industries 8.2.1. Chemical 8.2.2. Metallurgy 8.2.3. Electronics (m) 8.2.4. Civil aeronautics 8.2.5. Other means of transport 8.2.9. Miscellaneous industries 8.9. Other R&D <i>(of which: developing countries)</i>
<b>9. Promotion of Computer Science and of Automation</b> 9.0. R&D of a general nature 9.1. R&D on hardware 9.2. R&D on software 9.9. Other R&D <i>(of which: developing countries)</i>					<b>9. Promotion of Computer Science and of Automation</b> 9.0. R&D of a general nature 9.1. R&D on hardware 9.2. R&D on software 9.9. Other R&D <i>(of which: developing countries)</i>

## ANNEX 2 — TABLE A

## Central Government R &amp; D Expenditure by Objective (continued)

Country:  
(in national currency)

OBJECTIVE	1967		1968		1969		1970		OBJECTIVE
		°		°		°		°	
<b>10. Promotion of Research in the Social Sciences and Humanities</b>									<b>10. Promotion of Research in the Social Sciences and Humanities</b>
10.0. R&D of a general nature									10.0. R&D of a general nature
10.1. R&D on education, training and re-adaptation									10.1. R&D on education, training and re-adaptation
10.1.1. In the field of computer science									10.1.1. In the field of computer science
10.1.2. In the field of industry									10.1.2. In the field of industry
10.1.3. In the field of agriculture									10.1.3. In the field of agriculture
10.2. R&D on business administration									10.2. R&D on business administration
10.9. Other R&D (n) (of which: developing countries)									10.9. Other R&D (n) (of which: developing countries)
<b>11. General Promotion of Knowledge NES</b> (except Higher Education) (o)									<b>11. General Promotion of Knowledge NES</b> (except Higher Education) (o)
11.0. R&D of a general nature									11.0. R&D of a general nature
11.1. R&D in the natural sciences									11.1. R&D in the natural sciences
11.1.0. R&D of a general nature									11.1.0. R&D of a general nature
11.1.1. Natural sciences									11.1.1. Natural sciences
11.1.2. Engineering									11.1.2. Engineering
11.1.3. Medical sciences									11.1.3. Medical sciences
11.1.4. Agronomical sciences									11.1.4. Agronomical sciences
11.1.9. Other fields									11.1.9. Other fields
11.2. R&D in the social sciences and humanities (of which: developing countries)									11.2. R&D in the social sciences and humanities (of which: developing countries)
<b>12. General Promotion of Knowledge NES</b> (Higher Education) (p)									<b>12. General Promotion of Knowledge NES</b> (Higher Education) (p)
12.0. R&D of a general nature									12.0. R&D of a general nature
12.1. R&D in the natural sciences									12.1. R&D in the natural sciences
12.1.0. R&D of a general nature									12.1.0. R&D of a general nature
12.1.1. Natural sciences									12.1.1. Natural sciences
12.1.2. Engineering									12.1.2. Engineering
12.1.3. Medical sciences									12.1.3. Medical sciences
12.1.4. Agronomical sciences									12.1.4. Agronomical sciences
12.1.9. Other fields									12.1.9. Other fields
12.2. R&D in the social sciences and humanities (of which: developing countries)									12.2. R&D in the social sciences and humanities (of which: developing countries)
<i>For record only: expenditure not itemized</i> (of which: developing countries)									<i>For record only: expenditure not itemized</i> (of which: developing countries)
<b>GRAND TOTAL</b> (of which: developing countries)									<b>GRAND TOTAL</b> (of which: developing countries)

## NOTES

- (a) Nuclear and space R & D undertaken for defence purposes is classified under 3.
- (b) This sub-group includes, in particular, research in astronomy undertaken for the study of space which cannot be distributed separately among 2.1. or 2.9.; it excludes R & D in astronomy for defence purposes (classified in 3) or with a very general aim (classified under 11.1.1. or 12.1.1.).
- (c) Including participation in the CELES/ELDO programme.
- (d) Including participation in the CERS/ESRO programme.
- (e) Including participation in bilateral and other international programmes.
- (f) Excluding the exploration of undersea plateaux and the study of soils for agricultural purposes.
- (g) Including the exploration of undersea plateaux and the exploitation of underwater biological resources, but excluding fishing.
- (h) Excluding research for other than sanitary purposes, classified under 6 and 7.
- (i) Including general research on urbanism and the planning of national parks.
- (j) Including property improvement (dams, aqueducts, irrigation, drainage, the construction of wells, etc).
- (k) Including R & D on the environment (bioclimatology, the study of soils, etc); the study and preparation of soils excludes property improvement, classified under 6.2.
- (l) Including research on metrology, general automation and technological forecasting.
- (m) Excluding computers (classified under 9.1.), but including electronic components.
- (n) Not elsewhere specified, i.e. in major goals 1-9.
- (o) This major goal includes credits allocated to R & D with a very general aim, which cannot be classified in major goals 1-10, as well as credits accorded to large research establishments and to distributing bodies whose mission is very diversified.
- (p) This major goal includes credits for research allocated globally or by field of science to institutions of higher education, in the context of their broad vocation.



ANNEX **II**

**Brief Notes on the Structure  
of the Statistical Tables**





1. The tables which follow in Annex III relate to the *allocated expenditure on R&D by central governments*, classified according to the objectives contained in the Nomenclature for the Analysis and Comparison of Science Programmes and Budgets (NASB). The information was taken from national budgets, generally by using special classifying documents drawn up by the countries themselves.

Conversion of the budgetary classifications into the various NASB major goals, sub-groups and items was carried out by national coordinating bodies, in direct liaison with the Commission.

The NASB is a *functional classification* the aim of which is not to analyze research expenditure according to the funding or implementing bodies, but instead to break it down into uniform categories of objectives so that comparison can be effected on an international basis.

2. The arrangement of the figures in the tables has, as far as possible, followed the *general definitions in the OECD system* (Frascati Manual). Every endeavour has been made to exclude what it was agreed to call related scientific activities (documentation, standardization, education, etc.), as well as non-scientific activities sometimes associated with research (production, technical assistance, miscellaneous services). Nevertheless, some modifications introduced when the Frascati Manual was revised in 1969-70 have been integrated into the presentation of the figures. Cases in point are documentation and supervisory activities directly connected with research schemes and certain routine activities which were carried out before it was decided to put into production the products on which research had been conducted.

Furthermore, in order to give a more complete picture of governmental allocation of funds to R&D, *research expenditure in the field of social sciences and humanities* has been included in the tables. Such expenditure was taken into consideration where the countries themselves compiled the figures, i.e., in the majority of cases, where the expenditure related to activities carried out in the public sector itself (government, higher education).

3. Keeping to the conventions in the Frascati Manual was not an easy task, particularly as regards the *calculation of the proportion* of the appropriations for science as a whole which was allocated to research. The fact that the flow of public expenditure is examined at the entry in the budget stage instead of that at which it is finally utilized by the various laboratories and institutes means that except in a limited number of cases, the relevant calculations cannot have any real basis. It was thus necessary to have recourse to evaluation methods which differed from one country to another and sometimes from one type of expenditure to another within one and the same country. Generally speaking, adjustment of the budgetary figures was carried out in two stages.

4. When, in drawing up their budgetary classification documents, the Community countries attempt to pinpoint the appropriations set apart for research, they usually make an *initial calculation*. The results of this work depend on the budgetary procedures in operation at the time, the means at the disposal of the various coordinating bodies and the statistical methods used.

In France, the interdepartmental liaison procedure makes it possible for the "Délégation Générale à la Recherche Scientifique et Technique" to arrive at a precise and more or less complete estimate in the case of what are customarily called "crédits de recherche" (about 30% of the total); as for the other appropriations — where research expenditure cannot be pinpointed beforehand — less exact evaluations are made with the aid of coefficients which are calculated from special investigations or from data provided by the schedules of research carried out.

In the Netherlands, the Ministry of Education and Science uses a similar method, a system of coefficients which originated in an investigation undertaken in 1964 by the CBS (Central Bureau of Statistics) on funding agencies and bodies carrying out research being applied to the "science appropriations" already pinpointed.

In Italy, the law stipulates that ministerial departments must group the various appropriations for R&D under a single heading in their budget. These headings are analyzed by the National Re-

search Council (CNR) which supplements its information by means of questionnaires to the departments concerned. The CNR then calculates the proportion allocated to research, in most cases by directly analysing the programmes brought to its notice.

In Germany, the Ministry of Scientific Research draws up from data contained in the Federal budget a list of institutions and projects at least 50% of whose funds are devoted to research activities; any items in the budget below this figure are ignored and excluded from the grouping process. The Länder budget figures are compiled by the Federal Statistical Office on the basis of a list of institutions drawn up by the Science Council.

In Belgium, the Science Policy Programming Office systematically singles out from the various ministerial budgets the proposed appropriations for all scientific activities (research, education, public service activities, etc.). It can thus be seen that at the budgetary classification level research expenditure proper has not been completely pinpointed.

5. In order to arrive at the required comparable data, confined as far as possible just to research activities, it was necessary in the *second stage* to perform additional adjustments. This was done by the national coordinating bodies in liaison with the Commission.

In certain cases the adjustments made were only minor ones (France, the Netherlands); in others they were more substantial (Italy, Germany); Belgium, for its part, carried out a systematic adjustment of all the data in its science budget by referring, in the case of the bodies concerned, to the results of its schedule of research executed in 1967.

The results obtained at the end of these two work stages can be considered as satisfactory. It will doubtless be possible to improve them still further when they can be systematically collated with the definitive data from the schedules of completed research which were recently drawn up using the Frascati standards.

6. It must further be emphasized that the field covered by the Community statistical operation does not exactly correspond with the one normally adopted for OECD investigations.

As is specified in the introductory note on the NASB (para. 1), the expenditure shown here relates to the funding of activities carried out by both public bodies (part of the intramural expenditure) and organizations not comprised in the central government sector, including the rest of the world (total extramural expenditure). The OECD tables, which are based on the concept of internal expenditure, do not incorporate all extramural expenditure in the analysis of funding flows for research carried out.

This difference, together with the fact that research funding in the field of social sciences is included, explains to a very large extent why the NASB-based figures are slightly higher than those to be found in the original OECD documents (1).

7. In an operation involving analysis and comparison of scientific budgets, the *reliability of the data* used as a basis of calculation can be determined as a function of the following factors:

- a) the stage at which public expenditure is taken into account in the process of budget preparation and implementation;
- b) the methods of recording and evaluating the proportion of this expenditure which is devoted to R&D activities;
- c) entering the figures relating to this proportion under the appropriate items in the Nomenclature.

Points *a)* and *c)* are dealt with below. Point *b)*, already discussed in the preceding paragraphs, will be considered only in relation to university research expenditure.

8. For the most part, the data were gathered at the *budget estimates* stage. Belgium and France, however, preferred to put their figures for 1967 in terms of actual expenditure. With the exception of the Netherlands and Belgium, which

(1) These higher figures are, however, partly compensated by the fact that the figures for the Community countries relate to expenditure by central governments, while the OECD questionnaire concerns the general government sector.

were able to provide complete estimates, the figures available for 1970 are generally no more than preliminary evaluations.

It should be noted that for 1967 Germany and the Netherlands, which gave their figures in terms of estimates, achieved an overall estimated/actual expenditure ratio of 95.6% and 98.4% respectively. In the case of Italy, the figures for the same year show a greater disparity but in the reverse direction. Certain reservations must therefore be expressed on this point <sup>(1)</sup>.

9. *Conversion of national budgetary classifications into the various NASB headings* necessitated protracted and painstaking work, in which, however, no insurmountable obstacles were encountered in the final analysis.

The work of the coordinating bodies and the Commission was assisted by two favourable factors: a) the mass of detailed information frequently available, and b) in certain cases, the existence of national functional classifications which were fairly similar to the NASB model.

In the Netherlands, conversion to the Community nomenclature was carried out by direct use of the combined functional-institutional classification which appears in the *Wetenschaps budget* (science budget).

In Italy, it was possible to use the combined funding sources/research disciplines classification drawn up by the CNR for allocated research expenditure, making use, when necessary, of the purely functional nomenclature (by field of research) developed by the ISTAT for completed research.

In France and Belgium, the extent of the information gathered on the organizations and projects in receipt of public appropriations has generally compensated for the inadequacy of the national functional classifications.

In Germany, the numerous details provided in the Federal budget on the breakdown of expenditure by institutions, together with the documenta-

tion gathered by the Statistical Office and other national bodies on other types of expenditure, made it possible to effect a satisfactory integration of the overall research allocations into the NASB. A proviso must, however, be made with regard to the inclusion in detail of this expenditure; the reason for this is the preliminary research expenditure classification referred to in Section 4.

10. Although the results obtained from the complete Community operation (identification, evaluation and classification of national data in the NASB) can be generally considered as satisfactory and usable for the purposes of analysis, it would be rash to go quite so far with regard to one particular field of classified expenditure, namely, that of *public funds for research in higher education* which have been incorporated in Major Goal 12 of the Nomenclature.

This is not a new problem. It is encountered by international organizations as well as by coordinating bodies and national statistical offices. It derives from the fact that in educational institutions at university level research activities are closely linked to other scientific activities, and more particularly to teaching, and it is not possible to analyse them separately on the basis of precise data.

Up to now no country seems to have found a really satisfactory solution to this problem and, under the circumstances, one can understand that international organizations such as UNESCO and the OECD have hardly paid any attention to it. The Working Group is well aware of the problem and intends to give it careful consideration in the future.

11. In the meantime, certain reservations must be made with regard to the comparability of the figures shown under Major Goal 12 in the tables. These reservations relate both to the basis of the data and to the methods used for the calculation of the proportion assignable to research in the funds allocated to higher education.

(1) The Working Group experts are agreed that in future the data for year t-2 should be expressed in terms of both estimates and actual expenditure. This system would have the twofold advantage of improving the comparability of the figures and of giving a precise idea of any disparity existing between the estimated and the actual expenditure in the various countries' budgets.

With regard to the first point, there sometimes seems to have been a fairly liberal interpretation of the NASB directives, which stipulate that the only appropriations to be entered under Major Goal 12 are those allocated overall or by discipline to higher education bodies. Some countries have, for instance, included the activities of certain institutions (academies of science, institutes of archaeology, etc.) where the sole characteristic which the latter have in common with education proper is the fact of being financed by the same government department (national education).

As far as the second point is concerned, it was seen that all countries had used systems of coeffi-

cients to evaluate research's share in overall university activities. An initial examination revealed, however, that the method of establishing these coefficients differed from one country to another and the ways in which they had been applied to the total expenditure under consideration were not always compatible.

Some attempt at harmonization, therefore, is clearly necessary as a condition of achieving both better comparability of the figures-provided and a more accurate appraisal of the structural differences in the national university research systems.

**ANNEX III**

**Central Government R&D  
Expenditure by Objective**



**T A B L E S**

**Central Government R & D Expenditure by Objective  
Condensed Table**

1967

OBJECTIVE	Germany			Belgium			France		
	10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10
1. Nuclear R&D	235 619	19.5	31.7	19 997	22.6	38.2	363 354	20.3	25.1
2. Space	75 416	6.3	10.2	6 995	7.9	13.4	106 764	6.0	7.4
3. Defence	260 944	21.6	35.1	1 100	1.2	2.1	604 651	33.8	41.9
4. Earth and its atmosphere	22 123	1.8	3.0	2 389	2.7	4.6	11 869	0.7	0.8
5. Health	24 874	2.1	3.3	2 991	3.4	5.7	31 638	1.8	2.2
6. Human environment	9 868	0.8	1.3	2 002	2.3	3.8	44 764	2.5	3.1
7. Agricultural productivity	27 262	2.3	3.7	4 498	5.0	8.6	77 556	4.3	5.4
8. Industrial productivity	48 594	4.0	6.6	11 593	13.1	22.2	176 077	9.8	12.2
9. Computer science and automation	16 945	1.4	2.3	—	—	—	11 444	0.6	0.8
10. Social sciences	20 718	1.7	2.8	728	0.8	1.4	16 609	0.9	1.1
<b>Sub-total (1-10)</b>	<b>742 363</b>	<b>61.5</b>	<b>100.0</b>	<b>52 293</b>	<b>59.0</b>	<b>100.0</b>	<b>1 444 726</b>	<b>80.7</b>	<b>100.0</b>
11. General promotion of knowledge NES (except Higher Education)	81 360	6.7		9 153	10.3		138 726	7.8	
12. General promotion of knowledge NES (Higher Education)	384 525	31.8		27 195	30.7		202 165	11.3	
Not itemized	—	—		—	—		4 173	0.2	
<b>TOTAL</b>	<b>1 208 248</b>	<b>100.0</b>		<b>88 641</b>	<b>100.0</b>		<b>1 789 790</b>	<b>100.0</b>	
(of which: developing countries)	(—)	(—)		(607)	(0.7)	(—)	(24 508)	(1.4)	(1.4)

1968

OBJECTIVE	Germany			Belgium			France		
	10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10
1. Nuclear R&D	230 879	18.4	31.3	22 637	24.1	41.7	326 956	16.7	21.2
2. Space	85 382	6.8	11.6	6 765	7.2	12.5	139 172	7.1	9.0
3. Defence	246 489	19.6	33.4	1 127	1.2	2.1	621 828	31.8	40.4
4. Earth and its atmosphere	19 825	1.6	2.7	2 354	2.5	4.3	16 528	0.8	1.1
5. Health	27 903	2.2	3.8	3 182	3.4	5.9	42 475	2.2	2.8
6. Human environment	10 495	0.8	1.4	1 530	1.6	2.8	52 643	2.7	3.4
7. Agricultural productivity	27 097	2.1	3.7	5 879	6.2	10.9	89 972	4.6	5.8
8. Industrial productivity	48 315	3.8	6.6	9 679	10.3	17.9	202 286	10.3	13.1
9. Computer science and automation	18 427	1.5	2.5	240	0.2	0.4	28 762	1.5	1.9
10. Social sciences	22 080	1.8	3.0	835	0.9	1.5	20 032	1.0	1.3
<b>Sub-total (1-10)</b>	<b>736 892</b>	<b>58.6</b>	<b>100.0</b>	<b>54 228</b>	<b>57.6</b>	<b>100.0</b>	<b>1 540 654</b>	<b>78.7</b>	<b>100.0</b>
11. General promotion of knowledge NES (except Higher Education)	88 953	7.1		10 352	11.0		165 098	8.4	
12. General promotion of knowledge NES (Higher Education)	431 300	34.3		29 499	31.4		250 007	12.8	
Not itemized	—	—		—	—		2 836	0.1	
<b>TOTAL</b>	<b>1 257 145</b>	<b>100.0</b>		<b>94 079</b>	<b>100.0</b>		<b>1 958 595</b>	<b>100.0</b>	
(of which: developing countries)	(—)	(—)		(663)	(0.7)	(—)	(26 899)	(1.4)	(1.5)



**Central Government R & D Expenditure by Objective  
Condensed Table**

1967

Italy			Netherlands			Community			OBJECTIVE
10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10	
98 990	34.6	61.5	22 584	11.1	22.9	740 544	20.7	29.6	1. Nuclear R&D
21 234	7.4	13.2	6 342	3.1	6.4	216 751	6.1	8.7	2. Space
14 331	5.0	8.9	7 789	3.8	7.9	888 815	24.9	35.6	3. Defence
2 050	0.7	1.3	3 993	1.9	4.1	42 424	1.2	1.7	4. Earth and its atmosphere
4 219	1.5	2.6	6 711	3.3	6.8	70 433	2.0	2.8	5. Health
5 598	2.0	3.5	5 615	2.8	5.7	67 847	1.9	2.7	6. Human environment
4 435	1.5	2.7	20 531	10.1	20.9	134 282	3.7	5.4	7. Agricultural productivity
4 192	1.5	2.6	16 656	8.2	16.9	257 112	7.2	10.3	8. Industrial productivity
794	0.3	0.5	—	—	—	29 183	0.8	1.2	9. Computer science and automation
5 226	1.8	3.2	8 268	4.1	8.4	51 549	1.4	2.0	10. Social sciences
<b>161 069</b>	<b>56.3</b>	<b>100.0</b>	<b>98 489</b>	<b>48.4</b>	<b>100.0</b>	<b>2 498 940</b>	<b>69.9</b>	<b>100.0</b>	<b>Sub-total (1-10)</b>
36 253	12.7		9 796	4.8		275 288	7.7		11. General promotion of knowledge NES (except Higher Education)
88 617	31.0		95 367	46.8		797 869	22.3		12. General promotion of knowledge NES (Higher Education)
—	—		—	—		4 173	0.1		Not itemized
<b>285 939</b>	<b>100.0</b>		<b>203 652</b>	<b>100.0</b>		<b>3 576 270</b>	<b>100.0</b>		<b>TOTAL</b>
(—)	(—)	(—)	(1 670)	(0.8)	(1.7)	(26 785)	(0.7)	(0.9)	(of which: developing countries)

1968

Italy			Netherlands			Community			OBJECTIVE
10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10	
95 494	31.1	55.1	26 045	10.7	22.2	702 011	18.2	26.8	1. Nuclear R&D
16 912	5.5	9.8	9 757	4.0	8.3	257 988	6.7	9.8	2. Space
14 309	4.7	8.3	12 527	5.2	10.7	896 280	23.2	34.2	3. Defence
4 822	1.6	2.8	3 127	1.3	2.7	46 656	1.2	1.8	4. Earth and its atmosphere
6 656	2.2	3.8	8 753	3.6	7.5	88 969	2.3	3.4	5. Health
7 384	2.4	4.2	6 817	2.8	5.8	78 869	2.0	3.0	6. Human environment
11 417	3.7	6.6	22 772	9.4	19.4	157 137	4.1	6.0	7. Agricultural productivity
9 861	3.2	5.7	19 303	8.0	16.4	289 444	7.5	11.0	8. Industrial productivity
1 898	0.6	1.1	—	—	—	49 327	1.3	1.9	9. Computer science and automation
4 501	1.5	2.6	8 239	3.4	7.0	55 687	1.4	2.1	10. Social sciences
<b>173 254</b>	<b>56.5</b>	<b>100.0</b>	<b>117 340</b>	<b>48.4</b>	<b>100.0</b>	<b>2 622 368</b>	<b>67.9</b>	<b>100.0</b>	<b>Sub-total (1-10)</b>
37 816	12.3		11 405	4.7		313 624	8.1		11. General promotion of knowledge NES (except Higher Education)
95 965	31.2		113 704	46.9		920 475	23.9		12. General promotion of knowledge NES (Higher Education)
—	—		—	—		2 836	0.1		Not itemized
<b>307 035</b>	<b>100.0</b>		<b>242 449</b>	<b>100.0</b>		<b>3 859 303</b>	<b>100.0</b>		<b>TOTAL</b>
(—)	(—)	(—)	(980)	(0.4)	(0.8)	(28 542)	(0.7)	(0.9)	(of which: developing countries)

## ANNEX III

**Central Government R & D Expenditure by Objective (continued)**  
**Condensed Table**  
 1969

OBJECTIVE	Germany			Belgium			France		
	10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10
1. Nuclear R&D	237 740	16.5	28.8	24 511	23.1	40.3	341 085	17.0	22.1
2. Space	92 368	6.4	11.2	7 150	6.7	11.8	126 667	6.3	8.2
3. Defence	273 495	19.0	33.1	2 515	2.4	4.1	617 697	30.8	40.0
4. Earth and its atmosphere	23 076	1.6	2.8	2 611	2.5	4.3	18 376	0.9	1.2
5. Health	28 405	2.0	3.4	3 694	3.5	6.1	42 158	2.1	2.7
6. Human environment	15 081	1.0	1.8	1 915	1.8	3.2	52 968	2.6	3.4
7. Agricultural productivity	29 160	2.0	3.5	6 018	5.6	9.9	92 095	4.6	6.0
8. Industrial productivity	73 842	5.1	8.9	11 408	10.7	18.8	204 091	10.1	13.2
9. Computer science and automation	29 933	2.1	3.6	86	0.1	0.1	27 796	1.4	1.8
10. Social sciences	23 926	1.7	2.9	855	0.8	1.4	21 619	1.1	1.4
<b>Sub-total (1-10)</b>	<b>827 026</b>	<b>57.4</b>	<b>100.0</b>	<b>60 763</b>	<b>57.2</b>	<b>100.0</b>	<b>1 544 552</b>	<b>76.9</b>	<b>100.0</b>
11. General promotion of knowledge NES (except Higher Education)	119 138	8.3		11 421	10.8		177 627	8.8	
12. General promotion of knowledge NES (Higher Education)	493 078	34.3		34 039	32.0		282 886	14.1	
Not itemized	—	—		—	—		3 339	0.2	
<b>TOTAL</b>	<b>1 439 242</b>	<b>100.0</b>		<b>106 223</b>	<b>100.0</b>		<b>2 008 404</b>	<b>100.0</b>	
(of which: developing countries)	(—)	(—)		(748)	(0.7)	(—)	(n.d./n.v.)		

1970

OBJECTIVE	Germany			Belgium			France		
	10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10
1. Nuclear R&D	314 186	18.1	30.7	30 208	24.3	41.7	288 071	16.3	21.6
2. Space	117 646	6.7	11.5	7 659	6.2	10.6	118 829	6.7	8.9
3. Defence	301 033	17.3	29.4	2 772	2.2	3.8	540 133	30.6	40.5
4. Earth and its atmosphere	27 186	1.5	2.6	3 018	2.4	4.2	19 805	1.1	1.5
5. Health	37 913	2.2	3.7	4 418	3.5	6.1	39 610	2.2	3.0
6. Human environment	18 470	1.1	1.8	1 734	1.4	2.4	50 412	2.9	3.8
7. Agricultural productivity	32 209	1.9	3.1	7 142	5.8	9.9	82 820	4.7	6.2
8. Industrial productivity	94 453	5.4	9.2	14 413	11.6	19.9	144 035	8.2	10.8
9. Computer science and automation	54 660	3.1	5.3	105	0.1	0.1	30 608	1.8	2.3
10. Social sciences	27 399	1.6	2.7	931	0.8	1.3	18 005	1.0	1.4
<b>Sub-total (1-10)</b>	<b>1 025 155</b>	<b>58.9</b>	<b>100.0</b>	<b>72 400</b>	<b>58.3</b>	<b>100.0</b>	<b>1 332 328</b>	<b>75.5</b>	<b>100.0</b>
11. General promotion of knowledge NES (except Higher Education)	134 927	7.8		12 859	10.4		162 040	9.2	
12. General promotion of knowledge NES (Higher Education)	580 054	33.3		38 774	31.3		270 066	15.3	
Not itemized	—	—		—	—		—	—	
<b>TOTAL</b>	<b>1 740 136</b>	<b>100.0</b>		<b>124 033</b>	<b>100.0</b>		<b>1 764 434</b>	<b>100.0</b>	
(of which: developing countries)	(—)	(—)	(—)	(824)	(0.7)	(—)	(n.d./n.v.)		

**Central Government R & D Expenditure by Objective (continued)**  
**Condensed Table**

1969

Italy			Netherlands			Community			OBJECTIVE
10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10	
100 674	30.2	53.6	26 712	9.9	20.4	730 722	17.6	26.6	1. Nuclear R&D
16 622	5.0	8.9	10 472	3.9	8.0	253 279	6.1	9.2	2. Space
13 810	4.1	7.4	14 654	5.4	11.2	922 171	22.2	33.5	3. Defence
4 961	1.5	2.6	4 522	1.7	3.5	53 546	1.3	1.9	4. Earth and its atmosphere
9 443	2.8	5.0	11 402	4.2	8.7	95 102	2.3	3.5	5. Health
6 864	2.1	3.7	8 334	3.1	6.4	85 162	2.0	3.1	6. Human environment
12 163	3.6	6.5	25 455	9.4	19.5	164 891	4.0	6.0	7. Agricultural productivity
16 549	5.0	8.8	18 192	6.7	13.9	324 082	7.8	11.8	8. Industrial productivity
2 429	0.7	1.3	1 100	0.4	0.8	61 344	1.4	2.2	9. Computer science and automation
4 173	1.2	2.2	9 963	3.7	7.6	60 536	1.4	2.2	10. Social sciences
<b>187 688</b>	<b>56,2</b>	<b>100,0</b>	<b>130 806</b>	<b>48,4</b>	<b>100,0</b>	<b>2 750 835</b>	<b>66,1</b>	<b>100,0</b>	<b>Sub-total (1-10)</b>
38 002	11.4		14 195	5.2		360 383	8.7		11. General promotion of knowledge NES (except Higher Education)
107 974	32.4		125 525	46.4		1 043 502	25.1		12. General promotion of knowledge NES (Higher Education)
—	—		—	—		3 339	0.1		Not itemized
<b>333 664</b>	<b>100,0</b>		<b>270 526</b>	<b>100,0</b>		<b>4 158 059</b>	<b>100,0</b>		<b>TOTAL</b>
(—)	(—)	(—)	(1 793)	(0.7)	(1.4)				(of which: developing countries)

1970

Italy			Netherlands			Community			OBJECTIVE
10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10	10 <sup>3</sup> u.a.	% 1-12	% 1-10	
91 813	20.1	34.9	32 075	10.4	22.3	756 353	17.2	26.7	1. Nuclear R&D
19 779	4.3	7.5	8 939	2.9	6.2	272 852	6.2	9.6	2. Space
12 800	2.8	4.9	14 128	4.6	9.8	870 866	19.8	30.7	3. Defence
5 600	1.2	2.1	5 129	1.7	3.6	60 738	1.4	2.1	4. Earth and its atmosphere
10 400	2.3	4.0	11 873	3.9	8.3	104 214	2.4	3.7	5. Health
6 880	1.5	2.6	10 097	3.3	7.0	87 593	2.0	3.1	6. Human environment
12 480	2.7	4.7	28 770	9.4	20.0	163 421	3.7	5.8	7. Agricultural productivity
96 800	21.2	36.8	18 301	5.9	12.8	368 002	8.4	13.0	8. Industrial productivity
2 400	0.5	0.9	1 616	0.5	1.1	89 389	2.0	3.1	9. Computer science and automation
4 320	0.9	1.6	12 762	4.1	8.9	63 417	1.5	2.2	10. Social sciences
<b>263 272</b>	<b>57,5</b>	<b>100,0</b>	<b>143 690</b>	<b>46,7</b>	<b>100,0</b>	<b>2 836 845</b>	<b>64,6</b>	<b>100,0</b>	<b>Sub-total (1-10)</b>
73 600	16.1		15 054	4.9		398 480	9.1		11. General promotion of knowledge NES (except Higher Education)
120 800	26.4		147 343	47.9		1 157 037	26.3		12. General promotion of knowledge NES (Higher Education)
—	—		1 441	0.5		1 441	...		Not itemized
<b>457 672</b>	<b>100,0</b>		<b>307 528</b>	<b>100,0</b>		<b>4 393 803</b>	<b>100,0</b>		<b>TOTAL</b>
(—)	(—)	(—)	(2 543)	(0.8)	(1.8)				(of which: developing countries)

## Central Government R &amp; D Expenditure by Objective

Country: GERMANY  
(Federation and Lands) (\*)

(in national currency)

OBJECTIVE	1967		1968	
	DM 10 <sup>3</sup>	%	DM 10 <sup>3</sup>	%
<b>1. Nuclear Research and Development (a)</b>	<b>942 476</b>	<b>19,5</b>	<b>923 516</b>	<b>18,4</b>
1.0. R&D of a general nature	215 321	4,4	191 764	3,8
1.1. Energy R&D	661 090	13,7	678 080	13,5
1.9. Other research (of which: developing countries)	66 065	1,4	53 672	1,1
<b>2. Exploration and Exploitation of Space (a)</b>	<b>301 664</b>	<b>6,3</b>	<b>341 526</b>	<b>6,8</b>
2.0. R&D of a general nature (b)	94 476	2,0	101 019	2,0
2.1. R&D on launchers and satellites	206 543	4,3	239 447	4,8
2.1.1. Launching systems (c)	(91 800)	(1,9)	(102 600)	(2,0)
2.1.2. Scientific exploration (d)	(94 873)	(2,0)	(111 492)	(2,2)
2.1.3. Systems of application (e)	(6 000)	(0,1)	(10 000)	(...)
2.9. Other R&D (of which: developing countries)	645	...	1 060	...
<b>3. Defence (a)</b> (of which: developing countries)	<b>1 043 777</b>	<b>21,6</b>	<b>985 956</b>	<b>19,6</b>
<b>4. Exploration and Exploitation of the Earth and its Atmosphere</b>	<b>88 490</b>	<b>1,8</b>	<b>79 300</b>	<b>1,6</b>
4.0. R&D of a general nature	6 823	0,1	7 820	0,2
4.1. Soil and sub-stratum (f)	41 045	0,9	39 860	0,8
4.1.3. Prospecting for mines and petroleum	(4 315)	(0,1)	(4 631)	(...)
4.2. Seas and oceans (g)	39 403	0,8	30 078	0,6
4.3. Atmosphere	1 219	...	1 542	...
4.3.3. Meteorology	(1 219)	(...)	(1 542)	(...)
4.9. Other R&D (of which: developing countries)	—	—	—	—
<b>5. Protection and Promotion of Human Health</b>	<b>99 495</b>	<b>2,1</b>	<b>111 612</b>	<b>2,2</b>
5.0. R&D of a general nature	33 123	0,7	38 627	0,7
5.1. Medical research	36 946	0,8	44 158	0,9
5.2. R&D on alimentary hygiene and nutrition	11 242	0,2	10 143	0,2
5.3. R&D on noxious phenomena (h)	13 826	0,3	14 196	0,3
5.3.1. Water pollution	(2 543)	(0,1)	(2 758)	(0,1)
5.3.2. Air pollution	(3 028)	(0,1)	(3 028)	(0,1)
5.3.3. Action against noise	(578)	(...)	(1 352)	(...)
5.9. Other R&D (of which: developing countries)	4 358	0,1	4 488	0,1
<b>6. Planning of Human Environment</b>	<b>39 471</b>	<b>0,8</b>	<b>41 979</b>	<b>0,8</b>
6.0. R&D of a general nature (i)	15 011	0,3	15 717	0,3
6.1. Construction and planning of buildings	6 907	0,1	6 459	0,1
6.1.1. Residential	(685)	(...)	(735)	(...)
6.1.2. Non-residential	(643)	(...)	(1 105)	(...)
6.2. Civil engineering (j)	7 632	0,2	8 595	0,2
6.3. Transport systems	9 700	0,2	10 831	0,2
6.4. Systems of telecommunications	221	...	377	...
6.9. Other R&D (of which: developing countries)	—	—	—	—
<b>7. Promotion of Agricultural Productivity and Technology</b>	<b>109 047</b>	<b>2,3</b>	<b>108 388</b>	<b>2,1</b>
7.0. R&D of a general nature (k)	11 461	0,2	11 777	0,2
7.1. Animal products (agriculture and hunt)	23 138	0,5	21 103	0,4
7.1.3. Veterinary medicine	(5 372)	(0,1)	(4 910)	(0,1)
7.2. Vegetable products (including forests) and wines	62 933	1,3	64 978	1,3
7.3. Products of fishing and fish breeding	7 526	0,2	6 991	0,1
7.9. Other R&D (of which: developing countries)	3 989	0,1	3 539	0,1

(\*) Federation: according to data from the BMBW (Federal Ministry for Education and Science).  
Lands: estimates (partial) by the Federal Statistical Office.

(\*\*) Partly estimates.

## Central Government R &amp; D Expenditure by Objective

(in national currency)

Country: GERMANY  
(Federation and Lands) (\*)

1969		1970 (**)		OBJECTIVE
DM 10 <sup>3</sup>	%	DM 10 <sup>3</sup>	%	
<b>930 750</b>	<b>16,5</b>	<b>1 149 920</b>	<b>18,1</b>	<b>1. Nuclear Research and Development (a)</b>
218 285	3,9	258 596	4,1	1.0. R&D of a general nature
656 907	11,6	822 450	12,9	1.1. Energy R&D
55 558	1,0	68 874	1,1	1.9. Other research (of which: developing countries)
<b>361 619</b>	<b>6,4</b>	<b>430 583</b>	<b>6,7</b>	<b>2. Exploration and Exploitation of Space (a)</b>
126 988	2,3	155 324	2,4	2.0. R&D of a general nature (b)
233 501	4,1	273 494	4,3	2.1. R&D on launchers and satellites
(91 100)	(1,6)	(100 000)	(1,6)	2.1.1. Launching systems (c)
(111 546)	(2,0)	(118 994)	(1,9)	2.1.2. Scientific exploration (d)
(21 000)	(0,4)	(42 000)	(0,7)	2.1.3. Systems of application (e)
1 130	...	1 765	...	2.9. Other R&D (of which: developing countries)
<b>1 070 731</b>	<b>19,0</b>	<b>1 101 782</b>	<b>17,3</b>	<b>3. Defence (a)</b> (of which: developing countries)
<b>90 343</b>	<b>1,6</b>	<b>99 500</b>	<b>1,5</b>	<b>4. Exploration and Exploitation of the Earth and its Atmosphere</b>
6 346	0,1	6 663	0,1	4.0. R&D of a general nature
43 016	0,8	45 382	0,7	4.1. Soil and sub-stratum (f)
(5 250)	(0,1)	(5 670)	(0,1)	4.1.3. Prospecting for mines and petroleum
39 412	0,7	45 741	0,7	4.2. Seas and oceans (g)
1 569	...	1 714	...	4.3. Atmosphere
(1 569)	(...)	(1 714)	(...)	4.3.3. Meteorology
—	—	—	—	4.9. Other R&D (of which: developing countries)
<b>111 207</b>	<b>2,0</b>	<b>138 761</b>	<b>2,2</b>	<b>5. Protection and Promotion of Human Health</b>
39 085	0,7	45 287	0,7	5.0. R&D of a general nature
44 776	0,8	54 775	0,9	5.1. Medical research
9 380	0,2	14 015	0,2	5.2. R&D on alimentary hygiene and nutrition
13 159	0,2	19 672	0,3	5.3. R&D on noxious phenomena (h)
(2 657)	(0,1)	(3 008)	(0,1)	5.3.1. Water pollution
(3 028)	(0,1)	(3 512)	(0,1)	5.3.2. Air pollution
(1 318)	(...)	(1 544)	(...)	5.3.3. Action against noise
4 807	0,1	5 012	0,1	5.9. Other R&D (of which: developing countries)
<b>59 044</b>	<b>1,0</b>	<b>67 601</b>	<b>1,1</b>	<b>6. Planning of Human Environment</b>
20 630	0,4	21 681	0,4	6.0. R&D of a general nature (i)
9 888	0,2	10 547	0,2	6.1. Construction and planning of buildings
(1 400)	(...)	(1 487)	(...)	6.1.1. Residential
(1 608)	(...)	(1 737)	(...)	6.1.2. Non-residential
7 859	0,1	7 519	0,1	6.2. Civil engineering (j)
20 290	0,3	27 468	0,4	6.3. Transport systems
377	...	386	...	6.4. Systems of telecommunications
—	—	—	—	6.9. Other R&D (of which: developing countries)
<b>114 162</b>	<b>2,0</b>	<b>117 884</b>	<b>1,9</b>	<b>7. Promotion of Agricultural Productivity and Technology</b>
11 446	0,2	11 405	0,2	7.0. R&D of a general nature (k)
21 517	0,4	21 900	0,4	7.1. Animal products (agriculture and hunt)
(4 717)	(0,1)	(4 723)	(0,1)	7.1.3. Veterinary medicine
69 133	1,2	72 394	1,1	7.2. Vegetable products (including forests) and wines
8 550	0,2	8 669	0,1	7.3. Products of fishing and fish breeding
3 516	...	3 516	0,1	7.9. Other R&D (of which: developing countries)

(\*) Federation: according to data from the BMBW (Federal Ministry for Education and Science).  
Lands: estimates (partial) by the Federal Statistical Office.

(\*\*) Partly estimates.

## Central Government R &amp; D Expenditure by Objective (continued)

Country: GERMANY  
(Federation and Lands) (\*)

(in national currency)

	1967		1968	
	DM 10 <sup>3</sup>	%	DM 10 <sup>3</sup>	%
<b>8. Promotion of Industrial Productivity and Technology</b>	<b>194 377</b>	<b>4,0</b>	<b>193 259</b>	<b>3,8</b>
8.0. R&D of a general nature (l)	86 907	1,8	82 677	1,6
8.1. Products of the non-nuclear fuel industry	—	—	—	—
8.2. Products of other industries	106 770	2,2	107 882	2,1
8.2.1. Chemical	(—)	(—)	(—)	(—)
8.2.2. Metallurgy	(6 527)	(0,2)	(8 174)	(0,1)
8.2.3. Electronics (m)	(—)	(—)	(—)	(—)
8.2.4. Civil aeronautics	(49 908)	(1,0)	(48 990)	(1,0)
8.2.5. Other means of transport	(1 603)	(...)	(1 696)	(...)
8.2.9. Miscellaneous industries	(48 732)	(1,0)	(49 022)	(1,0)
8.9. Other R&D (of which: developing countries)	700	...	2 700	0,1
<b>9. Promotion of Computer Science and of Automation</b>	<b>67 781</b>	<b>1,4</b>	<b>73 708</b>	<b>1,5</b>
9.0. R&D of a general nature	4 430	0,1	4 225	0,1
9.1. R&D on hardware	47 500	1,0	47 000	1,0
9.2. R&D on software	15 200	0,3	21 912	0,4
9.9. Other R&D (of which: developing countries)	651	...	571	...
<b>10. Promotion of Research in the Social Sciences and Humanities</b>	<b>82 874</b>	<b>1,7</b>	<b>88 321</b>	<b>1,8</b>
10.0. R&D of a general nature	—	—	—	—
10.1. R&D on education, training and readaptation	11 038	0,2	12 420	0,3
10.1.1. In the field of computer science	(—)	(—)	(—)	(—)
10.1.2. In the field of industry	(—)	(—)	(—)	(—)
10.1.3. In the field of agriculture	(—)	(—)	(—)	(—)
10.2. R&D on business administration	3 436	0,1	3 293	0,1
10.9. Other R&D (n) (of which: developing countries)	68 400	1,4	72 608	1,4
<b>11. General Promotion of Knowledge NES (except Higher Education) (o)</b>	<b>325 440</b>	<b>6,7</b>	<b>355 813</b>	<b>7,1</b>
11.0. R&D of a general nature	53 621	1,1	67 125	1,4
11.1. R&D in the natural sciences	244 662	5,1	258 119	5,1
11.1.0. R&D of a general nature	(58 810)	(1,2)	(50 520)	(1,0)
11.1.1. Natural sciences	(107 274)	(2,2)	(126 071)	(2,5)
11.1.2. Engineering	(36 378)	(0,8)	(41 120)	(0,8)
11.1.3. Medical sciences	(19 658)	(0,4)	(22 071)	(0,4)
11.1.4. Agricultural sciences	(9 614)	(0,2)	(10 768)	(0,2)
11.1.9. Other fields	(12 928)	(0,3)	(7 569)	(0,2)
11.2. R&D in the social sciences (of which: developing countries)	27 157	0,5	30 569	0,6
<b>12. General Promotion of Knowledge NES (Higher Education) (p)</b>	<b>1 538 100</b>	<b>31,8</b>	<b>1 725 200</b>	<b>34,3</b>
12.0. R&D of a general nature	—	—	—	—
12.1. R&D in the natural sciences	1 419 900	29,4	1 593 000	31,7
12.1.0. R&D of a general nature	(—)	(—)	(—)	(—)
12.1.1. Natural sciences	(645 500)	(13,4)	(733 000)	(14,5)
12.1.2. Engineering	(233 900)	(4,8)	(265 700)	(5,3)
12.1.3. Medical sciences	(390 400)	(8,1)	(423 800)	(8,5)
12.1.4. Agricultural sciences	(150 100)	(3,1)	(170 500)	(3,4)
12.1.9. Other fields	(—)	(—)	(—)	(—)
12.2. R&D in the social sciences and humanities (of which: developing countries)	118 200	2,4	132 200	2,6
<i>Memorandum only: expenditure not itemized</i> (of which: developing countries)	—	—	—	—
<b>GRAND TOTAL</b> (of which: developing countries)	<b>4 832 992</b>	<b>100,0</b>	<b>5 028 578</b>	<b>100,0</b>

(\*) Federation: according to data from the BMBW (Federal Ministry for Education and Science).  
Lands: estimates (partial) by the Federal Statistical Office.

(\*\*) Partly estimates.

## Central Government R &amp; D Expenditure by Objective (continued)

Country: GERMANY  
(Federation and Lands) (\*)

(in national currency)

1969		1970 (**)		
DM 10 <sup>3</sup>	%	DM 10 <sup>3</sup>	%	
289 093	5,1	345 700	5,4	<b>8. Promotion of Industrial Productivity and Technology</b>
113 566	2,0	147 733	2,3	8.0. R&D of a general nature (l)
—	—	—	—	8.1. Products of the non-nuclear fuel industry
169 527	3,0	185 685	2,9	8.2. Products of other industries
(—)	(—)	(—)	(—)	8.2.1. Chemical
(6 692)	(0,1)	(7 831)	(0,1)	8.2.2. Metallurgy
(—)	(—)	(—)	(—)	8.2.3. Electronics (m)
(105 300)	(1,9)	(117 252)	(1,8)	8.2.4. Civil aeronautics
(3 550)	(0,1)	(3 669)	(0,1)	8.2.5. Other means of transport
(53 985)	(0,9)	(56 933)	(0,9)	8.2.9. Miscellaneous industries
6 000	0,1	12 282	0,2	8.9. Other R&D (of which: developing countries)
117 186	2,1	200 056	3,1	<b>9. Promotion of Computer Science and/of Automation</b>
16 173	0,3	26 855	0,4	9.0. R&D of a general nature
64 000	1,1	101 560	1,6	9.1. R&D on hardware
36 442	0,7	71 070	1,1	9.2. R&D on software
571	...	571	...	9.9. Other R&D (of which: developing countries)
93 672	1,7	100 279	1,6	<b>10. Promotion of Research in the Social Sciences and Humanities</b>
10 506	0,2	11 844	0,2	10.0. R&D of a general nature
(—)	(—)	(—)	(—)	10.1. R&D on education, training and readaptation
(—)	(—)	(—)	(—)	10.1.1. In the field of computer science
(—)	(—)	(—)	(—)	10.1.2. In the field of industry
(—)	(—)	(—)	(—)	10.1.3. In the field of agriculture
3 560	0,1	4 094	0,1	10.2. R&D on business administration
79 606	1,4	84 341	1,3	10.9. Other R&D (n) (of which: developing countries)
466 425	8,3	493 833	7,8	<b>11. General Promotion of Knowledge NES (except Higher Education) (o)</b>
72 514	1,3	84 584	1,3	11.0. R&D of a general nature
352 999	6,3	368 598	5,8	11.1. R&D in the natural sciences
(80 855)	(1,4)	(85 763)	(1,3)	11.1.0. R&D of a general nature
(147 892)	(2,6)	(155 680)	(2,5)	11.1.1. Natural sciences
(54 487)	(1,0)	(53 653)	(0,8)	11.1.2. Engineering
(29 474)	(0,5)	(29 028)	(0,5)	11.1.3. Medical sciences
(14 409)	(0,3)	(14 140)	(0,2)	11.1.4. Agricultural sciences
(25 882)	(0,5)	(30 334)	(0,5)	11.1.9. Other fields
40 912	0,7	40 651	0,7	11.2. R&D in the social sciences (of which: developing countries)
1 930 400	34,3	2 123 000	33,3	<b>12. General Promotion of Knowledge NES (Higher Education) (p)</b>
1 782 100	31,7	1 960 000	30,8	12.0. R&D of a general nature
(—)	(—)	(—)	(—)	12.1. R&D in the natural sciences
(835 700)	(14,8)	(919 000)	(14,4)	12.1.0. R&D of a general nature
(302 900)	(5,4)	(333 000)	(5,2)	12.1.1. Natural sciences
(449 200)	(8,0)	(494 000)	(7,8)	12.1.2. Engineering
(194 300)	(3,4)	(214 000)	(3,5)	12.1.3. Medical sciences
(—)	(—)	(—)	(—)	12.1.4. Agricultural sciences
148 300	2,6	163 000	2,5	12.1.9. Other fields
—	—	—	—	12.2. R&D in the social sciences and humanities (of which: developing countries)
—	—	—	—	<i>Memorandum only: expenditure not itemized</i> (of which: developing countries)
5 634 632	100,0	6 368 899	100,0	<b>GRAND TOTAL</b> (of which: developing countries)

(\*) Federation: according to data from the BMBW (Federal Ministry for Education and Science).  
Lands: estimates (partial) by the Federal Statistical Office.

(\*\*) Partly estimates.

## Central Government R &amp; D Expenditure by Objective

Country: BELGIUM

(in national currency)

OBJECTIVE	1967		1968	
	B.Fr. 10 <sup>3</sup>	%	B.Fr. 10 <sup>3</sup>	%
<b>1. Nuclear Research and Development (a)</b>	<b>999 859</b>	<b>22,6</b>	<b>1 131 869</b>	<b>24,1</b>
1.0. R&D of a general nature	240 192	5,4	295 398	6,3
1.1. Energy R&D	659 797	14,9	771 164	16,4
1.9. Other research	99 870	2,3	65 307	1,4
(of which: developing countries)	(—)	(—)	(—)	(—)
<b>2. Exploration and Exploitation of Space (a)</b>	<b>349 777</b>	<b>7,9</b>	<b>338 227</b>	<b>7,2</b>
2.0. R&D of a general nature (b)	41 477	0,9	53 227	1,1
2.1. R&D on launchers and satellites	308 300	7,0	285 000	6,1
2.1.1. Launching systems (c)	(198 853)	(4,5)	(183 825)	(3,9)
2.1.2. Scientific exploration (d)	(109 447)	(2,5)	(101 175)	(2,2)
2.1.3. Systems of application (e)	(—)	(—)	(—)	(—)
2.9. Other R&D	(—)	(—)	(—)	(—)
(of which: developing countries)	(—)	(—)	(—)	(—)
<b>3. Defence (a)</b>	<b>55 029</b>	<b>1,2</b>	<b>56 361</b>	<b>1,2</b>
(of which: developing countries)	(—)	(—)	(—)	(—)
<b>4. Exploration and Exploitation of the Earth and its Atmosphere</b>	<b>119 430</b>	<b>2,7</b>	<b>117 692</b>	<b>2,5</b>
4.0. R&D of a general nature	4 540	0,1	2 545	0,1
4.1. Soil and sub-stratum (f)	80 705	1,8	74 756	1,5
4.1.3. Prospecting for mines and petroleum	(2 900)	(0,1)	(3 121)	(0,1)
4.2. Seas and oceans (g)	3 902	0,1	4 324	0,1
4.3. Atmosphere	30 283	0,7	36 067	0,8
4.3.3. Meteorology	(29 808)	(0,7)	(35 571)	(0,8)
4.9. Other R&D	(—)	(—)	(—)	(—)
(of which: developing countries)	(—)	(—)	(—)	(—)
<b>5. Protection and Promotion of Human Health</b>	<b>149 540</b>	<b>3,4</b>	<b>159 112</b>	<b>3,4</b>
5.0. R&D of a general nature	51 373	1,2	65 850	1,4
5.1. Medical research	69 643	1,6	56 612	1,2
5.2. R&D on alimentary hygiene and nutrition	4 153	0,1	4 050	0,1
5.3. R&D on noxious phenomena (h)	13 387	0,3	19 368	0,4
5.3.1. Water pollution	(1 125)	(—)	(4 797)	(0,1)
5.3.2. Air pollution	(5 190)	(0,1)	(5 847)	(0,1)
5.3.3. Action against noise	(—)	(—)	(—)	(—)
5.9. Other R&D	10 984	0,2	13 232	0,3
(of which: developing countries)	(—)	(—)	(—)	(—)
<b>6. Planning of Human Environment</b>	<b>100 093</b>	<b>2,3</b>	<b>76 485</b>	<b>1,6</b>
6.0. R&D of a general nature (i)	38 550	0,9	1 128	—
6.1. Construction and planning of buildings	16 516	0,4	14 258	0,3
6.1.1. Residential	(—)	(—)	(—)	(—)
6.1.2. Non-residential	(16 516)	(0,4)	(14 258)	(0,3)
6.2. Civil engineering (j)	24 445	0,5	38 903	0,8
6.3. Transport systems	11 635	0,3	12 501	0,3
6.4. Systems of telecommunications	(—)	(—)	(—)	(—)
6.9. Other R&D	8 947	0,2	9 695	0,2
(of which: developing countries)	(—)	(—)	(—)	(—)
<b>7. Promotion of Agricultural Productivity and Technology</b>	<b>224 880</b>	<b>5,0</b>	<b>293 963</b>	<b>6,2</b>
7.0. R&D of a general nature (k)	37 010	0,8	80 279	1,7
7.1. Animal products (agriculture and hunt)	41 174	0,9	75 715	1,6
7.1.3. Veterinary medicine	(14 210)	(0,3)	(8 550)	(0,2)
7.2. Vegetable products (including forests) and wines	146 696	3,3	134 129	2,8
7.3. Products of fishing and fish breeding	(—)	(—)	3 840	0,1
7.9. Other R&D	(—)	(—)	(—)	(—)
(of which: developing countries)	(—)	(—)	(—)	(—)



## Central Government R &amp; D Expenditure by Objective

(in national currency)

Country: BELGIUM

1969		1970		OBJECTIVE
B.Fr. 10 <sup>3</sup>	%	B.Fr. 10 <sup>3</sup>	%	
<b>1 225 564</b>	<b>23,1</b>	<b>1 510 398</b>	<b>24,3</b>	<b>1. Nuclear Research and Development (a)</b>
310 566	5.8	402 049	6.5	1.0. R&D of a general nature
863 892	16.3	1 032 134	16.6	1.1. Energy R&D
51 106	1.0	76 215	1.2	1.9. Other research
(—)	(—)	(—)	(—)	(of which: developing countries)
<b>357 512</b>	<b>6,7</b>	<b>382 940</b>	<b>6,2</b>	<b>2. Exploration and Exploitation of Space (a)</b>
54 762	1.0	54 840	0.9	2.0. R&D of a general nature (b)
302 750	5.7	328 100	5.3	2.1. R&D on launchers and satellites
(196 250)	(3.7)	(212 725)	(3.4)	2.1.1. Launching systems (c)
(106 500)	(2.0)	(115 375)	(1.9)	2.1.2. Scientific exploration (d)
(—)	(—)	(—)	(—)	2.1.3. Systems of application (e)
(—)	(—)	(—)	(—)	2.9. Other R&D
(—)	(—)	(—)	(—)	(of which: developing countries)
<b>125 733</b>	<b>2,4</b>	<b>138 614</b>	<b>2,2</b>	<b>3. Defence (a)</b>
(—)	(—)	(—)	(—)	(of which: developing countries)
<b>130 533</b>	<b>2,5</b>	<b>150 883</b>	<b>2,4</b>	<b>4. Exploration and Exploitation of the Earth and its Atmosphere</b>
5 588	0.1	3 835	0.1	4.0. R&D of a general nature
80 773	1.5	94 982	1.5	4.1. Soil and sub-stratum (f)
(3 742)	(0.1)	(4 378)	(0.1)	4.1.3. Prospecting for mines and petroleum
4 500	0.1	9 312	0.1	4.2. Seas and oceans (g)
39 672	0.8	42 754	0.7	4.3. Atmosphere
(39 086)	(0.7)	(42 093)	(0.7)	4.3.3. Meteorology
(—)	(—)	(—)	(—)	4.9. Other R&D
(—)	(—)	(—)	(—)	(of which: developing countries)
<b>184 688</b>	<b>3,5</b>	<b>220 914</b>	<b>3,5</b>	<b>5. Protection and Promotion of Human Health</b>
77 614	1.5	86 137	1.4	5.0. R&D of a general nature
69 240	1.3	80 630	1.3	5.1. Medical research
4 640	0.1	4 882	0.1	5.2. R&D on alimentary hygiene and nutrition
18 605	0.3	27 871	0.4	5.3. R&D on noxious phenomena (h)
(1 350)	(—)	(1 950)	(—)	5.3.1. Water pollution
(6 329)	(0.1)	(7 952)	(0.1)	5.3.2. Air pollution
(860)	(—)	(1 044)	(—)	5.3.3. Action against noise
14 589	0.3	21 394	0.3	5.9. Other R&D
(—)	(—)	(—)	(—)	(of which: developing countries)
<b>95 771</b>	<b>1,8</b>	<b>86 717</b>	<b>1,4</b>	<b>6. Planning of Human Environment</b>
1 238	—	1 365	—	6.0. R&D of a general nature (i)
20 495	0.4	24 565	0.4	6.1. Construction and planning of buildings
(1 650)	(—)	(1 860)	(—)	6.1.1. Residential
(18 845)	(0.4)	(22 705)	(0.4)	6.1.2. Non-residential
26 728	0.5	9 591	0.2	6.2. Civil engineering (j)
18 962	0.4	18 179	0.3	6.3. Transport systems
18 480	0.3	21 242	0.3	6.4. Systems of telecommunications
9 868	0.2	11 775	0.2	6.9. Other R&D
(—)	(—)	(—)	(—)	(of which: developing countries)
<b>300 905</b>	<b>5,6</b>	<b>357 101</b>	<b>5,8</b>	<b>7. Promotion of Agricultural Productivity and Technology</b>
43 336	0.8	50 797	0.8	7.0. R&D of a general nature (k)
64 035	1.2	75 721	1.2	7.1. Animal products (agriculture and hunt)
(21 554)	(0.4)	(24 816)	(0.4)	7.1.3. Veterinary medicine
191 814	3.6	228 495	3.7	7.2. Vegetable products (including forests) and wines
1 720	—	2 088	0.1	7.3. Products of fishing and fish breeding
(—)	(—)	(—)	(—)	7.9. Other R&D
(—)	(—)	(—)	(—)	(of which: developing countries)

## Central Government R &amp; D Expenditure by Objective (continued)

Country: BELGIUM

(in national currency)

OBJECTIVE	1967		1968	
	B.Fr. 10 <sup>3</sup>	%	B.Fr. 10 <sup>3</sup>	%
<b>8. Promotion of Industrial Productivity and Technology</b>	<b>579 632</b>	<b>13,1</b>	<b>483 943</b>	<b>10,3</b>
8.0. R&D of a general nature (l)	18 784	0.4	35 458	0.8
8.1. Products of the non-nuclear fuel industry	—	—	—	—
8.2. Products of other industries	560 848	2.7	448 485	9,5
8.2.1. Chemical	(94 949)	(2,2)	(93 931)	(2,0)
8.2.2. Metallurgy	(111 954)	(2,5)	(96 769)	(2,0)
8.2.3. Electronics (m)	(47 884)	(1,1)	(37 680)	(0,8)
8.2.4. Civil aeronautics	(10 175)	(0,2)	(3 329)	(0,1)
8.2.5. Other means of transport	(47 302)	(1,1)	(38 590)	(0,8)
8.2.9. Miscellaneous industries	(248 584)	(5,6)	(178 186)	(3,8)
8.9. Other R&D (of which: developing countries)	(—)	(—)	(—)	(—)
<b>9. Promotion of Computer Science and of Automation</b>	—	—	<b>12 000</b>	<b>0,2</b>
9.0. R&D of a general nature	—	—	12 000	0.2
9.1. R&D on hardware	—	—	—	—
9.2. R&D on software	—	—	—	—
9.9. Other R&D (of which: developing countries)	(—)	(—)	(—)	(—)
<b>10. Promotion of Research in the Social Sciences and Humanities</b>	<b>36 422</b>	<b>0,8</b>	<b>41 756</b>	<b>0,9</b>
10.0. R&D of a general nature	—	—	—	—
10.1. R&D on education, training and readaptation	—	—	145	—
10.1.1. In the field of computer science	(—)	(—)	(—)	(—)
10.1.2. In the field of industry	(—)	(—)	(—)	(—)
10.1.3. In the field of agriculture	(—)	(—)	(—)	(—)
10.2. R&D on business administration	15 716	0.3	15 794	0.3
10.9. Other R&D (n) (of which: developing countries)	20 706	0,5	25 817	0,6
(of which: developing countries)	(—)	(—)	(—)	(—)
<b>11. General Promotion of Knowledge NES (except Higher Education) (o)</b>	<b>457 644</b>	<b>10,3</b>	<b>517 620</b>	<b>11,0</b>
11.0. R&D of a general nature	—	—	—	—
11.1. R&D in the natural sciences	293 366	6,6	294 533	6,3
11.1.0. R&D of a general nature	(—)	(—)	(—)	(—)
11.1.1. Natural sciences	(218 693)	(5,0)	(252 473)	(5,4)
11.1.2. Engineering	(9 757)	(0,2)	(10 555)	(0,2)
11.1.3. Medical sciences	(63 999)	(1,4)	(30 552)	(0,7)
11.1.4. Agricultural sciences	(21)	(—)	(31)	(—)
11.1.9. Other fields	(896)	(—)	(922)	(—)
11.2. R&D in the social sciences (of which: developing countries)	164 278	3,7	223 087	4,7
(of which: developing countries)	(14 654)	(0,3)	(15 937)	(0,3)
<b>12. General Promotion of Knowledge NES (Higher Education) (p)</b>	<b>1 359 737</b>	<b>30,7</b>	<b>1 474 942</b>	<b>31,4</b>
12.0. R&D of a general nature	—	—	—	—
12.1. R&D in the natural sciences	1 113 757	25,1	1 207 977	25,7
12.1.0. R&D of a general nature	(—)	(—)	(—)	(—)
12.1.1. Natural sciences	(633 308)	(14,3)	(687 323)	(14,6)
12.1.2. Engineering	(128 145)	(2,9)	(138 644)	(3,0)
12.1.3. Medical sciences	(334 237)	(7,5)	(362 836)	(7,7)
12.1.4. Agricultural sciences	(18 067)	(0,4)	(19 174)	(0,4)
12.1.9. Other fields	(—)	(—)	(—)	(—)
12.2. R&D in the social sciences and humanities (of which: developing countries)	245 980	5,6	266 965	5,7
(of which: developing countries)	(15 686)	(0,4)	(17 198)	(0,4)
<i>Memorandum only: expenditure not itemized</i> (of which: developing countries)	(—)	(—)	(—)	(—)
<b>GRAND TOTAL</b> (of which: developing countries)	<b>4 432 043</b> (30 340)	<b>100,0</b> (0,7)	<b>4 703 970</b> (33 135)	<b>100,0</b> (0,7)

## Central Government R &amp; D Expenditure by Objective (continued)

(in national currency)

Country: BELGIUM

1969		1970		OBJECTIVE
B.Fr. 10 <sup>3</sup>	%	B.Fr. 10 <sup>3</sup>	%	
<b>570 406</b>	<b>10,7</b>	<b>720 625</b>	<b>11,6</b>	<b>8. Promotion of Industrial Productivity and Technology</b>
9 730	0,2	11 192	0,2	8.0. R&D of a general nature (l)
21 070	0,4	25 578	0,4	8.1. Products of the non-nuclear fuel industry
<b>539 606</b>	<b>10,1</b>	<b>683 855</b>	<b>11,0</b>	8.2. Products of other industries
(118 612)	(2,2)	(143 056)	(2,3)	8.2.1. Chemical
(89 687)	(1,7)	(107 167)	(1,7)	8.2.2. Metallurgy
(15 333)	(0,3)	(17 902)	(0,3)	8.2.3. Electronics (m)
(2 347)	(—)	(2 821)	(—)	8.2.4. Civil aeronautics
(4 950)	(0,1)	(5 580)	(0,1)	8.2.5. Other means of transport
(308 677)	(5,8)	(407 329)	(6,6)	8.2.9. Miscellaneous industries
—	—	—	—	8.9. Other R&D
(—)	(—)	(—)	(—)	(of which: developing countries)
<b>4 300</b>	<b>0,1</b>	<b>5 220</b>	<b>0,1</b>	<b>9. Promotion of Computer Science and of Automation</b>
4 300	0,1	5 220	0,1	9.0. R&D of a general nature
—	—	—	—	9.1. R&D on hardware
—	—	—	—	9.2. R&D on software
(—)	(—)	(—)	(—)	9.9. Other R&D
(—)	(—)	(—)	(—)	(of which: developing countries)
<b>42 770</b>	<b>0,8</b>	<b>46 567</b>	<b>0,8</b>	<b>10. Promotion of Research in the Social Sciences and Humanities</b>
—	—	—	—	10.0. R&D of a general nature
145	—	145	—	10.1. R&D on education, training and readaptation
(—)	(—)	(—)	(—)	10.1.1. In the field of computer science
(—)	(—)	(—)	(—)	10.1.2. In the field of industry
(—)	(—)	(—)	(—)	10.1.3. In the field of agriculture
15 904	0,3	16 031	0,3	10.2. R&D on business administration
26 721	0,5	30 391	0,5	10.9. Other R&D (n)
(—)	(—)	(—)	(—)	(of which: developing countries)
<b>571 058</b>	<b>10,8</b>	<b>642 963</b>	<b>10,4</b>	<b>11. General Promotion of Knowledge NES (except Higher Education) (o)</b>
—	—	—	—	11.0. R&D of a general nature
326 503	6,2	366 223	5,9	11.1. R&D in the natural sciences
(—)	(—)	(—)	(—)	11.1.0. R&D of a general nature
(279 455)	(5,3)	(313 489)	(5,1)	11.1.1. Natural sciences
(11 721)	(0,2)	(13 062)	(0,2)	11.1.2. Engineering
(34 320)	(0,7)	(38 600)	(0,6)	11.1.3. Medical sciences
(34)	(—)	(37)	(—)	11.1.4. Agricultural sciences
(973)	(—)	(1 035)	(—)	11.1.9. Other fields
244 555	4,6	276 740	4,5	11.2. R&D in the social sciences
(17 791)	(0,3)	(18 920)	(0,3)	(of which: developing countries)
<b>1 701 933</b>	<b>32,0</b>	<b>1 938 712</b>	<b>31,3</b>	<b>12. General Promotion of Knowledge NES (Higher Education) (p)</b>
—	—	—	—	12.0. R&D of a general nature
1 393 884	26,2	1 587 805	25,6	12.1. R&D in the natural sciences
(—)	(—)	(—)	(—)	12.1.0. R&D of a general nature
(793 101)	(14,9)	(903 440)	(14,6)	12.1.1. Natural sciences
(159 982)	(3,0)	(182 239)	(2,9)	12.1.2. Engineering
(418 676)	(7,9)	(476 923)	(7,7)	12.1.3. Medical sciences
(22 125)	(0,4)	(25 203)	(0,4)	12.1.4. Agricultural sciences
(—)	(—)	(—)	(—)	12.1.9. Other fields
308 049	5,8	350 907	5,7	12.2. R&D in the social sciences and humanities
(19 618)	(0,4)	(22 282)	(0,4)	(of which: developing countries)
—	—	—	—	<i>Memorandum only: expenditure not itemized</i>
(—)	(—)	(—)	(—)	(of which: developing countries)
<b>5 311 173</b>	<b>100,0</b>	<b>6 201 654</b>	<b>100,0</b>	<b>GRAND TOTAL</b>
(37 409)	(0,7)	(41 202)	(0,7)	(of which: developing countries)

## Central Government R &amp; D Expenditure by Objective

Country: FRANCE

(in national currency)

OBJECTIVE	1967		1968	
	F.Fr. 10 <sup>6</sup>	%	F.Fr. 10 <sup>6</sup>	%
<b>1. Nuclear Research and Development (a)</b>	<b>1 793,9</b>	<b>20,3</b>	<b>1 614,2</b>	<b>16,7</b>
1.0. R&D of a general nature	360,0	4,1	370,0	3,8
1.1. Energy R&D	1 368,9	15,5	1 184,2	12,3
1.9. Other research	65,0	0,7	60,0	0,6
(of which: developing countries)	(—)	(—)	(—)	(—)
<b>2. Exploration and Exploitation of Space (a)</b>	<b>527,1</b>	<b>6,0</b>	<b>687,1</b>	<b>7,1</b>
2.0. R&D of a general nature (b)	28,1	0,3	40,0	0,4
2.1. R&D on launchers and satellites	462,3	5,3	597,1	6,2
2.1.1. Launching systems (c)	(152,8)	(1,8)	(200,0)	(2,1)
2.1.2. Scientific exploration (d)	(265,3)	(3,0)	(340,0)	(3,5)
2.1.3. Systems of application (e)	(44,2)	(0,5)	(57,1)	(0,6)
2.9. Other R&D	36,7	0,4	50,0	0,5
(of which: developing countries)	(—)	(—)	(—)	(—)
<b>3. Defence (a)</b>	<b>2 985,2</b>	<b>33,8</b>	<b>3 070,0</b>	<b>31,8</b>
(of which: developing countries)	(—)	(—)	(—)	(—)
<b>4. Exploration and Exploitation of the Earth and its Atmosphere</b>	<b>58,6</b>	<b>0,7</b>	<b>81,6</b>	<b>0,8</b>
4.0. R&D of a general nature	—	—	—	—
4.1. Soil and sub-stratum (f)	36,2	0,4	38,5	0,4
4.1.3. Prospecting for mines and petroleum	(—)	(—)	(—)	(—)
4.2. Seas and oceans (g)	3,5	0,1	18,3	0,2
4.3. Atmosphere	18,9	0,2	24,8	0,2
4.3.3. Meteorology	(9,7)	(0,1)	(12,0)	(0,1)
4.9. Other R&D	—	—	—	—
(of which: developing countries)	(2,1)	(...)	(2,3)	(...)
<b>5. Protection and Promotion of Human Health</b>	<b>156,2</b>	<b>1,8</b>	<b>209,7</b>	<b>2,2</b>
5.0. R&D of a general nature	—	—	—	—
5.1. Medical research	151,4	1,7	202,7	2,1
5.2. R&D on alimentary hygiene and nutrition	—	—	—	—
5.3. R&D on noxious phenomena (h)	1,9	...	3,0	...
5.3.1. Water pollution	(1,0)	(...)	(—)	(—)
5.3.2. Air pollution	(—)	(—)	(—)	(—)
5.3.3. Action against noise	(—)	(—)	(—)	(—)
5.9. Other R&D	2,9	0,1	4,0	0,1
(of which: developing countries)	(—)	(—)	(—)	(—)
<b>6. Planning of Human Environment</b>	<b>221,0</b>	<b>2,5</b>	<b>259,9</b>	<b>2,7</b>
6.0. R&D of a general nature (i)	20,0	0,2	22,0	0,2
6.1. Construction and planning of buildings	35,9	0,4	36,2	0,4
6.1.1. Residential	(13,4)	(0,2)	(20,0)	(0,2)
6.1.2. Non-residential	(7,6)	(0,1)	(4,7)	(0,1)
6.2. Civil engineering (j)	57,6	0,6	54,8	0,5
6.3. Transport systems	16,4	0,2	17,2	0,2
6.4. Systems of telecommunications	87,1	1,0	124,1	1,3
6.9. Other R&D	4,0	0,1	5,6	0,1
(of which: developing countries)	(—)	(—)	(—)	(—)
<b>7. Promotion of Agricultural Productivity and Technology</b>	<b>382,9</b>	<b>4,3</b>	<b>444,2</b>	<b>4,6</b>
7.0. R&D of a general nature (k)	35,0	0,4	45,0	0,5
7.1. Animal products (agriculture and hunt)	180,0	2,0	205,1	2,1
7.1.3. Veterinary medicine	(14,4)	(0,2)	(16,4)	(0,2)
7.2. Vegetable products (including forests) and wines	155,3	1,8	177,0	1,8
7.3. Products of fishing and fish breeding	12,6	0,1	17,1	0,2
7.9. Other R&D	—	—	—	—
(of which: developing countries)	(89,3)	(1,0)	(100,0)	(1,1)

## Central Government R &amp; D Expenditure by Objective

(in national currency)

Country: FRANCE

1969		1970		OBJECTIVE
F.Fr. 10 <sup>6</sup>	%	F.Fr. 10 <sup>6</sup>	%	
1 767,0	17,0	1 600	16,3	1. Nuclear Research and Development (a) 1.0. R&D of a general nature 1.1. Energy R&D 1.9. Other research (of which: developing countries)
656,2	6,3	660	6,7	2. Exploration and Exploitation of Space (a) 2.0. R&D of a general nature (b) 2.1. R&D on launchers and satellites 2.1.1. Launching systems (c) 2.1.2. Scientific exploration (d) 2.1.3. Systems of application (e) 2.9. Other R&D (of which: developing countries)
3 200,0	30,8	3 000	30,6	3. Defence (a) (of which: developing countries)
95,2	0,9	110	1,1	4. Exploration and Exploitation of the Earth and its Atmosphere 4.0. R&D of a general nature 4.1. Soil and sub-stratum (f) 4.1.3. Prospecting for mines and petroleum 4.2. Seas and oceans (g) 4.3. Atmosphere 4.3.3. Meteorology 4.9. Other R&D (of which: developing countries)
218,4	2,1	220	2,2	5. Protection and Promotion of Human Health 5.0. R&D of a general nature 5.1. Medical research 5.2. R&D on alimentary hygiene and nutrition 5.3. R&D on noxious phenomena (h) 5.3.1. Water pollution 5.3.2. Air pollution 5.3.3. Action against noise 5.9. Other R&D (of which: developing countries)
274,4	2,6	280	2,9	6. Planning of Human Environment 6.0. R&D of a general nature (i) 6.1. Construction and planning of buildings 6.1.1. Residential 6.1.2. Non-residential 6.2. Civil engineering (j) 6.3. Transport systems 6.4. Systems of telecommunications 6.9. Other R&D (of which: developing countries)
477,1	4,6	460	4,7	7. Promotion of Agricultural Productivity and Technology 7.0. R&D of a general nature (k) 7.1. Animal products (agriculture and hunt) 7.1.3. Veterinary medicine 7.2. Vegetable products (including forests) and wines 7.3. Products of fishing and fish breeding 7.9. Other R&D (of which: developing countries)

## Central Government R &amp; D Expenditure by Objective (continued)

Country: FRANCE

(in national currency)

OBJECTIVE	1967		1968	
	F. Fr. 10 <sup>6</sup>	%	F. Fr. 10 <sup>6</sup>	%
<b>8. Promotion of Industrial Productivity and Technology</b>	<b>869,3</b>	<b>9,8</b>	<b>998,7</b>	<b>10,3</b>
8.0. R&D of a general nature (l)	—	—	—	—
8.1. Products of the non-nuclear fuel industry	—	—	—	—
8.2. Products of other industries	829,8	9,4	948,7	9,8
8.2.1. Chemical	(11,6)	(0,1)	(16,8)	(0,2)
8.2.2. Metallurgy	(10,6)	(0,1)	(10,6)	(0,1)
8.2.3. Electronics (m)	(28,7)	(0,3)	(31,9)	(0,3)
8.2.4. Civil aeronautics	(643,8)	(7,3)	(693,0)	(7,2)
8.2.5. Other means of transport	(5,2)	(0,1)	(5,5)	(...)
8.2.9. Miscellaneous industries	(129,9)	(1,5)	(190,9)	(2,0)
8.9. Other R&D (of which: developing countries)	39,5 (—)	0,4 (—)	50,0 (—)	0,5 (—)
<b>9. Promotion of Computer Science and of Automation</b>	<b>56,5</b>	<b>0,6</b>	<b>142,0</b>	<b>1,5</b>
9.0. R&D of a general nature	—	—	—	—
9.1. R&D on hardware	48,4	0,5	107,8	1,1
9.2. R&D on software	8,1	0,1	34,2	0,4
9.9. Other R&D (of which: developing countries)	— (—)	— (—)	— (—)	— (—)
<b>10. Promotion of Research in the Social Sciences and Humanities</b>	<b>82,0</b>	<b>0,9</b>	<b>98,9</b>	<b>1,0</b>
10.0. R&D of a general nature	36,8	0,4	43,1	0,4
10.1. R&D on education, training and readaptation	23,7	0,3	30,8	0,3
10.1.1. In the field of computer science	(—)	(—)	(—)	(—)
10.1.2. In the field of industry	(—)	(—)	(—)	(—)
10.1.3. In the field of agriculture	(14,5)	(0,2)	(—)	(—)
10.2. R&D on business administration	—	—	—	—
10.9. Other R&D (n) (of which: developing countries)	21,5 (8,2)	0,2 (0,1)	25,0 (9,0)	0,3 (0,1)
<b>11. General Promotion of Knowledge NES (except Higher Education) (o)</b>	<b>684,9</b>	<b>7,8</b>	<b>815,1</b>	<b>8,4</b>
11.0. R&D of a general nature	—	—	—	—
11.1. R&D in the natural sciences	610,7	6,9	725,9	7,5
11.1.0. R&D of a general nature	(—)	(—)	(—)	(—)
11.1.1. Natural sciences	(563,6)	(6,4)	(671,2)	(7,0)
11.1.2. Engineering	(13,2)	(0,1)	(13,5)	(0,1)
11.1.3. Medical sciences	(33,9)	(0,4)	(39,3)	(0,4)
11.1.4. Agricultural sciences	(—)	(—)	(—)	(—)
11.1.9. Other fields	(—)	(—)	(1,9)	(...)
11.2. R&D in the social sciences (of which: developing countries)	74,2 (—)	0,9 (—)	89,2 (—)	0,9 (—)
<b>12. General Promotion of Knowledge NES (Higher Education) (p)</b>	<b>998,1</b>	<b>11,3</b>	<b>1 234,3</b>	<b>12,8</b>
12.0. R&D of a general nature	—	—	—	—
12.1. R&D in the natural sciences	881,8	10,0	1 093,5	11,3
12.1.0. R&D of a general nature	(—)	(—)	(—)	(—)
12.1.1. Natural sciences	(592,6)	(6,7)	(737,8)	(7,7)
12.1.2. Engineering	(1,7)	(...)	(2,1)	(...)
12.1.3. Medical sciences	(174,8)	(2,0)	(215,3)	(2,2)
12.1.4. Agricultural sciences	(—)	(—)	(—)	(—)
12.1.9. Other fields	(112,7)	(1,3)	(138,3)	(1,4)
12.2. R&D in the social sciences and humanities (of which: developing countries)	116,3 (20,0)	1,3 (0,3)	140,8 (20,0)	1,5 (0,2)
<i>Memorandum only: expenditure not itemized</i> (of which: developing countries)	20,6 (1,4)	0,2 (...)	14,0 (1,5)	0,1 (...)
<b>GRAND TOTAL</b> (of which: developing countries)	<b>8 836,3</b> (121,0)	<b>100,0</b> (1,4)	<b>9 669,7</b> (132,8)	<b>100,0</b> (1,4)

## Central Government R &amp; D Expenditure by Objective (continued)

(in national currency)

Country: FRANCE

1969		1970		OBJECTIVE
F.Fr. 10 <sup>6</sup>	%	F.Fr. 10 <sup>6</sup>	%	
1 057,3	10,1	800	8,2	<b>8. Promotion of Industrial Productivity and Technology</b> 8.0. R&D of a general nature (l) 8.1. Products of the non-nuclear fuel industry 8.2. Products of other industries 8.2.1. Chemical 8.2.2. Metallurgy 8.2.3. Electronics (m) 8.2.4. Civil aeronautics 8.2.5. Other means of transport 8.2.9. Miscellaneous industries 8.9. Other R&D (of which: developing countries)
144,0	1,4	170	1,8	<b>9. Promotion of Computer Science and of Automation</b> 9.0. R&D of a general nature 9.1. R&D on hardware 9.2. R&D on software 9.9. Other R&D (of which: developing countries)
112,0	1,1	100	1,0	<b>10. Promotion of Research in the Social Sciences and Humanities</b> 10.0. R&D of a general nature 10.1. R&D on education, training and readaptation 10.1.1. In the field of computer science 10.1.2. In the field of industry 10.1.3. In the field of agriculture 10.2. R&D on business administration 10.9. Other R&D (n) (of which: developing countries)
920,2	8,8	900	9,2	<b>11. General Promotion of Knowledge NES (except Higher Education) (o)</b> 11.0. R&D of a general nature 11.1. R&D in the natural sciences 11.1.0. R&D of a general nature 11.1.1. Natural sciences 11.1.2. Engineering 11.1.3. Medical sciences 11.1.4. Agricultural sciences 11.1.9. Other fields 11.2. R&D in the social sciences (of which: developing countries)
1 465,5	14,1	1 500	15,3	<b>12. General Promotion of Knowledge NES (Higher Education) (p)</b> 12.0. R&D of a general nature 12.1. R&D in the natural sciences 12.1.0. R&D of a general nature 12.1.1. Natural sciences 12.1.2. Engineering 12.1.3. Medical sciences 12.1.4. Agricultural sciences 12.1.9. Other fields 12.2. R&D in the social sciences and humanities (of which: developing countries)
17,3	0,2	—	—	<i>Memorandum only: expenditure not itemized</i> (of which: developing countries)
10 404,6 (n.d./n.v.)	100,0 —	9 800 (n.d./n.v.)	100,0 —	<b>GRAND TOTAL</b> (of which: developing countries)

## Central Government R &amp; D Expenditure by Objective

Country: ITALY

(in national currency)

OBJECTIVE	1967		1968	
	It.Lire 10 <sup>6</sup>	%	It.Lire 10 <sup>6</sup>	%
<b>1. Nuclear Research and Development (a)</b>	<b>61 869</b>	<b>34,6</b>	<b>59 684</b>	<b>31,1</b>
1.0. R&D of a general nature	17 322	9,7	17 316	9,0
1.1. Energy R&D	37 148	20,8	34 712	18,1
1.9. Other research (of which: developing countries)	7 399 (—)	4,1 (—)	7 656 (—)	4,0 (—)
<b>2. Exploration and Exploitation of Space (a)</b>	<b>13 271</b>	<b>7,4</b>	<b>10 570</b>	<b>5,5</b>
2.0. R&D of a general nature (b)	413	0,2	297	0,1
2.1. R&D on launchers and satellites	12 858	7,2	10 146	5,3
2.1.1. Launching systems (c)	(7 571)	(4,2)	(5 438)	(2,8)
2.1.2. Scientific exploration (d)	(4 976)	(2,8)	(4 327)	(2,3)
2.1.3. Systems of application (e)	(—)	(—)	(—)	(—)
2.9. Other R&D (of which: developing countries)	— (—)	— (—)	127 (—)	0,1 (—)
<b>3. Defence (a)</b> (of which: developing countries)	<b>8 957</b> (—)	<b>5,0</b> (—)	<b>8 943</b> (—)	<b>4,7</b> (—)
<b>4. Exploration and Exploitation of the Earth and its Atmosphere</b>	<b>1 281</b>	<b>0,7</b>	<b>3 014</b>	<b>1,6</b>
4.0. R&D of a general nature	—	—	—	—
4.1. Soil and sub-stratum (f)	120	0,1	383	0,2
4.1.3. Prospecting for mines and petroleum	(—)	(—)	(—)	(—)
4.2. Seas and oceans (g)	799	0,4	2 104	1,1
4.3. Atmosphere	362	0,2	527	0,3
4.3.3. Meteorology	(286)	(0,2)	(447)	(0,2)
4.9. Other R&D (of which: developing countries)	— (—)	— (—)	— (—)	— (—)
<b>5. Protection and Promotion of Human Health</b>	<b>2 637</b>	<b>1,5</b>	<b>4 160</b>	<b>2,2</b>
5.0. R&D of a general nature	227	0,1	172	0,1
5.1. Medical research	1 408	0,8	2 454	1,3
5.2. R&D on alimentary hygiene and nutrition	534	0,3	697	0,3
5.3. R&D on noxious phenomena (h)	157	0,1	520	0,3
5.3.1. Water pollution	(125)	(0,1)	(383)	(0,2)
5.3.2. Air pollution	(3)	(...)	(81)	(0,1)
5.3.3. Action against noise	(29)	(...)	(56)	(...)
5.9. Other R&D (of which: developing countries)	311 (—)	0,2 (—)	317 (—)	0,2 (—)
<b>6. Planning of Human Environment</b>	<b>3 499</b>	<b>2,0</b>	<b>4 615</b>	<b>2,4</b>
6.0. R&D of a general nature (i)	—	—	3	...)
6.1. Construction and planning of buildings	315	0,2	2 453	1,3
6.1.1. Residential	(—)	(—)	(—)	(—)
6.1.2. Non-residential	(98)	(0,1)	(2 000)	(1,0)
6.2. Civil engineering (j)	414	0,2	233	0,1
6.3. Transport systems	9	...)	10	...)
6.4. Systems of telecommunications	367	0,2	645	0,3
6.9. Other R&D (of which: developing countries)	2 394 (—)	1,4 (—)	1 271 (—)	0,7 (—)
<b>7. Promotion of Agricultural Productivity and Technology</b>	<b>2 772</b>	<b>1,5</b>	<b>7 136</b>	<b>3,7</b>
7.0. R&D of a general nature (k)	685	0,4	483	0,2
7.1. Animal products (agriculture and hunt)	568	0,3	432	0,2
7.1.3. Veterinary medicine	(69)	(...)	(54)	(...)
7.2. Vegetable products (including forests) and wines	1 504	0,8	2 527	1,3
7.3. Products of fishing and fish breeding	15	...)	328	0,2
7.9. Other R&D (of which: developing countries)	— (—)	— (—)	3 366 (—)	1,8 (—)



## Central Government R &amp; D Expenditure by Objective

(in national currency)

Country: ITALY

1969		1970		OBJECTIVE
It.Lire 10 <sup>6</sup>	%	It.Lire 10 <sup>6</sup>	%	
62 921	30,2	57 383	20,1	<b>1. Nuclear Research and Development (a)</b>
18 477	8,9			1.0. R&D of a general nature
38 032	18,2			1.1. Energy R&D
6 412	3,1			1.9. Other research
(—)	(—)			(of which: developing countries)
10 389	5,0	12 362	4,3	<b>2. Exploration and Exploitation of Space (a)</b>
731	0,4			2.0. R&D of a general nature (b)
9 466	4,5			2.1. R&D on launchers and satellites
(5 400)	(2,6)			2.1.1. Launching systems (c)
(4 000)	(1,9)			2.1.2. Scientific exploration (d)
(—)	(—)			2.1.3. Systems of application (e)
192	0,1			2.9. Other R&D
(—)	(—)			(of which: developing countries)
8 631	4,1	8 000	2,8	<b>3. Defence (a)</b>
(—)	(—)			(of which: developing countries)
3 101	1,5	3 500	1,2	<b>4. Exploration and Exploitation of the Earth and its Atmosphere</b>
—	—			4.0. R&D of a general nature
555	0,3			4.1. Soil and sub-stratum (f)
(—)	(—)			4.1.3. Prospecting for mines and petroleum
1 987	0,9			4.2. Seas and oceans (g)
559	0,3			4.3. Atmosphere
(474)	(0,2)			4.3.3. Meteorology
(—)	(—)			4.9. Other R&D
(—)	(—)			(of which: developing countries)
5 902	2,8	6 500	2,3	<b>5. Protection and Promotion of Human Health</b>
1 063	0,5			5.0. R&D of a general nature
2 602	1,2			5.1. Medical research
1 380	0,7			5.2. R&D on alimentary hygiene and nutrition
548	0,3			5.3. R&D on noxious phenomena (h)
(406)	(0,2)			5.3.1. Water pollution
(32)	(...)			5.3.2. Air pollution
(60)	(...)			5.3.3. Action against noise
309	0,1			5.9. Other R&D
(—)	(—)			(of which: developing countries)
4 290	2,1	4 300	1,5	<b>6. Planning of Human Environment</b>
33	...			6.0. R&D of a general nature (i)
1 297	0,6			6.1. Construction and planning of buildings
(436)	(0,2)			6.1.1. Residential
(200)	(0,1)			6.1.2. Non-residential
1 203	0,6			6.2. Civil engineering (j)
10	...			6.3. Transport systems
647	0,3			6.4. Systems of telecommunications
1 100	0,6			6.9. Other R&D
(—)	(—)			(of which: developing countries)
7 602	3,6	7 800	2,7	<b>7. Promotion of Agricultural Productivity and Technology</b>
548	0,2			7.0. R&D of a general nature (k)
719	0,3			7.1. Animal products (agriculture and hunt)
(41)	(...)			7.1.3. Veterinary medicine
3 026	1,5			7.2. Vegetable products (including forests) and wines
243	0,1			7.3. Products of fishing and fish breeding
3 066	1,5			7.9. Other R&D
(—)	(—)			(of which: developing countries)

## Central Government R &amp; D Expenditure by Objective (continued)

Country: ITALY

(in national currency)

OBJECTIVE	1967		1968	
	It.Lire 10 <sup>6</sup>	%	It.Lire 10 <sup>6</sup>	%
<b>8. Promotion of Industrial Productivity and Technology</b>	<b>2 620</b>	<b>1,5</b>	<b>6 163</b>	<b>3,2</b>
8.0. R&D of a general nature (l)	291	0,2	649	0,3
8.1. Products of the non-nuclear fuel industry	665	0,4	738	0,4
8.2. Products of other industries	1 664	0,9	4 776	2,5
8.2.1. Chemical	(48)	(...)	(116)	(0,1)
8.2.2. Metallurgy	(18)	(...)	(417)	(0,2)
8.2.3. Electronics (m)	(255)	(0,1)	(1 248)	(0,6)
8.2.4. Civil aeronautics	(—)	(—)	(150)	(0,1)
8.2.5. Other means of transport	(64)	(0,1)	(207)	(0,1)
8.2.9. Miscellaneous industries	(1 279)	(0,7)	(2 638)	(1,4)
8.9. Other R&D (of which: developing countries)	(—)	(—)	(—)	(—)
<b>9. Promotion of Computer Science and of Automation</b>	<b>496</b>	<b>0,3</b>	<b>1 186</b>	<b>0,6</b>
9.0. R&D of a general nature	146	0,1	190	0,1
9.1. R&D on hardware	39	...	412	0,2
9.2. R&D on software	311	0,2	584	0,3
9.9. Other R&D (of which: developing countries)	(—)	(—)	(—)	(—)
<b>10. Promotion of Research in the Social Sciences and Humanities</b>	<b>3 266</b>	<b>1,8</b>	<b>2 813</b>	<b>1,5</b>
10.0. R&D of a general nature	—	—	—	—
10.1. R&D on education, training and readaptation	25	...	17	...
10.1.1. In the field of computer science	(—)	(—)	(—)	(—)
10.1.2. In the field of industry	(—)	(—)	(—)	(—)
10.1.3. In the field of agriculture	(—)	(—)	(—)	(—)
10.2. R&D on business administration	—	—	—	—
10.9. Other R&D (n) (of which: developing countries)	3 241	1,8	2 796	1,5
	(—)	(—)	(—)	(—)
<b>11. General Promotion of Knowledge NES (except Higher Education) (o)</b>	<b>22 658</b>	<b>12,7</b>	<b>23 635</b>	<b>12,3</b>
11.0. R&D of a general nature	—	—	—	—
11.1. R&D in the natural sciences	19 797	11,1	20 506	10,7
11.1.0. R&D of a general nature	(932)	(0,5)	(3)	(...)
11.1.1. Natural sciences	(11 213)	(6,3)	(11 743)	(6,1)
11.1.2. Engineering	(2 901)	(1,6)	(3 634)	(1,9)
11.1.3. Medical sciences	(1 526)	(0,9)	(1 887)	(1,0)
11.1.4. Agricultural sciences	(2 225)	(1,2)	(2 239)	(1,2)
11.1.9. Other fields	(1 000)	(0,6)	(1 000)	(0,5)
11.2. R&D in the social sciences (of which: developing countries)	2 861	1,6	3 129	1,6
	(—)	(—)	(—)	(—)
<b>12. General Promotion of Knowledge NES (Higher Education) (p)</b>	<b>55 386</b>	<b>31,0</b>	<b>59 978</b>	<b>31,2</b>
12.0. R&D of a general nature	—	—	—	—
12.1. R&D in the natural sciences	38 205	21,4	41 373	21,5
12.1.0. R&D of a general nature	(—)	(—)	(—)	(—)
12.1.1. Natural sciences	(20 997)	(11,8)	(22 735)	(11,8)
12.1.2. Engineering	(7 050)	(3,9)	(7 638)	(4,0)
12.1.3. Medical sciences	(7 878)	(4,4)	(8 553)	(4,4)
12.1.4. Agricultural sciences	(2 260)	(1,3)	(2 447)	(1,3)
12.1.9. Other fields	(—)	(—)	(—)	(—)
12.2. R&D in the social sciences and humanities (of which: developing countries)	17 181	9,6	18 605	9,7
	(—)	(—)	(—)	(—)
<i>Memorandum only: expenditure not itemized</i> (of which: developing countries)	(—)	(—)	(—)	(—)
<b>GRAND TOTAL</b> (of which: developing countries)	<b>178 712</b>	<b>100,0</b>	<b>191 897</b>	<b>100,0</b>
	(—)	(—)	(—)	(—)

## Central Government R &amp; D Expenditure by Objective (continued)

(in national currency)

Country: ITALY

1969		1970		OBJECTIVE
It.Lire 10 <sup>6</sup>	%	It.Lire 10 <sup>6</sup>	%	
<b>10 343</b>	<b>5,0</b>	<b>60 500</b>	<b>21,2</b>	<b>8. Promotion of Industrial Productivity and Technology</b>
1 726	0,8			8.0. R&D of a general nature (l)
205	0,1			8.1. Products of the non-nuclear fuel industry
8 113	3,9			8.2. Products of other industries
(139)	(0,1)			8.2.1. Chemical
(518)	(0,2)			8.2.2. Metallurgy
(2 987)	(1,4)			8.2.3. Electronics (m)
(330)	(0,2)			8.2.4. Civil aeronautics
(221)	(0,1)			8.2.5. Other means of transport
(3 918)	(1,9)			8.2.9. Miscellaneous industries
299	0,2			8.9. Other R&D
(—)	(—)			(of which: developing countries)
<b>1 518</b>	<b>0,7</b>	<b>1 500</b>	<b>0,5</b>	<b>9. Promotion of Computer Science and of Automation</b>
203	0,1			9.0. R&D of a general nature
479	0,2			9.1. R&D on hardware
836	0,4			9.2. R&D on software
(—)	(—)			9.9. Other R&D
(—)	(—)			(of which: developing countries)
<b>2 608</b>	<b>1,2</b>	<b>2 700</b>	<b>0,9</b>	<b>10. Promotion of Research in the Social Sciences and Humanities</b>
21	...			10.0. R&D of a general nature
50	...			10.1. R&D on education, training and readaptation
(—)	(—)			10.1.1. In the field of computer science
(—)	(—)			10.1.2. In the field of industry
(3)	(...)			10.1.3. In the field of agriculture
(—)	(—)			10.2. R&D on business administration
2 537	1,2			10.9. Other R&D (n)
(—)	(—)			(of which: developing countries)
<b>23 751</b>	<b>11,4</b>	<b>46 000</b>	<b>16,1</b>	<b>11. General Promotion of Knowledge NES (except Higher Education) (o)</b>
(—)	(—)			11.0. R&D of a general nature
20 881	10,0			11.1. R&D in the natural sciences
(98)	(0,1)			11.1.0. R&D of a general nature
(14 896)	(7,1)			11.1.1. Natural sciences
(2 708)	(1,3)			11.1.2. Engineering
(1 419)	(0,7)			11.1.3. Medical sciences
(1 760)	(0,8)			11.1.4. Agricultural sciences
(—)	(—)			11.1.9. Other fields
2 870	1,4			11.2. R&D in the social sciences
(—)	(—)			(of which: developing countries)
<b>67 484</b>	<b>32,4</b>	<b>75 500</b>	<b>26,4</b>	<b>12. General Promotion of Knowledge NES (Higher Education) (p)</b>
(—)	(—)			12.0. R&D of a general nature
46 510	22,3			12.1. R&D in the natural sciences
(—)	(—)			12.1.0. R&D of a general nature
(25 556)	(12,3)			12.1.1. Natural sciences
(8 587)	(4,1)			12.1.2. Engineering
(9 618)	(4,6)			12.1.3. Medical sciences
(2 749)	(1,3)			12.1.4. Agricultural sciences
(—)	(—)			12.1.9. Other fields
20 974	10,1			12.2. R&D in the social sciences and humanities
(—)	(—)			(of which: developing countries)
(—)	(—)			Memorandum only: expenditure not itemized
(—)	(—)			(of which: developing countries)
<b>208 540</b>	<b>100,0</b>	<b>286 045</b>	<b>100,0</b>	<b>GRAND TOTAL</b>
(—)	(—)	(—)	(—)	(of which: developing countries)

## Central Government R &amp; D Expenditure by Objective

Country: NETHERLANDS

(in national currency)

OBJECTIVE	1967		1968	
	Fl. 10 <sup>3</sup>	%	Fl. 10 <sup>3</sup>	%
<b>1. Nuclear Research and Development (a)</b>	<b>81 752</b>	<b>11,1</b>	<b>94 285</b>	<b>10,7</b>
1.0. R&D of a general nature	2 195	0,3	2 375	0,3
1.1. Energy R&D	67 365	9,1	81 823	9,3
1.9. Other research	12 192	1,7	10 087	1,1
<i>(of which: developing countries)</i>	(—)	(—)	(—)	(—)
<b>2. Exploration and Exploitation of Space (a)</b>	<b>22 959</b>	<b>3,1</b>	<b>35 322</b>	<b>4,0</b>
2.0. R&D of a general nature (b)	1 009	0,1	4 127	0,5
2.1. R&D on launchers and satellites	21 650	2,9	30 861	3,5
2.1.1. Launching systems (c)	(10 000)	(1,3)	(17 000)	(1,9)
2.1.2. Scientific exploration (d)	(11 650)	(1,6)	(13 861)	(1,6)
2.1.3. Systems of application (e)	(—)	(—)	(—)	(—)
2.9. Other R&D	300	0,1	334	...
<i>(of which: developing countries)</i>	(—)	(—)	(—)	(—)
<b>3. Defence (a)</b>	<b>28 196</b>	<b>3,8</b>	<b>45 346</b>	<b>5,2</b>
<i>(of which: developing countries)</i>	(—)	(—)	(—)	(—)
<b>4. Exploration and Exploitation of the Earth and its Atmosphere</b>	<b>14 455</b>	<b>1,9</b>	<b>11 320</b>	<b>1,3</b>
4.0. R&D of a general nature	—	—	—	—
4.1. Soil and sub-stratum (f)	1 800	0,2	3 910	0,4
4.1.3. Prospecting for mines and petroleum	(—)	(—)	(—)	(—)
4.2. Seas and oceans (g)	9 608	1,3	4 895	0,6
4.3. Atmosphere	3 047	0,4	2 515	0,3
4.3.3. Meteorology	(2 981)	(0,4)	(2 515)	(0,3)
4.9. Other R&D	—	—	—	—
<i>(of which: developing countries)</i>	(—)	(—)	(—)	(—)
<b>5. Protection and Promotion of Human Health</b>	<b>24 295</b>	<b>3,3</b>	<b>31 685</b>	<b>3,6</b>
5.0. R&D of a general nature	17 217	2,3	17 633	2,0
5.1. Medical research	499	0,1	977	0,1
5.2. R&D on alimentary hygiene and nutrition	—	—	—	—
5.3. R&D on noxious phenomena (h)	382	0,1	369	0,1
5.3.1. Water pollution	(100)	(...)	(169)	(...)
5.3.2. Air pollution	(—)	(—)	(—)	(—)
5.3.3. Action against noise	(—)	(—)	(—)	(—)
5.9. Other R&D	6 197	0,8	12 706	1,4
<i>(of which: developing countries)</i>	(—)	(—)	(—)	(—)
<b>6. Planning of Human Environment</b>	<b>20 325</b>	<b>2,8</b>	<b>24 677</b>	<b>2,8</b>
6.0. R&D of a general nature (i)	2 785	0,4	3 538	0,4
6.1. Construction and planning of buildings	6 049	0,8	7 178	0,8
6.1.1. Residential	(2 634)	(0,4)	(2 846)	(0,3)
6.1.2. Non-residential	(1 164)	(0,2)	(1 532)	(0,2)
6.2. Civil engineering (j)	5 105	0,7	8 243	0,9
6.3. Transport systems	3 970	0,6	3 114	0,4
6.4. Systems of telecommunications	—	—	—	—
6.9. Other R&D	2 416	0,3	2 604	0,3
<i>(of which: developing countries)</i>	(—)	(—)	(—)	(—)
<b>7. Promotion of Agricultural Productivity and Technology</b>	<b>74 321</b>	<b>10,1</b>	<b>82 434</b>	<b>9,4</b>
7.0. R&D of a general nature (k)	41 640	5,7	46 030	5,2
7.1. Animal products (agriculture and hunt)	8 849	1,2	11 082	1,3
7.1.3. Veterinary medicine	(2 552)	(0,4)	(2 926)	(0,3)
7.2. Vegetable products (including forests) and wines	17 456	2,4	19 397	2,2
7.3. Products of fishing and fish breeding	2 475	0,3	1 530	0,2
7.9. Other R&D	3 901	0,5	4 395	0,5
<i>(of which: developing countries)</i>	(—)	(—)	(455)	(...)

## Central Government R &amp; D Expenditure by Objective

(in national currency)

Country: NETHERLANDS

1969		1970		OBJECTIVE
Fl. 10 <sup>3</sup>	%	Fl. 10 <sup>3</sup>	%	
96 699	9,9	116 112	10,4	<b>1. Nuclear Research and Development (a)</b>
2 065	0,2	2 219	0,2	1.0. R&D of a general nature
85 587	8,8	100 207	9,0	1.1. Energy R&D
9 047	0,9	13 686	1,2	1.9. Other research
(—)	(—)	(—)	(—)	(of which: developing countries)
37 907	3,9	32 358	2,9	<b>2. Exploration and Exploitation of Space (a)</b>
4 168	0,4	7 808	0,7	2.0. R&D of a general nature (b)
33 379	3,4	24 125	2,1	2.1. R&D on launchers and satellites
(17 000)	(1,7)	(5 700)	(0,5)	2.1.1. Launching systems (c)
(16 379)	(1,7)	(18 425)	(1,6)	2.1.2. Scientific exploration (d)
(—)	(—)	(—)	(—)	2.1.3. Systems of application (e)
360	0,1	425	0,1	2.9. Other R&D
(—)	(—)	(—)	(—)	(of which: developing countries)
53 047	5,4	51 142	4,6	<b>3. Defence (a)</b>
(—)	(—)	(—)	(—)	(of which: developing countries)
16 370	1,7	18 569	1,7	<b>4. Exploration and Exploitation of the Earth and its Atmosphere</b>
—	—	—	—	4.0. R&D of a general nature
3 915	0,4	4 422	0,4	4.1. Soil and sub-stratum (f)
(—)	(—)	(—)	(—)	4.1.3. Prospecting for mines and petroleum
9 585	1,0	10 963	1,0	4.2. Seas and oceans (g)
2 870	0,3	3 184	0,3	4.3. Atmosphere
(2 870)	(0,3)	(3 118)	(0,3)	4.3.3. Meteorology
(—)	(—)	(—)	(—)	4.9. Other R&D
(—)	(—)	(—)	(—)	(of which: developing countries)
41 276	4,2	42 981	3,9	<b>5. Protection and Promotion of Human Health</b>
25 020	2,6	23 835	2,2	5.0. R&D of a general nature
1 137	0,1	1 518	0,1	5.1. Medical research
—	—	—	—	5.2. R&D on alimentary hygiene and nutrition
330	...	297	...	5.3. R&D on noxious phenomena (h)
(190)	(...)	(63)	(...)	5.3.1. Water pollution
(—)	(—)	(—)	(—)	5.3.2. Air pollution
(—)	(—)	(—)	(—)	5.3.3. Action against noise
14 789	1,5	17 331	1,8	5.9. Other R&D
(—)	(—)	(—)	(—)	(of which: developing countries)
30 170	3,1	36 550	3,3	<b>6. Planning of Human Environment</b>
3 527	0,4	4 023	0,4	6.0. R&D of a general nature (i)
9 632	1,0	11 302	1,0	6.1. Construction and planning of buildings
(4 529)	(0,5)	(5 682)	(0,5)	6.1.1. Residential
(1 656)	(0,2)	(1 770)	(0,2)	6.1.2. Non-residential
9 702	1,0	10 911	1,0	6.2. Civil engineering (j)
4 149	0,4	6 945	0,6	6.3. Transport systems
—	—	—	—	6.4. Systems of telecommunications
3 160	0,3	3 369	0,3	6.9. Other R&D
(—)	(—)	(—)	(—)	(of which: developing countries)
92 145	9,4	104 146	9,4	<b>7. Promotion of Agricultural Productivity and Technology</b>
51 085	5,2	60 698	5,5	7.0. R&D of a general nature (k)
11 103	1,1	13 813	1,2	7.1. Animal products (agriculture and hunt)
(3 498)	(0,4)	(4 164)	(0,4)	7.1.3. Veterinary medicine
23 568	2,4	23 201	2,1	7.2. Vegetable products (including forests) and wines
1 709	0,2	1 968	0,2	7.3. Products of fishing and fish breeding
4 680	0,5	4 466	0,4	7.9. Other R&D
(2 722)	(0,3)	(3 901)	(0,3)	(of which: developing countries)

## Central Government R &amp; D Expenditure by Objective (continued)

Country: NETHERLANDS

(in national currency)

OBJECTIVE	1967		1968	
	Fl. 10 <sup>3</sup>	%	Fl. 10 <sup>3</sup>	%
<b>8. Promotion of Industrial Productivity and Technology</b>	<b>60 295</b>	<b>8,2</b>	<b>69 876</b>	<b>8,0</b>
8.0. R&D of a general nature (l)	33 483	4,6	32 526	3,7
8.1. Products of the non-nuclear fuel industry	—	—	—	—
8.2. Products of other industries	26 812	3,6	37 350	4,3
8.2.1. Chemical	(—)	(—)	(—)	(—)
8.2.2. Metallurgy	(—)	(—)	(—)	(—)
8.2.3. Electronics (m)	(—)	(—)	(—)	(—)
8.2.4. Civil aeronautics	(21 081)	(2,8)	(22 139)	(2,5)
8.2.5. Other means of transport	(—)	(—)	(—)	(—)
8.2.9. Miscellaneous industries	(5 731)	(0,8)	(15 211)	(1,8)
8.9. Other R&D (of which: developing countries)	(1 066)	(0,1)	(468)	(0,1)
<b>9. Promotion of Computer Science and of Automation</b>	—	—	—	—
9.0. R&D of a general nature	—	—	—	—
9.1. R&D on hardware	—	—	—	—
9.2. R&D on software	—	—	—	—
9.9. Other R&D (of which: developing countries)	(—)	(—)	(—)	(—)
<b>10. Promotion of Research in the Social Sciences and Humanities</b>	<b>29 931</b>	<b>4,1</b>	<b>29 826</b>	<b>3,4</b>
10.0. R&D of a general nature	4 802	0,7	2 388	0,3
10.1. R&D on education, training and readaptation	8 046	1,1	8 743	1,0
10.1.1. In the field of computer science	(—)	(—)	(—)	(—)
10.1.2. In the field of industry	(—)	(—)	(—)	(—)
10.1.3. In the field of agriculture	(275)	(0,1)	(300)	(...)
10.2. R&D on business administration	21	...	41	...
10.9. Other R&D (n) (of which: developing countries)	17 062 (4 981)	2,3 (0,7)	18 654 (2 626)	2,1 (0,3)
<b>11. General Promotion of Knowledge NES (except Higher Education) (o)</b>	<b>35 463</b>	<b>4,8</b>	<b>41 288</b>	<b>4,7</b>
11.0. R&D of a general nature	—	—	—	—
11.1. R&D in the natural sciences	32 256	4,4	36 981	4,2
11.1.0. R&D of a general nature	(—)	(—)	(—)	(—)
11.1.1. Natural sciences	(15 257)	(2,1)	(17 098)	(1,9)
11.1.2. Engineering	(—)	(—)	(—)	(—)
11.1.3. Medical sciences	(1 932)	(0,3)	(2 188)	(0,3)
11.1.4. Agricultural sciences	(—)	(—)	(—)	(—)
11.1.9. Other fields	(15 067)	(2,0)	(17 695)	(2,0)
11.2. R&D in the social sciences (of which: developing countries)	3 207 (—)	0,4 (—)	4 307 (—)	0,5 (—)
<b>12. General Promotion of Knowledge NES (Higher Education) (p)</b>	<b>345 228</b>	<b>46,8</b>	<b>411 607</b>	<b>46,9</b>
12.0. R&D of a general nature	—	—	—	—
12.1. R&D in the natural sciences	286 928	38,9	349 377	39,8
12.1.0. R&D of a general nature	(—)	(—)	(—)	(—)
12.1.1. Natural sciences	(99 500)	(13,5)	(128 697)	(14,7)
12.1.2. Engineering	(102 500)	(13,9)	(112 156)	(12,8)
12.1.3. Medical sciences	(65 800)	(8,9)	(80 397)	(9,1)
12.1.4. Agricultural sciences	(19 128)	(2,6)	(28 127)	(3,2)
12.1.9. Other fields	(—)	(—)	(—)	(—)
12.2. R&D in the social sciences and humanities (of which: developing countries)	58 300 (—)	7,9 (—)	62 230 (—)	7,1 (—)
<i>Memorandum only: expenditure not itemized</i> (of which: developing countries)	— (—)	— (—)	— (—)	— (—)
<b>GRAND TOTAL</b> (of which: developing countries)	<b>737 220</b> (6 047)	<b>100,0</b> (0,8)	<b>877 666</b> (3 549)	<b>100,0</b> (0,4)

## Central Government R &amp; D Expenditure by Objective (continued)

(in national currency)

Country: NETHERLANDS

1969		1970		OBJECTIVE
Fl. 10 <sup>3</sup>	%	Fl. 10 <sup>3</sup>	%	
65 856	6.7	66 250	5.9	<b>8. Promotion of Industrial Productivity and Technology</b>
35 113	3.6	36 898	3.3	8.0. R&D of a general nature (l)
—	—	—	—	8.1. Products of the non-nuclear fuel industry
30 743	3.1	29 352	2.6	8.2. Products of other industries
(—)	(—)	(—)	(—)	8.2.1. Chemical
(—)	(—)	(—)	(—)	8.2.2. Metallurgy
(—)	(—)	(—)	(—)	8.2.3. Electronics (m)
(12 512)	(1.3)	(14 243)	(1.3)	8.2.4. Civil aeronautics
(—)	(—)	(—)	(—)	8.2.5. Other means of transport
(18 231)	(1.8)	(15 109)	(1.3)	8.2.9. Miscellaneous industries
—	—	—	—	8.9. Other R&D
(576)	(0.1)	(876)	(0.1)	(of which: developing countries)
<b>3 980</b>	<b>0.4</b>	<b>5 850</b>	<b>0.5</b>	<b>9. Promotion of Computer Science and of Automation</b>
3 980	0.4	5 850	0.5	9.0. R&D of a general nature
—	—	—	—	9.1. R&D on hardware
—	—	—	—	9.2. R&D on software
—	—	—	—	9.9. Other R&D
(—)	(—)	(—)	(—)	(of which: developing countries)
<b>36 066</b>	<b>3.7</b>	<b>46 200</b>	<b>4.1</b>	<b>10. Promotion of Research in the Social Sciences and Humanities</b>
3 094	0.3	4 428	0.4	10.0. R&D of a general nature
11 226	1.2	15 382	1.4	10.1. R&D on education, training and readaptation
(—)	(—)	(—)	(—)	10.1.1. In the field of computer science
(—)	(—)	(—)	(—)	10.1.2. In the field of industry
(350)	(...)	(475)	(...)	10.1.3. In the field of agriculture
19	...	19	...	10.2. R&D on business administration
21 727	2.2	26 371	2.3	10.9. Other R&D (n)
(3 194)	(0.3)	(4 428)	(0.4)	(of which: developing countries)
<b>51 387</b>	<b>5.2</b>	<b>54 495</b>	<b>4.9</b>	<b>11. General Promotion of Knowledge NES (except Higher Education) (o)</b>
—	—	—	—	11.0. R&D of a general nature
46 472	4.7	48 720	4.4	11.1. R&D in the natural sciences
(—)	(—)	(—)	(—)	11.1.0. R&D of a general nature
(17 715)	(1.8)	(19 737)	(1.8)	11.1.1. Natural sciences
(—)	(—)	(—)	(—)	11.1.2. Engineering
(2 310)	(0.2)	(2 476)	(0.2)	11.1.3. Medical sciences
(—)	(—)	(—)	(—)	11.1.4. Agricultural sciences
(26 447)	(2.7)	(26 507)	(2.4)	11.1.9. Other fields
4 915	0.5	5 775	0.5	11.2. R&D in the social sciences
(—)	(—)	(—)	(—)	(of which: developing countries)
<b>454 400</b>	<b>46.4</b>	<b>533 381</b>	<b>47.9</b>	<b>12. General Promotion of Knowledge NES (Higher Education) (p)</b>
—	—	—	—	12.0. R&D of a general nature
379 056	38.7	443 342	39.8	12.1. R&D in the natural sciences
(—)	(—)	(—)	(—)	12.1.0. R&D of a general nature
(146 656)	(15.0)	(174 731)	(15.7)	12.1.1. Natural sciences
(124 296)	(12.7)	(139 290)	(12.5)	12.1.2. Engineering
(77 133)	(7.9)	(92 067)	(8.3)	12.1.3. Medical sciences
(30 971)	(3.1)	(37 254)	(3.3)	12.1.4. Agricultural sciences
(—)	(—)	(—)	(—)	12.1.9. Other fields
75 344	7.7	90 039	8.1	12.2. R&D in the social sciences and humanities
(—)	(—)	(—)	(—)	(of which: developing countries)
—	—	5 219	0.5	<i>Memorandum only: expenditure not itemized</i>
(—)	(—)	(—)	(—)	(of which: developing countries)
<b>979 303</b>	<b>100.0</b>	<b>1 113 253</b>	<b>100.0</b>	<b>GRAND TOTAL</b>
(6 492)	(0.7)	(9 205)	(0.8)	(of which: developing countries)

## NOTES

- (a) Nuclear and space R&D undertaken for defence purposes is classified under 3.
- (b) This sub-group includes, in particular, research in astronomy undertaken for the study of space which cannot be distributed among separately 2.1. or 2.9. ; it excludes R&D in astronomy for defence purposes (classified in 3) or with a very general aim (classified under 11.1.1. or 12.1.1.).
- (c) Including participation in the CECLES/ELDO programmes.
- (d) Including participation in the CERS/ESRO programmes.
- (e) Including participation in bilateral and other international programmes.
- (f) Excluding the exploration of undersea plateaux and the study of soils for agricultural purposes.
- (g) Including the exploration of undersea plateaux and the exploitation of underwater biological resources, but excluding fishing.
- (h) Excluding research for other than sanitary purposes, classified under 6 and 7.
- (i) Including general research on urbanism and planning of national parks.
- (j) Including property improvement (dams, aqueducts, irrigation, drainage, the construction of wells, etc).
- (k) Including R&D on the environment (bioclimatology, the study of soils, etc) ; the study and preparation of soils excludes property improvement, classified under 6.2.
- (l) Including research on metrology, general automation and technological forecasting.
- (m) Excluding computers (classified under 9.1.), but including electronic components.
- (n) Not elsewhere specified, i.e. in major goals 1-9.
- (o) This major goal includes credits allocated to R&D with a very general aim, which cannot be classified in major goals 1-10, as well as credits accorded to large research establishments and to distributing bodies whose mission is very diversified.
- (p) This major goal includes credits for research allocated globally or by field of science to institutions of higher education, in the context of their broad vocation.



ANNEX IV

**Statistical Indicators**



## 1. INTRODUCTION

This Annex presents in the form of tables and graphs a number of indicators concerning state backing for R&D. These indicators have been calculated from the statistical tables in Annex III.

The documentation includes the following items:

— *Tables 1 : Central Government R&D expenditure* by NASB major goal, expressed in round figures, in units of account for the whole of the Community (current exchange rates) and in national currency by country, with the annual rates of variation and the proportion accounted for by each category in the total expenditure.

— *Table 2a: comparison for the year 1969 of the per capita Central Government R&D expenditure*, expressed in units of account (current exchange rates), showing the ranking for the various countries and the ratio between the unit expenditure of the country with the highest expenditure and that of the country with the lowest expenditure.

— *Table 2b: comparison for the year 1969 of the Central Government R&D expenditure per 10,000 u.a. of GDP*, expressed in the same way as in Table 2a.

— *Graph 3 : curve of Central Government R&D expenditure and of total expenditure* (current and capital) by Central Government (indices 1967 = 100), showing R&D expenditure as a fraction of the total public expenditure in 1967.

## 2. CHARACTERISTICS OF THE INDICATORS ADOPTED

Tables 1, derived from the data shown in Annex III, illustrate the irregular trend of research expenditure. This may be due to either decisions on general budgetary policy (see Graph 3), specific decisions, or the sporadic implementation of certain programmes.

Tables 2a and 2b offer a comparison of the public R&D effort of the various countries with the effects of size eliminated. Several problems have arisen here. Two parameters were finally selected

for the denominators used in the relative values—the population and the GDP (expressed in 10,000 u.a.). As regards the choice of a rate for conversion into u.a., it should be remembered, firstly, that the official rates of exchange may not reflect the real purchasing powers of the various currencies, and, secondly, that the research workers' salaries and the cost of scientific equipment differ from country to country to an extent which is not offset by the exchange rate.

During the period under consideration, the purchasing powers of the currencies concerned deviated from the official exchange rates. The solution chosen was to make a data comparison for one year only (1969), on the basis of the time-weighted current exchange rates for use in Annex III. The figures thus reflect the exchange-rate adjustments made in 1969.

Because of the methodological and statistical difficulties involved, it was decided not to use the exchange rates specific to research. Work of such a nature would call for information on the unit cost of research, which could not be obtained with the means available to and within the deadlines fixed for the Working Group. If it had nevertheless been possible, interpretation of the results would have raised difficulties, since the method is not transitive, and countries can be compared only in pairs<sup>(1)</sup>. As it was, the problem related to a comparison between five countries. In confining itself to conversion into official exchange rates, the Group has simply used the method finally adopted by the OECD.

In order to facilitate comparison, Tables 2a and 2b show the position occupied by each country in the intra-Community comparison, together with the ratio between the figure for the country with the highest expenditure and that for the country with the lowest expenditure. It will be noted that the scatter is wider in Table 2a than in Table 2b. This is because R&D funding is related more to the level of development of the various countries, the countries with a higher per capita income being able to make a proportionally greater effort.

(1) See OECD, a Study of resources devoted to R&D in OECD Member Countries in 1963-64, Part 2, statistical tables and explanatory notes, Paris 1968.

Graph 3 compares on a ratio scale the curve of public expenditure on R&D with that of the total expenditure by the governments concerned. In graphs of this type the elasticity of R&D expenditure by comparison with overall public expenditure is equal to unity when the slopes of the two curves are identical. These graphs are supplemented by the proportion % of R&D expenditure in the total public expenditure, calculated according to the definitions in the national accounting system (see Statistical Office of the European

Communities, National Accounts 1958/1967, tables of Central Government transactions). The aggregate chosen as the denominator is the sum of the current expenditures (line 16), the capital transfers (line 20) and the gross fixed capital formation (line 21).

The data on the trend of public expenditure for the period 1967-69 derive from the work of the Budgetary Policy Committee and are generally firm data for the year 1967 and estimates, in some cases revised, for the subsequent years.

ANNEX IV — TABLE 1

## Trends and Structure of Central Government R &amp; D Expenditure by Objective and by Country

## COMMUNITY

OBJECTIVE	Absolute amount in 10 <sup>6</sup> u.a.				As % of grand total				OBJECTIVE
	1967	1968	1969	1970	1967	1968	1969	1970	
1. Nuclear R&D	740.5	702.0	730.7	756.4	20.7	18.2	17.6	17.2	1. Nuclear R&D
2. Space	216.8	258.0	253.3	272.9	6.1	6.7	6.1	6.2	2. Space
3. Defence	888.8	896.3	922.2	870.9	24.9	23.2	22.2	19.8	3. Defence
4. Earth and its atmosphere	42.4	46.7	53.5	60.7	1.2	1.2	1.3	1.4	4. Earth and its atmosphere
5. Health	70.4	89.0	95.1	104.2	2.0	2.3	2.3	2.4	5. Health
6. Human environment	67.9	78.9	85.2	87.6	1.9	2.0	2.0	2.0	6. Human environment
7. Agricultural productivity	134.3	157.1	164.9	163.4	3.7	4.1	4.0	3.7	7. Agricultural productivity
8. Industrial productivity	257.1	289.4	324.1	368.0	7.2	7.5	7.8	8.4	8. Industrial productivity
9. Computer science and automation	29.2	49.3	61.3	89.4	0.8	1.3	1.4	2.0	9. Computer science and automation
10. Social sciences	51.5	55.7	60.5	63.4	1.4	1.4	1.4	1.5	10. Social sciences
<b>Sub-total (1-10)</b>	<b>2 498.9</b>	<b>2 622.4</b>	<b>2 750.8</b>	<b>2 836.9</b>	<b>69.9</b>	<b>67.9</b>	<b>66.1</b>	<b>64.6</b>	<b>Sub-total (1-10)</b>
11. General promotion of knowledge NES (except Higher Education)	275.3	313.6	360.4	398.5	7.7	8.1	8.7	9.1	11. General promotion of knowledge NES (except Higher Education)
12. General promotion of knowledge NES (Higher Education)	797.9	920.5	1 043.5	1 157.0	22.3	23.9	25.1	26.3	12. General promotion of knowledge NES (Higher Education)
<b>Total (excluding Defence) Not itemized</b>	<b>2 683.3</b> 4.2	<b>2 960.2</b> 2.8	<b>3 232.5</b> 3.3	<b>3 521.5</b> 1.4	<b>75.0</b> 0.1	<b>76.7</b> 0.1	<b>77.7</b> 0.1	<b>80.2</b> 0.0	<b>Total (excluding Defence) Not itemized</b>
<b>GRAND TOTAL</b>	<b>3 576.3</b>	<b>3 859.3</b>	<b>4 158.0</b>	<b>4 393.8</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>GRAND TOTAL</b>

## GERMANY

OBJECTIVE	Absolute amount in national currency (DM 10 <sup>6</sup> )				As % of grand total				Annual rate of variation (%)			OBJECTIVE
	1967	1968	1969	1970	1967	1968	1969	1970	1968/67	1969/68	1970/69	
1. Nuclear R&D	942.5	923.5	930.8	1 149.9	10.5	18.4	16.5	18.1	- 2.0	0.8	23.5	1. Nuclear R&D
2. Space	301.7	341.5	361.6	430.6	6.3	6.8	6.4	6.7	13.2	5.9	19.1	2. Space
3. Defence	1 043.8	986.0	1 070.7	1 101.8	21.6	19.6	19.0	17.3	- 5.5	8.6	2.9	3. Defence
4. Earth and its atmosphere	88.5	79.3	90.3	99.5	1.8	1.6	1.6	1.5	- 10.4	13.9	10.1	4. Earth and its atmosphere
5. Health	99.5	111.6	111.2	138.8	2.1	2.2	2.0	2.2	12.2	- 0.4	24.8	5. Health
6. Human environment	39.5	42.0	59.0	67.6	0.8	0.8	1.0	1.1	6.4	40.7	14.5	6. Human environment
7. Agricultural productivity	109.0	108.4	114.2	117.9	2.3	2.1	2.0	1.9	- 0.6	5.3	3.3	7. Agricultural productivity
8. Industrial productivity	194.4	193.3	289.1	345.7	4.0	3.8	5.1	5.4	- 0.6	49.6	19.6	8. Industrial productivity
9. Computer science and automation	67.8	73.7	117.2	200.0	1.4	1.5	2.1	3.1	8.7	59.0	70.7	9. Computer science and automation
10. Social sciences	82.8	88.3	93.7	100.3	1.7	1.8	1.7	1.6	6.6	6.1	7.1	10. Social sciences
<b>Sub-total (1-10)</b>	<b>2 969.5</b>	<b>2 947.6</b>	<b>3 237.8</b>	<b>3 752.1</b>	<b>61.5</b>	<b>58.6</b>	<b>57.4</b>	<b>58.9</b>	<b>0.7</b>	<b>9.8</b>	<b>15.9</b>	<b>Sub-total (1-10)</b>
11. General promotion of knowledge NES (except Higher Education)	325.4	355.8	466.4	493.8	6.7	7.1	8.3	7.8	9.3	31.1	5.9	11. General promotion of knowledge NES (except Higher Education)
12. General promotion of knowledge NES (Higher Education)	1 538.1	1 725.2	1 930.4	2 123.0	31.8	34.3	34.3	33.3	12.2	11.9	10.0	12. General promotion of knowledge NES (Higher Education)
<b>Total (excluding Defence)</b>	<b>3 789.2</b>	<b>4 042.6</b>	<b>4 563.9</b>	<b>5 267.1</b>	<b>78.4</b>	<b>80.4</b>	<b>81.0</b>	<b>82.7</b>	<b>6.7</b>	<b>12.9</b>	<b>15.4</b>	<b>Total (excluding Defence)</b>
<b>GRAND TOTAL</b>	<b>4 833.0</b>	<b>5 028.6</b>	<b>5 634.6</b>	<b>6 368.9</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>4.0</b>	<b>12.1</b>	<b>13.0</b>	<b>GRAND TOTAL</b>

ANNEX IV — TABLE 1

## Trends and Structure of Central Government R &amp; D Expenditure by Objective and by Country

## BELGIUM

OBJECTIVE	Absolute amount in national currency (B.Fr. 10 <sup>6</sup> )				As % of grand total				Annual rate of variation (%)			OBJECTIVE
	1967	1968	1969	1970	1967	1968	1969	1970	1968/67	1969/68	1970/69	
1. Nuclear R&D	999.9	1 131.9	1 225.6	1 510.4	22.6	24.1	23.1	24.3	13.2	8.3	23.2	1. Nuclear R&D
2. Space	349.8	338.2	357.5	382.9	7.9	7.2	6.7	6.2	- 3.3	5.7	7.1	2. Space
3. Defence	55.0	56.4	125.7	138.6	1.2	1.2	2.4	2.2	2.4	123.1	10.2	3. Defence
4. Earth and its atmosphere	119.4	117.7	130.5	150.9	2.7	2.5	2.5	2.4	- 1.5	10.9	15.6	4. Earth and its atmosphere
5. Health	149.5	159.1	184.7	220.9	3.4	3.4	3.5	3.5	6.4	16.1	19.6	5. Health
6. Human environment	100.1	76.5	95.8	86.7	2.3	1.6	1.8	1.4	- 23.6	25.2	- 9.5	6. Human environment
7. Agricultural productivity	224.9	294.0	300.9	357.1	5.0	6.2	5.6	5.8	30.7	2.4	18.7	7. Agricultural productivity
8. Industrial productivity	579.6	483.9	570.4	720.6	13.1	10.3	10.7	11.6	- 16.5	17.9	26.3	8. Industrial productivity
9. Computer science and automa- tion	—	12.0	4.3	5.2	—	0.2	0.1	0.1	—	- 64.2	21.4	9. Computer science and automa- tion
10. Social sciences	36.4	41.8	42.8	46.6	0.8	0.9	0.8	0.8	14.6	2.4	8.9	10. Social sciences
<b>Sub-total (1-10)</b>	<b>2 614.6</b>	<b>2 711.5</b>	<b>3 038.2</b>	<b>3 619.9</b>	<b>59.0</b>	<b>57.6</b>	<b>57.2</b>	<b>58.3</b>	<b>3.7</b>	<b>12.1</b>	<b>19.1</b>	<b>Sub-total (1-10)</b>
11. General promotion of knowledge NES (except Higher Education)	457.7	517.6	571.0	643.0	10.3	11.0	10.8	10.4	13.1	10.3	12.6	11. General promotion of knowledge NES (except Higher Education)
12. General promotion of knowledge NES (Higher Education)	1 359.7	1 474.9	1 702.0	1 938.7	30.7	31.4	32.0	31.3	8.5	15.4	13.9	12. General promotion of knowledge NES (Higher Education)
<b>Total (excluding Defence)</b>	<b>4 377.0</b>	<b>4 647.6</b>	<b>5 185.5</b>	<b>6 063.0</b>	<b>98.8</b>	<b>98.8</b>	<b>97.6</b>	<b>97.8</b>	<b>6.2</b>	<b>11.6</b>	<b>16.9</b>	<b>Total (excluding Defence)</b>
<b>GRAND TOTAL</b>	<b>4 432.0</b>	<b>4 704.0</b>	<b>5 311.2</b>	<b>6 201.6</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>6.1</b>	<b>12.9</b>	<b>16.8</b>	<b>GRAND TOTAL</b>

## FRANCE

OBJECTIVE	Absolute amount in national currency (F.Fr. 10 <sup>6</sup> )				As % of grand total				Annual rate of variation (%)			OBJECTIVE
	1967	1968	1969	1970	1967	1968	1969	1970	1968/67	1969/68	1970/69	
1. Nuclear R&D	1 793.9	1 614.2	1 767.0	1 600	20.3	16.7	17.0	16.3	- 10.0	9.5	- 9.5	1. Nuclear R&D
2. Space	527.1	687.1	656.2	660	6.0	7.1	6.3	6.7	30.4	- 4.5	0.6	2. Space
3. Defence	2 985.2	3 070.0	3 200.0	3 000	33.8	31.8	30.8	30.6	2.8	4.2	- 6.3	3. Defence
4. Earth and its atmosphere	58.6	81.6	95.2	110	0.7	0.8	0.9	1.1	39.2	16.7	15.5	4. Earth and its atmosphere
5. Health	156.2	209.7	218.4	220	1.8	2.2	2.1	2.2	34.3	4.1	0.7	5. Health
6. Human environment	221.0	259.9	274.4	280	2.5	2.7	2.6	2.9	17.6	5.6	2.0	6. Human environment
7. Agricultural productivity	382.9	444.2	477.1	460	4.3	4.6	4.6	4.7	16.0	7.4	- 3.6	7. Agricultural productivity
8. Industrial productivity	869.3	998.7	1 057.3	800	9.8	10.3	10.1	8.2	14.9	5.9	- 24.3	8. Industrial productivity
9. Computer science and automa- tion	56.5	142.0	144.0	170	0.6	1.5	1.4	1.8	151.3	1.4	18.1	9. Computer science and automa- tion
10. Social sciences	82.0	98.9	112.0	100	0.9	1.0	1.1	1.0	20.6	13.2	- 10.7	10. Social sciences
<b>Sub-total (1-10)</b>	<b>7 132.7</b>	<b>7 606.3</b>	<b>8 001.6</b>	<b>7 400</b>	<b>80.7</b>	<b>78.7</b>	<b>76.9</b>	<b>75.5</b>	<b>6.6</b>	<b>5.2</b>	<b>- 7.5</b>	<b>Sub-total (1-10)</b>
11. General promotion of knowledge NES (except Higher Education)	684.9	815.1	920.2	900	7.8	8.4	8.8	9.2	19.0	12.9	- 2.2	11. General promotion of knowledge NES (except Higher Education)
12. General promotion of knowledge NES (Higher Education)	998.1	1 234.3	1 465.5	1 500	11.3	12.8	14.1	15.3	23.7	18.7	2.4	12. General promotion of knowledge NES (Higher Education)
<b>Total (excluding Defence) Not itemized</b>	<b>5 830.5</b> <b>20.6</b>	<b>6 585.7</b> <b>14.0</b>	<b>7 187.3</b> <b>17.3</b>	<b>6 800</b> <b>—</b>	<b>66.0</b> <b>0.2</b>	<b>68.1</b> <b>0.1</b>	<b>69.0</b> <b>0.2</b>	<b>69.4</b> <b>—</b>	<b>13.0</b> <b>- 32.0</b>	<b>9.1</b> <b>23.6</b>	<b>- 5.4</b> <b>—</b>	<b>Total (excluding Defence) Not itemized</b>
<b>GRAND TOTAL</b>	<b>8 836.3</b>	<b>9 669.7</b>	<b>10 404.6</b>	<b>9 800</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>9.4</b>	<b>7.6</b>	<b>- 5.8</b>	<b>GRAND TOTAL</b>

ANNEX IV — TABLE 1

## Trends and Structure of Central Government R &amp; D Expenditure by Objective and by Country

## ITALY

OBJECTIVE	Absolute amount in national currency (It. Lire 10 <sup>9</sup> )				As % of grand total				Annual rate of variation (%)			OBJECTIVE
	1967	1968	1969	1970	1967	1968	1969	1970	1968/67	1969/68	1970/69	
1. Nuclear R&D	61.9	59.7	62.9	57.4	34.6	31.1	30.2	20.1	- 3.5	5.4	- 8.8	1. Nuclear R&D
2. Space	13.3	10.6	10.4	12.4	7.4	5.5	5.0	4.3	- 20.4	- 1.7	19.0	2. Space
3. Defence	8.9	8.9	8.6	8.0	5.0	4.7	4.1	2.8	- 0.2	- 3.5	- 7.3	3. Defence
4. Earth and its atmosphere	1.3	3.0	3.1	3.5	0.7	1.6	1.5	1.2	135.3	2.9	12.9	4. Earth and its atmosphere
5. Health	2.6	4.2	5.9	6.5	1.5	2.2	2.8	2.3	57.8	41.9	10.1	5. Health
6. Human environment	3.5	4.6	4.3	4.3	2.0	2.4	2.1	1.5	31.9	- 7.0	0.2	6. Human environment
7. Agricultural productivity	2.8	7.1	7.6	7.8	1.5	3.7	3.6	2.7	157.4	6.5	2.6	7. Agricultural productivity
8. Industrial productivity	2.6	6.2	10.4	60.5	1.5	3.2	5.0	21.2	135.2	67.8	484.9	8. Industrial productivity
9. Computer science and automa- tion	0.5	1.2	1.5	1.5	0.3	0.6	0.7	0.5	139.1	28.0	- 1.2	9. Computer science and automa- tion
10. Social sciences	3.3	2.8	2.6	2.7	1.8	1.5	1.2	0.9	- 13.9	- 7.3	- 3.5	10. Social sciences
<b>Sub-total (1-10)</b>	<b>100.7</b>	<b>108.3</b>	<b>117.3</b>	<b>164.6</b>	<b>56.3</b>	<b>56.5</b>	<b>56.2</b>	<b>57.5</b>	<b>7.6</b>	<b>8.3</b>	<b>40.3</b>	<b>Sub-total (1-10)</b>
11. General promotion of knowledge NES (except Higher Education)	22.6	23.6	23.7	46.0	12.7	12.3	11.4	16.1	4.3	0.5	93.7	11. General promotion of knowledge NES (except Higher Education)
12. General promotion of knowledge NES (Higher Education)	55.4	60.0	67.5	75.5	31.0	31.2	32.4	26.4	8.3	12.5	11.9	12. General promotion of knowledge NES (Higher Education)
<b>Total (excluding Defence)</b>	<b>169.8</b>	<b>183.0</b>	<b>199.9</b>	<b>278.1</b>	<b>95.0</b>	<b>95.3</b>	<b>95.9</b>	<b>97.2</b>	<b>7.8</b>	<b>9.3</b>	<b>39.1</b>	<b>Total (excluding Defence)</b>
<b>GRAND TOTAL</b>	<b>178.7</b>	<b>191.9</b>	<b>208.5</b>	<b>286.1</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>7.4</b>	<b>8.7</b>	<b>37.2</b>	<b>GRAND TOTAL</b>

## NETHERLANDS

OBJECTIVE	Absolute amount in national currency (Fl. 10 <sup>6</sup> )				As % of grand total				Annual rate of variation (%)			OBJECTIVE
	1967	1968	1969	1970	1967	1968	1969	1970	1968/67	1969/68	1970/69	
1. Nuclear R&D	81.7	94.3	96.7	116.1	11.1	10.7	9.9	10.4	15.3	2.6	20.1	1. Nuclear R&D
2. Space	23.0	35.3	37.9	32.4	3.1	4.0	3.9	2.9	53.8	7.3	- 14.6	2. Space
3. Defence	28.2	45.3	53.0	51.1	3.8	5.2	5.4	4.6	60.8	17.0	- 3.6	3. Defence
4. Earth and its atmosphere	14.5	11.3	16.4	18.6	1.9	1.3	1.7	1.7	- 21.7	44.6	13.4	4. Earth and its atmosphere
5. Health	24.3	31.7	41.3	43.0	3.3	3.6	4.2	3.9	30.4	30.3	4.1	5. Health
6. Human environment	20.3	24.7	30.2	36.5	2.8	2.8	3.1	3.3	21.4	22.3	21.1	6. Human environment
7. Agricultural productivity	74.3	82.4	92.1	104.1	10.1	9.4	9.4	9.4	10.9	11.8	13.0	7. Agricultural productivity
8. Industrial productivity	60.3	69.9	65.8	66.2	8.2	8.0	6.7	5.9	15.9	- 5.8	0.6	8. Industrial productivity
9. Computer science and automa- tion	—	—	4.0	5.9	—	—	0.4	0.5	—	—	47.0	9. Computer science and automa- tion
10. Social sciences	29.9	29.8	36.1	46.2	4.1	3.4	3.7	4.1	- 0.4	20.9	28.1	10. Social sciences
<b>Sub-total (1-10)</b>	<b>356.5</b>	<b>424.7</b>	<b>473.5</b>	<b>520.1</b>	<b>48.4</b>	<b>48.4</b>	<b>48.4</b>	<b>46.7</b>	<b>19.1</b>	<b>11.5</b>	<b>9.9</b>	<b>Sub-total (1-10)</b>
11. General promotion of knowledge NES (except Higher Education)	35.5	41.3	51.4	54.5	4.8	4.7	5.2	4.9	16.4	24.5	6.0	11. General promotion of knowledge NES (except Higher Education)
12. General promotion of knowledge NES (Higher Education)	345.2	411.6	454.4	533.4	46.8	46.9	46.4	47.9	19.2	10.4	17.4	12. General promotion of knowledge NES (Higher Education)
<b>Total (excluding Defence) Not itemized</b>	<b>709.0</b>	<b>832.3</b>	<b>926.3</b>	<b>1 056.9</b>	<b>96.2</b>	<b>94.8</b>	<b>94.6</b>	<b>94.9</b>	<b>17.4</b>	<b>11.3</b>	<b>14.1</b>	<b>Total (excluding Defence) Not itemized</b>
<b>GRAND TOTAL</b>	<b>737.2</b>	<b>877.6</b>	<b>979.3</b>	<b>1 113.2</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>19.1</b>	<b>11.6</b>	<b>13.7</b>	<b>GRAND TOTAL</b>

ANNEX IV — TABLE 2

a) Per capita R &amp; D Expenditure in u.a.; comparative table of rank; ratios between highest and lowest values

1969

OBJECTIVE	Germany		Belgium		France		Italy		Netherlands		Community		OBJECTIVE
	POPULATION (millions)										Max/min ratio	POPULATION (millions)	
	60,5	R	9,7	R	50,3	R	53,3	R	12,8	R	186,6		
1. Nuclear R&D	3,93	2	2,54	3	6,78	1	1,90	5	2,08	4	3,9	3,6	1. Nuclear R&D
2. Space	1,53	2	0,74	4	2,52	1	0,32	5	0,82	3	1,4	0,8	2. Space
3. Defence	4,52	2	0,26	4	12,27	1	0,26	4	1,14	3	4,9	47,2	3. Defence
4. Earth and its atmosphere	0,38	1	0,27	4	0,37	2	0,10	5	0,35	3	0,3	3,8	4. Earth and its atmosphere
5. Health	0,47	3	0,38	4	0,84	2	0,18	5	0,89	1	0,5	4,9	5. Health
6. Human environment	0,25	3	0,20	4	1,05	1	0,13	5	0,65	2	0,5	8,1	6. Human environment
7. Agricultural productivity	0,48	4	0,62	3	1,83	2	0,23	5	1,98	1	0,9	8,6	7. Agricultural productivity
8. Industrial productivity	1,22	3	1,18	4	4,05	1	0,31	5	1,42	2	1,7	13,1	8. Industrial productivity
9. Computer science and automation	0,49	2	0,01	5	0,55	1	0,05	4	0,09	3	0,3	55,0	9. Computer science and automation
10. Social sciences	0,40	3	0,10	4	0,43	2	0,08	5	0,78	1	0,3	9,7	10. Social sciences
<b>Sub-total (1-10)</b>	<b>13,67</b>	<b>2</b>	<b>6,30</b>	<b>4</b>	<b>30,69</b>	<b>1</b>	<b>3,56</b>	<b>5</b>	<b>10,20</b>	<b>3</b>	<b>14,7</b>	<b>8,6</b>	<b>Sub-total (1-10)</b>
11. General promotion of knowledge NES (except Higher Education)	1,97	2	1,18	3	3,53	1	0,71	5	1,11	4	1,9	5,0	11. General promotion of knowledge NES (except Higher Education)
12. General promotion of knowledge NES (Higher Education)	8,15	2	3,52	4	5,62	3	2,03	5	9,78	1	5,6	4,8	12. General promotion of knowledge NES (Higher Education)
<b>Total (excluding Defence)</b>	<b>19,27</b>	<b>3</b>	<b>10,73</b>	<b>4</b>	<b>27,63</b>	<b>1</b>	<b>6,0</b>	<b>5</b>	<b>19,93</b>	<b>2</b>	<b>17,3</b>	<b>4,6</b>	<b>Total (excluding Defence)</b>
<b>GRAND TOTAL</b>	<b>23,80</b>	<b>2</b>	<b>11,00</b>	<b>4</b>	<b>39,90</b>	<b>1</b>	<b>6,3</b>	<b>5</b>	<b>21,1</b>	<b>3</b>	<b>22,2</b>	<b>6,4</b>	<b>GRAND TOTAL</b>

b) R &amp; D Expenditure in u.a. per 10.000 u.a. of GDP; comparative table of rank; ratios between highest and lowest values

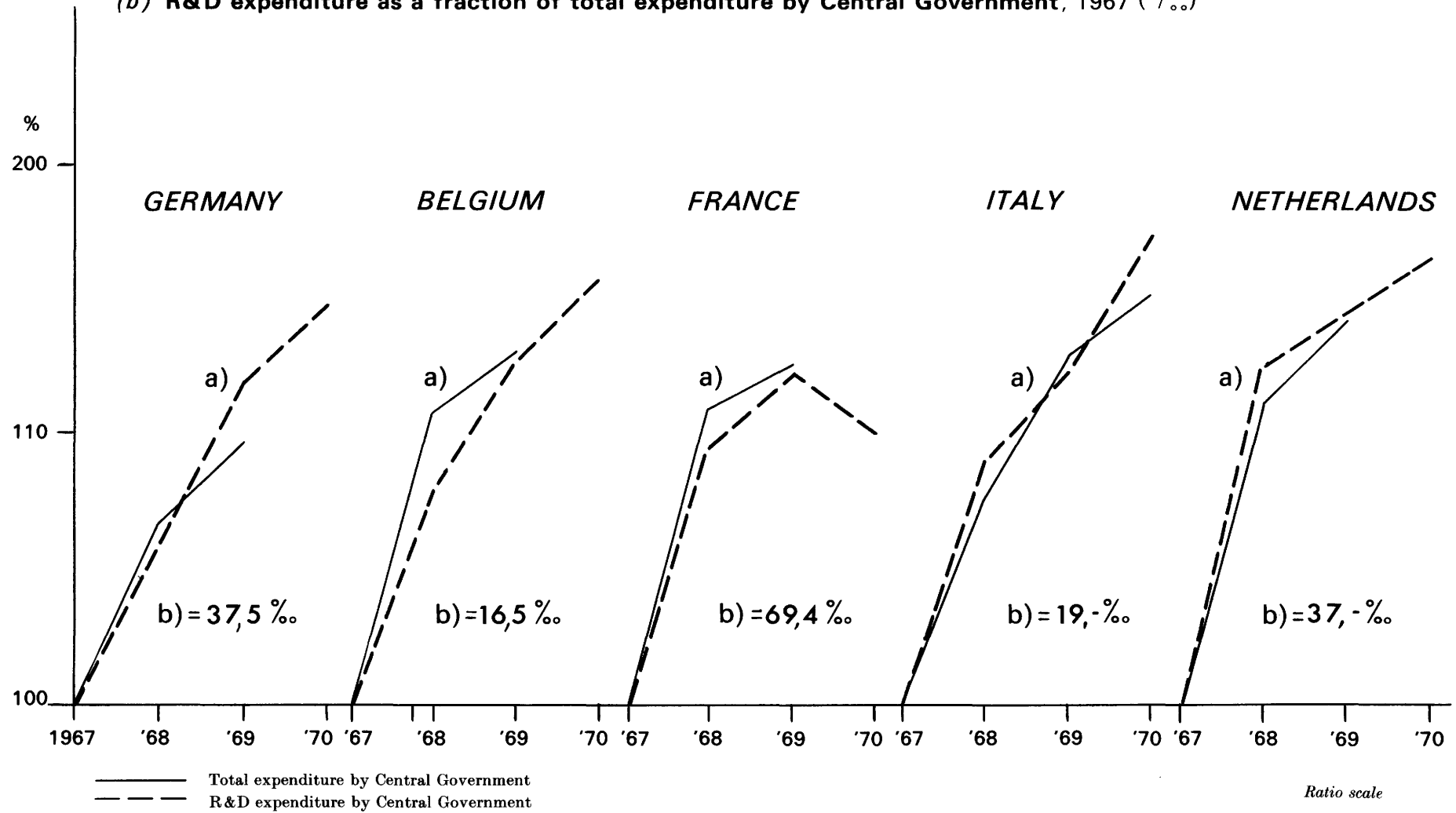
1969

OBJECTIVE	Germany		Belgium		France		Italy		Netherlands		Community		OBJECTIVE
	GDP in 10 <sup>6</sup> u.a.										Max/min ratio	GDP in 10 <sup>6</sup> u.a.	
	150,0	R	22,9	R	139,0	R	82,6	R	27,8	R	422,3		
1. Nuclear R&D	15,82	2	10,71	4	24,39	1	12,19	3	9,63	5	17,3	2,5	1. Nuclear R&D
2. Space	6,15	2	3,13	4	9,06	1	2,01	5	3,77	3	6,0	4,5	2. Space
3. Defence	18,20	2	1,10	5	44,17	1	1,67	4	5,28	3	21,8	40,2	3. Defence
4. Earth and its atmosphere	1,54	2	1,14	4	1,31	3	0,60	5	1,63	1	1,3	2,7	4. Earth and its atmosphere
5. Health	1,89	3	1,61	4	3,01	2	1,14	5	4,11	1	2,2	3,6	5. Health
6. Human environment	1,00	3	0,84	4	3,79	1	0,83	5	3,00	2	2,0	4,5	6. Human environment
7. Agricultural productivity	1,94	4	2,63	3	6,59	2	1,47	5	9,17	1	3,9	6,2	7. Agricultural productivity
8. Industrial productivity	4,92	4	4,99	3	14,59	1	2,00	5	6,56	2	7,7	7,3	8. Industrial productivity
9. Computer science and automation	2,00	1	0,04	5	1,99	2	0,30	4	0,40	3	1,4	50,0	9. Computer science and automation
10. Social sciences	1,60	2	0,37	5	1,55	3	0,51	4	3,59	1	1,4	9,7	10. Social sciences
<b>Sub-total (1-10)</b>	<b>55,06</b>	<b>2</b>	<b>26,56</b>	<b>4</b>	<b>110,45</b>	<b>1</b>	<b>22,72</b>	<b>5</b>	<b>47,14</b>	<b>3</b>	<b>65,0</b>	<b>4,8</b>	<b>Sub-total (1-10)</b>
11. General promotion of knowledge NES (except Higher Education)	7,93	2	4,99	4	12,70	1	4,60	5	5,12	3	8,5	2,8	11. General promotion of knowledge NES (except Higher Education)
12. General promotion of knowledge NES (Higher Education)	32,81	2	14,88	4	20,23	3	13,08	5	45,23	1	24,7	3,5	12. General promotion of knowledge NES (Higher Education)
<b>Total (excluding Defence)</b>	<b>77,58</b>	<b>3</b>	<b>45,33</b>	<b>4</b>	<b>99,45</b>	<b>1</b>	<b>38,73</b>	<b>5</b>	<b>92,20</b>	<b>2</b>	<b>76,5</b>	<b>2,6</b>	<b>Total (excluding Defence)</b>
<b>GRAND TOTAL</b>	<b>95,78</b>	<b>3</b>	<b>46,43</b>	<b>4</b>	<b>143,62</b>	<b>1</b>	<b>40,4</b>	<b>5</b>	<b>97,49</b>	<b>2</b>	<b>98,3</b>	<b>3,6</b>	<b>GRAND TOTAL</b>



(a) Curve of R&D expenditure and total expenditure by Central Government, 1967 = 100

(b) R&D expenditure as a fraction of total expenditure by Central Government, 1967 (‰)



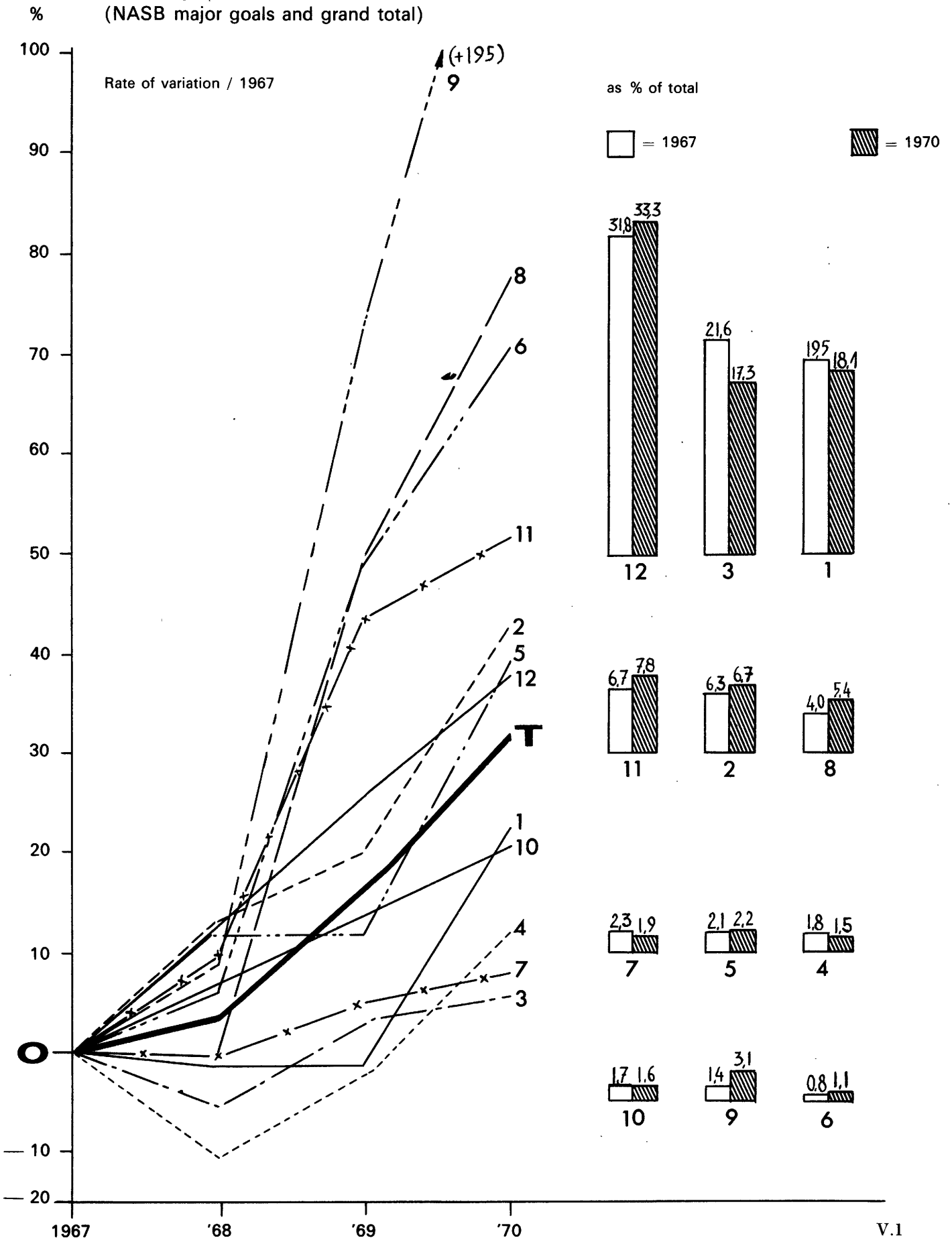


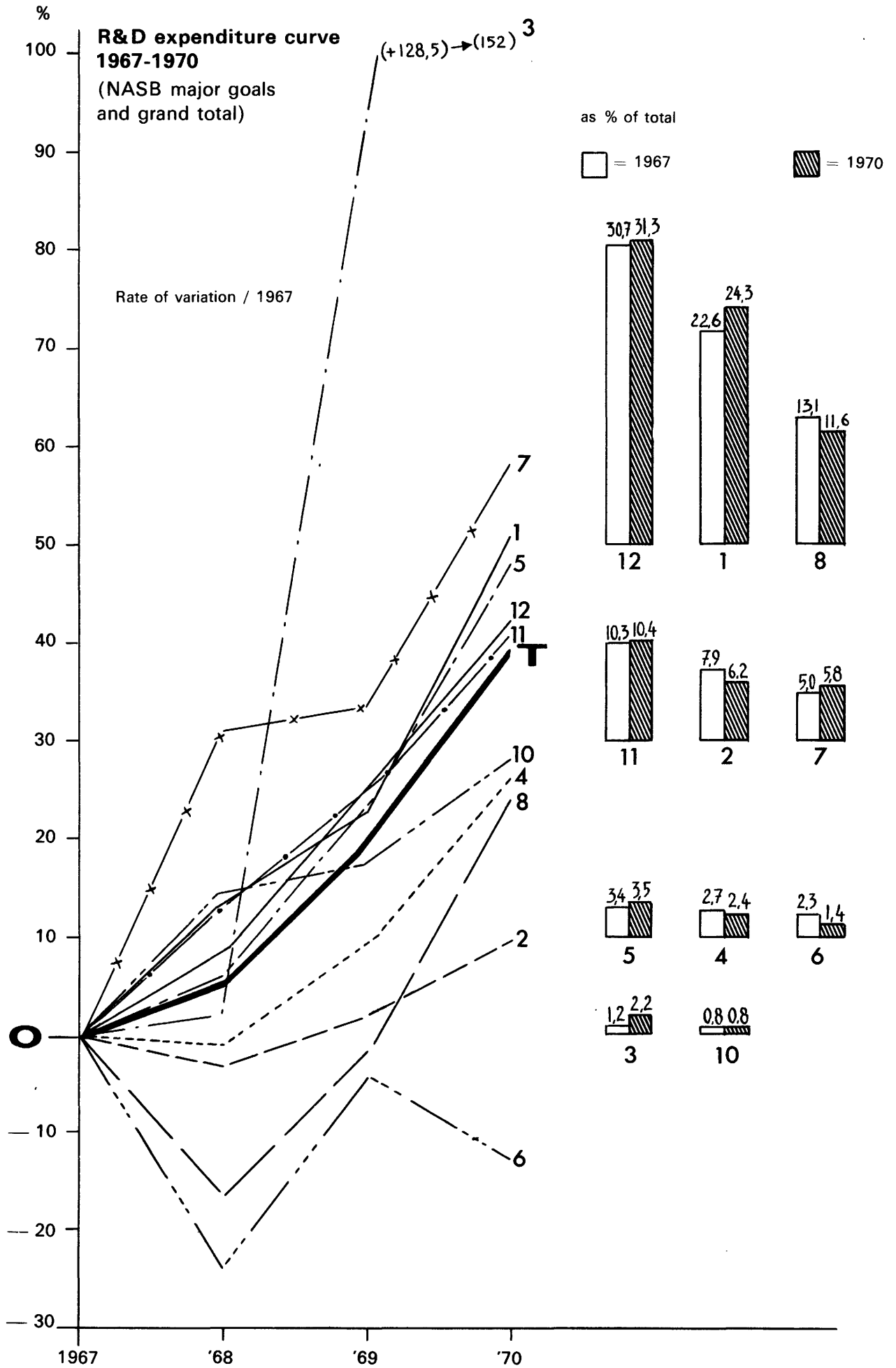
**ANNEX V**

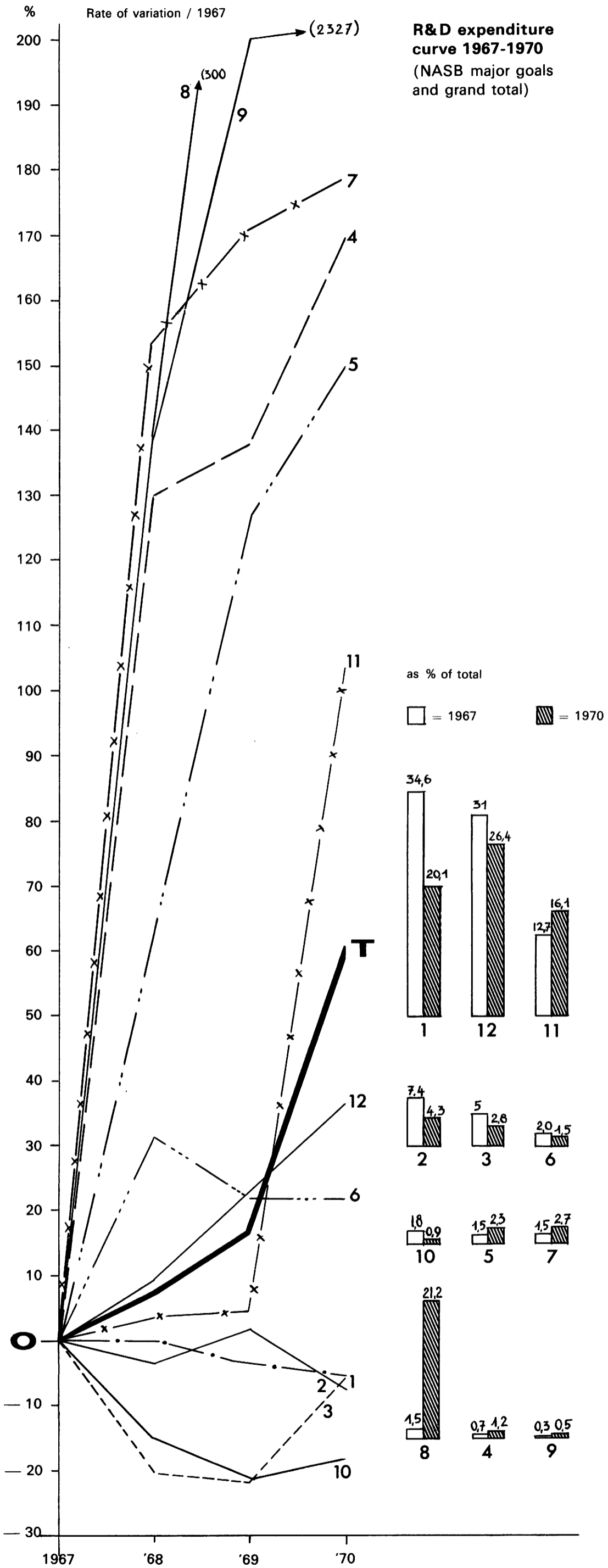
**Graphs**



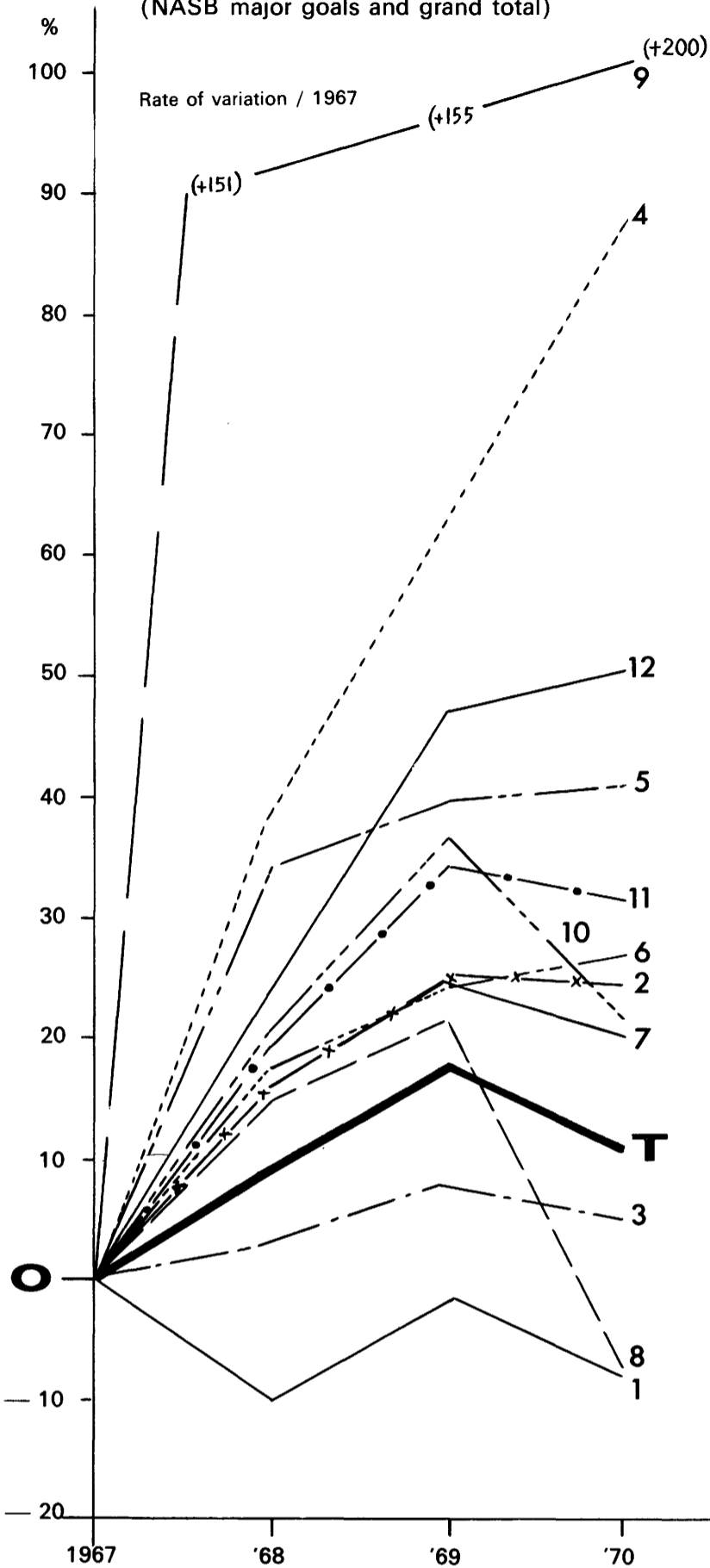
**R&D expenditure curve 1967-1970**  
(NASB major goals and grand total)







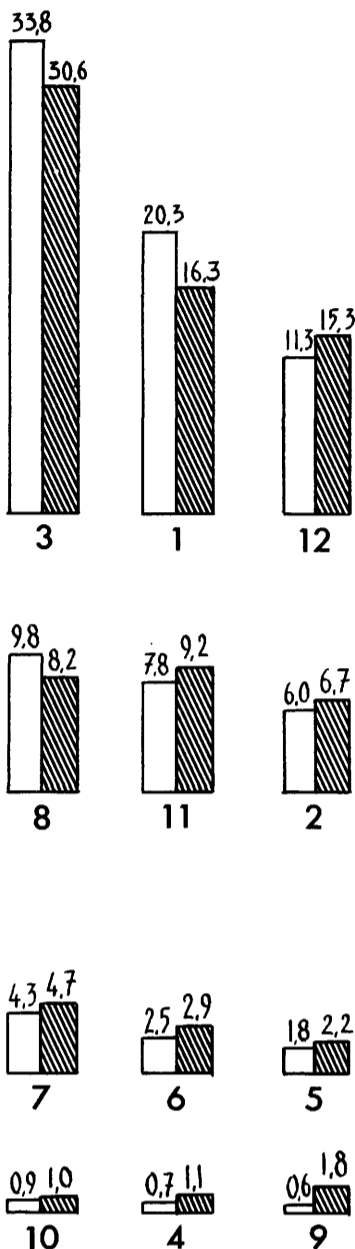
**R&D expenditure curve 1967-1970**  
(NASB major goals and grand total)



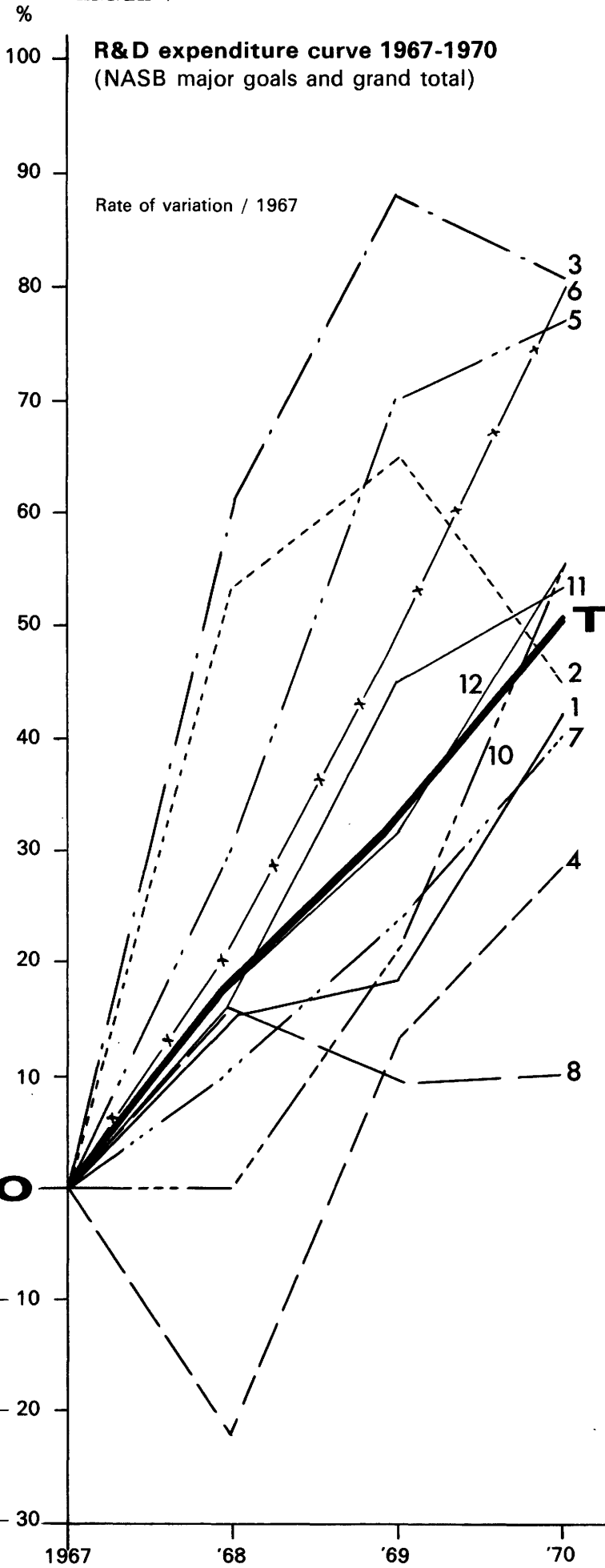
as % of total

□ = 1967

▨ = 1970



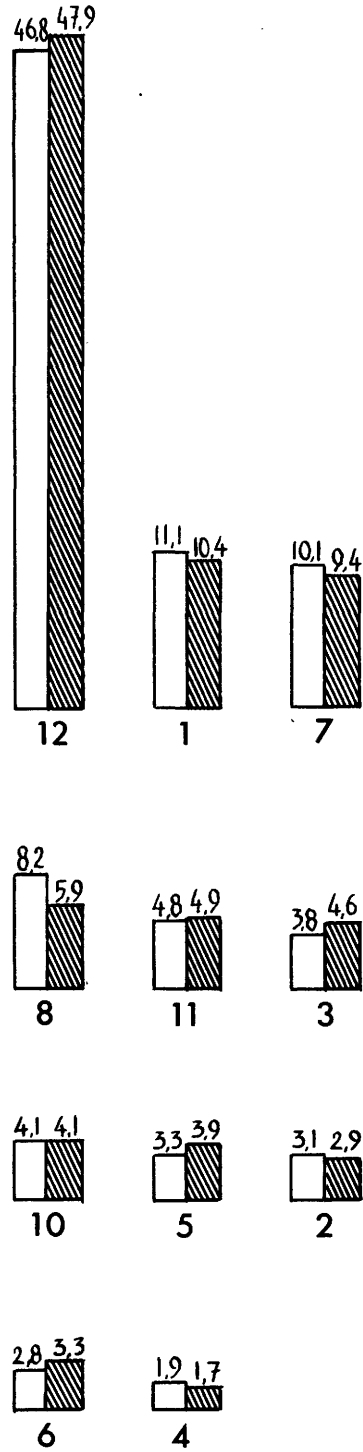




as % of total

□ = 1967

▨ = 1970





ANNEX VI

**National Projects and Contributions  
to Multilateral and Bilateral Projects**



## INTRODUCTION

This Annex sets out various data on the Community countries' contributions to *multilateral and bilateral projects*. The central governments' total R&D expenditure, broken down by major goals, is subdivided for the purpose into, on the one hand, appropriations earmarked for strictly national projects, and, on the other hand, the amounts assigned to international projects.

The latter sums comprise the financial contributions to international organizations (e.g., institutions under the sponsorship of the United Nations) and Community institutions (e.g., Euratom) and participations in particular bilateral and multilateral projects<sup>(1)</sup>. The research worker exchange programmes have been disregarded.

These two categories of expenditure are shown generally in all the Annex tables against the initial letters N (national expenditure) and I (contributions to multilateral and bilateral projects). The letter T (total) relates to the sum of the two categories, i.e., the total R&D expenditure by the central governments.

The first set of tables (*Tables a*) shows the categories of expenditure (N, I and T) per country, expressed in units of account for each year.

The second set (*Tables b*) gives a horizontal analysis by country of the various expenditure categories in the entire Community for each year, the figures being expressed in percentages.

The third set (*Tables c*) gives a vertical breakdown by country of each expenditure category for each year, the figures being expressed in percentages.

The fourth set (*Tables d*) shows for each country the breakdown by year under the various major goals of the national projects and the contributions to multilateral and bilateral projects, the figures here being expressed in national currencies and in percentages.

The fifth set (*Tables e*) summarizes the findings, giving by year and by country a horizontal analysis and a vertical breakdown of the total public R&D appropriations, divided into expenditure categories (N, I and T), together with their annual rates of variation.

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<sup>(1)</sup> The flows in question usually relate to extramural expenditure assigned to the rest of the world and exclude what are known as counterperformance contracts ("contrats-retour"), i.e., expenditure relating to R&D carried out on the country's own territory and financed by other countries. Nevertheless, for certain bilateral projects (defence, aeronautics), the financing by the countries themselves of research carried out on their own territory has been taken into consideration.

## ANNEX VI

## National projects and contributions to multilateral and bilateral projects

a) In 10<sup>3</sup> u.a.

1967

OBJECTIVE		Germany	Belgium	France	Italy	Netherlands	Community
1. Nuclear R&D	N	178 894	5 593	308 828	57 756	13 396	564 467
	I	56 725	14 404	54 526	41 234	9 188	176 077
	T	235 619	19 997	363 354	98 990	22 584	740 544
2. Space	N	37 666	649	76 463	5 343	1 590	121 711
	I	37 750	6 346	30 301	15 891	4 752	95 040
	T	75 416	6 995	106 764	21 234	6 342	216 751
3. Defence	N	217 169	1 040	574 269	14 331	7 728	814 537
	I	43 775	60	30 382	—	61	74 278
	T	260 944	1 100	604 651	14 331	7 789	888 815
4. Earth and its atmosphere	N	21 873	2 262	11 322	2 002	3 957	41 416
	I	250	127	547	48	36	1 008
	T	22 123	2 389	11 869	2 050	3 993	42 424
5. Health	N	24 724	2 991	31 233	3 219	6 711	68 878
	I	150	—	405	1 000	—	1 555
	T	24 874	2 991	31 638	4 219	6 711	70 433
6. Human environment	N	9 868	1 990	44 703	5 478	5 615	67 654
	I	—	12	61	120	—	193
	T	9 868	2 002	44 764	5 598	5 615	67 847
7. Agricultural productivity	N	27 262	4 497	68 826	4 251	20 531	125 367
	I	—	1	8 730	184	—	8 915
	T	27 262	4 498	77 556	4 435	20 531	134 282
8. Industrial productivity	N	48 594	11 489	45 817	4 192	16 497	126 589
	I	...	104	130 260	—	159	130 523
	T	48 594	11 593	176 077	4 192	16 656	257 112
9. Computer science and automation	N	16 945	—	11 383	794	—	29 122
	I	—	—	61	—	—	61
	T	16 945	—	11 444	794	—	29 183
10. Social sciences	N	20 718	654	16 487	4 357	7 632	49 848
	I	...	74	122	869	636	1 701
	T	20 718	728	16 609	5 226	8 268	51 549
<b>Sub-total (1-10)</b>	N	<b>603 713</b>	<b>31 165</b>	<b>1 189 331</b>	<b>101 723</b>	<b>83 657</b>	<b>2 009 589</b>
	I	<b>138 650</b>	<b>21 128</b>	<b>255 395</b>	<b>59 346</b>	<b>14 832</b>	<b>489 351</b>
	T	<b>742 363</b>	<b>52 293</b>	<b>1 444 726</b>	<b>161 069</b>	<b>98 489</b>	<b>2 498 940</b>
11. General promotion of knowledge NES (excluding Higher Education)	N	81 185	9 129	138 726	35 962	9 475	274 477
	I	175	24	—	291	321	811
	T	81 360	9 153	138 726	36 253	9 796	275 288
12. General promotion of knowledge NES (Higher Education)	N	384 525	27 195	202 165	88 617	95 367	797 869
	I	—	—	—	—	—	—
	T	384 525	27 195	202 165	88 617	95 367	797 869
Not itemized	N	—	—	3 424	—	—	3 424
	I	—	—	749	—	—	749
	T	—	—	4 173	—	—	4 173
<b>GRAND TOTAL</b>	N	<b>1 069 423</b>	<b>67 489</b>	<b>1 533 646</b>	<b>226 302</b>	<b>188 499</b>	<b>3 085 359</b>
	I	<b>138 825</b>	<b>21 152</b>	<b>256 144</b>	<b>59 637</b>	<b>15 153</b>	<b>490 911</b>
	T	<b>1 208 248</b>	<b>88 641</b>	<b>1 789 790</b>	<b>285 939</b>	<b>203 652</b>	<b>3 576 270</b>

## ANNEX VI

## National projects and contributions to multilateral and bilateral projects

b) In % in the Community

1967

OBJECTIVE		Germany	Belgium	France	Italy	Netherlands	Community
1. Nuclear R&D	N	31.7	1.0	54.7	10.2	2.4	100.0
	I	32.2	8.2	31.0	23.4	5.2	100.0
	T	31.8	2.7	49.1	13.4	3.0	100.0
2. Space	N	31.0	0.5	62.8	4.4	1.3	100.0
	I	39.7	6.7	31.9	16.7	5.0	100.0
	T	34.8	3.2	49.3	9.8	2.9	100.0
3. Defence	N	26.7	0.1	70.5	1.8	0.9	100.0
	I	58.9	0.1	40.9	—	0.1	100.0
	T	29.4	0.1	68.0	1.6	0.9	100.0
4. Earth and its atmosphere	N	52.8	5.5	27.3	4.8	9.6	100.0
	I	24.8	12.6	54.2	4.8	3.6	100.0
	T	52.2	5.6	28.0	4.8	9.4	100.0
5. Health	N	35.9	4.3	45.4	4.7	9.7	100.0
	I	9.6	—	26.1	64.3	—	100.0
	T	35.3	4.3	44.9	6.0	9.5	100.0
6. Human environment	N	14.6	2.9	66.1	8.1	8.3	100.0
	I	—	6.2	31.6	62.2	—	100.0
	T	14.5	3.0	66.0	8.2	8.3	100.0
7. Agricultural productivity	N	21.7	3.6	54.9	3.4	16.4	100.0
	I	—	—	97.9	2.1	—	100.0
	T	20.3	3.3	57.8	3.3	15.3	100.0
8. Industrial productivity	N	38.4	9.1	36.2	3.3	13.0	100.0
	I	...	0.1	99.8	—	0.1	100.0
	T	18.9	4.5	68.5	1.6	6.5	100.0
9. Computer science and automation	N	58.2	—	39.1	2.7	—	100.0
	I	—	—	100.0	—	—	100.0
	T	58.1	—	39.2	2.7	—	100.0
10. Social sciences	N	41.6	1.3	33.1	8.7	15.3	100.0
	I	...	4.3	7.2	51.1	37.4	100.0
	T	40.2	1.4	32.2	10.1	16.1	100.0
<b>Sub-total (1-10)</b>	N	<b>30.0</b>	<b>1.5</b>	<b>59.2</b>	<b>5.1</b>	<b>4.2</b>	<b>100.0</b>
	I	<b>28.4</b>	<b>4.3</b>	<b>52.2</b>	<b>12.1</b>	<b>3.0</b>	<b>100.0</b>
	T	<b>29.7</b>	<b>2.1</b>	<b>57.8</b>	<b>6.5</b>	<b>3.9</b>	<b>100.0</b>
11. General promotion of knowledge NES (excluding Higher Education)	N	29.6	3.3	50.5	13.1	3.5	100.0
	I	21.6	2.9	—	35.9	39.6	100.0
	T	29.6	3.3	50.4	13.2	3.5	100.0
12. General promotion of knowledge NES (Higher Education)	N	48.2	3.4	25.3	11.1	12.0	100.0
	I	—	—	—	—	—	—
	T	48.2	3.4	25.3	11.1	12.0	100.0
<b>TOTAL</b>	N	<b>34.7</b>	<b>2.2</b>	<b>49.7</b>	<b>7.3</b>	<b>6.1</b>	<b>100.0</b>
	I	<b>28.3</b>	<b>4.3</b>	<b>52.2</b>	<b>12.1</b>	<b>3.1</b>	<b>100.0</b>
	T	<b>33.8</b>	<b>2.5</b>	<b>50.0</b>	<b>8.0</b>	<b>5.7</b>	<b>100.0</b>

## ANNEX VI

## National projects and contributions to multilateral and bilateral projects

a) In 10<sup>3</sup> u.a.  
1968

OBJECTIVE		Germany	Belgium	France	Italy	Netherlands	Community
1. Nuclear R&D	N	172 354	12 494	281 808	52 865	15 534	535 055
	I	58 525	10 143	45 148	42 629	10 511	166 956
	T	230 879	22 637	326 956	95 494	26 045	702 011
2. Space	N	41 182	931	109 924	2 526	2 906	157 469
	I	44 200	5 834	29 248	14 386	6 851	100 519
	T	85 382	6 765	139 172	16 912	9 757	257 988
3. Defence	N	200 289	1 065	591 445	14 309	12 466	819 574
	I	46 200	62	30 383	—	61	76 706
	T	246 489	1 127	621 828	14 309	12 527	896 280
4. Earth and its atmosphere	N	19 625	2 284	15 900	4 760	3 091	45 660
	I	200	70	628	62	36	996
	T	19 825	2 354	16 528	4 822	3 127	46 656
5. Health	N	27 753	3 182	42 070	5 216	8 753	86 974
	I	150	—	405	1 440	—	1 995
	T	27 903	3 182	42 475	6 656	8 753	88 969
6. Human environment	N	10 495	1 518	52 582	7 264	6 817	78 676
	I	—	12	61	120	—	193
	T	10 495	1 530	52 643	7 384	6 817	78 869
7. Agricultural productivity	N	27 097	5 878	81 182	11 233	22 772	148 162
	I	—	1	8 790	184	—	8 975
	T	27 097	5 879	89 972	11 417	22 772	157 137
8. Industrial productivity	N	48 315	9 598	50 313	9 861	19 223	137 310
	I	...	81	151 973	—	80	152 134
	T	48 315	9 679	202 286	9 861	19 303	289 444
9. Computer science and automation	N	18 427	240	28 701	1 898	—	49 266
	I	—	—	61	—	—	61
	T	18 427	240	28 762	1 898	—	49 327
10. Social sciences	N	22 080	686	19 890	3 699	7 921	54 276
	I	...	149	142	802	318	1 411
	T	22 080	835	20 032	4 501	8 239	55 687
<b>Sub-total (1-10)</b>	N	<b>587 617</b>	<b>37 876</b>	<b>1 273 815</b>	<b>113 631</b>	<b>99 483</b>	<b>2 112 422</b>
	I	<b>149 275</b>	<b>16 352</b>	<b>266 839</b>	<b>59 623</b>	<b>17 857</b>	<b>509 946</b>
	T	<b>736 892</b>	<b>54 228</b>	<b>1 540 654</b>	<b>173 254</b>	<b>117 340</b>	<b>2 622 368</b>
11. General promotion of knowledge NES (excluding Higher Education)	N	88 828	10 327	165 098	37 784	11 104	313 141
	I	125	25	—	32	301	483
	T	88 953	10 352	165 098	37 816	11 405	313 624
12. General promotion of knowledge NES (Higher Education)	N	431 300	29 499	250 007	95 965	113 704	920 475
	I	—	—	—	—	—	—
	T	431 300	29 499	250 007	95 965	113 704	920 475
Not itemized	N	—	—	2 026	—	—	2 026
	I	—	—	810	—	—	810
	T	—	—	2 836	—	—	2 836
<b>GRAND TOTAL</b>	N	<b>1 107 745</b>	<b>77 702</b>	<b>1 690 946</b>	<b>247 380</b>	<b>224 291</b>	<b>3 348 064</b>
	I	<b>149 400</b>	<b>16 377</b>	<b>267 649</b>	<b>59 655</b>	<b>18 158</b>	<b>511 239</b>
	T	<b>1 257 145</b>	<b>94 079</b>	<b>1 958 595</b>	<b>307 035</b>	<b>242 449</b>	<b>3 859 303</b>



## ANNEX VI

## National projects and contributions to multilateral and bilateral projects

## b) In % in the Community

1968

OBJECTIVE		Germany	Belgium	France	Italy	Netherlands	Community
1. Nuclear R&D	N	32,2	2,3	52,7	9,9	2,9	100,0
	I	35,1	6,1	27,0	25,5	6,3	100,0
	T	32,9	3,2	46,6	13,6	3,7	100,0
2. Space	N	26,2	0,6	69,8	1,6	1,8	100,0
	I	44,0	5,8	29,1	14,3	6,8	100,0
	T	33,1	2,6	53,9	6,6	3,8	100,0
3. Defence	N	24,4	0,1	72,2	1,8	1,5	100,0
	I	60,2	0,1	39,6	—	0,1	100,0
	T	27,5	0,1	69,4	1,6	1,4	100,0
4. Earth and its atmosphere	N	43,0	5,0	34,8	10,4	6,8	100,0
	I	20,1	7,0	63,1	6,2	3,6	100,0
	T	42,5	5,1	35,4	10,3	6,7	100,0
5. Health	N	31,9	3,6	48,4	6,0	10,1	100,0
	I	7,5	—	20,3	72,2	—	100,0
	T	31,4	3,6	47,7	7,5	9,8	100,0
6. Human environment	N	13,4	1,9	66,8	9,2	8,7	100,0
	I	—	6,2	31,6	62,2	—	100,0
	T	13,3	1,9	66,8	9,4	8,6	100,0
7. Agricultural productivity	N	18,3	4,0	54,8	7,6	15,3	100,0
	I	—	—	97,9	2,1	—	100,0
	T	17,2	3,7	57,3	7,3	14,5	100,0
8. Industrial productivity	N	35,2	7,0	36,6	7,2	14,0	100,0
	I	—	0,1	99,8	—	0,1	100,0
	T	16,7	3,3	69,9	3,4	6,7	100,0
9. Computer science and automation	N	37,4	0,5	58,3	3,8	—	100,0
	I	—	—	100,0	—	—	100,0
	T	37,4	0,5	58,3	3,8	—	100,0
10. Social sciences	N	40,7	1,3	36,6	6,8	14,6	100,0
	I	—	10,6	10,1	56,8	22,5	100,0
	T	39,6	1,5	36,0	8,1	14,8	100,0
<b>Sub-total (1-10)</b>	N	<b>27,8</b>	<b>1,8</b>	<b>60,3</b>	<b>5,4</b>	<b>4,7</b>	<b>100,0</b>
	I	<b>29,3</b>	<b>3,2</b>	<b>52,3</b>	<b>11,7</b>	<b>3,5</b>	<b>100,0</b>
	T	<b>28,1</b>	<b>2,1</b>	<b>58,7</b>	<b>6,6</b>	<b>4,5</b>	<b>100,0</b>
11. General promotion of knowledge NES (excluding Higher Education)	N	28,4	3,3	52,7	12,1	3,5	100,0
	I	25,9	5,2	—	6,6	62,3	100,0
	T	28,4	3,3	52,6	12,1	3,6	100,0
12. General promotion of knowledge NES (Higher Education)	N	46,9	3,2	27,2	10,4	12,3	100,0
	I	—	—	—	—	—	—
	T	46,9	3,2	27,2	10,4	12,3	100,0
<b>TOTAL</b>	N	<b>33,1</b>	<b>2,3</b>	<b>50,5</b>	<b>7,4</b>	<b>6,7</b>	<b>100,0</b>
	I	<b>29,2</b>	<b>3,2</b>	<b>52,4</b>	<b>11,7</b>	<b>3,5</b>	<b>100,0</b>
	T	<b>32,6</b>	<b>2,4</b>	<b>50,7</b>	<b>8,0</b>	<b>6,3</b>	<b>100,0</b>

## ANNEX VI

## National projects and contributions to multilateral and bilateral projects

a) In 10<sup>3</sup> u.a.

1969

OBJECTIVE		Germany	Belgium	France	Italy	Netherlands	Community
1. Nuclear R&D	N	190 869	15 983	309 447	68 424	17 969	602 692
	I	46 871	8 528	31 638	32 250	8 743	128 030
	T	237 740	24 511	341 085	100 674	26 712	730 722
2. Space	N	46 289	1 072	95 762	1 582	3 510	148 215
	I	46 079	6 078	30 905	15 040	6 962	105 064
	T	92 368	7 150	126 667	16 622	10 472	253 279
3. Defence	N	223 712	2 450	588 743	13 810	14 593	843 308
	I	49 783	65	28 954	—	61	78 863
	T	273 495	2 515	617 697	13 810	14 654	922 171
4. Earth and its atmosphere	N	22 821	2 479	17 739	4 895	4 486	52 420
	I	255	132	637	66	36	1 126
	T	23 076	2 611	18 376	4 961	4 522	53 546
5. Health	N	28 252	3 694	41 714	7 691	11 402	92 753
	I	153	—	444	1 752	—	2 349
	T	28 405	3 694	42 158	9 443	11 402	95 102
6. Human environment	N	15 081	1 902	52 910	6 752	8 334	84 979
	I	—	13	58	112	—	183
	T	15 081	1 915	52 968	6 864	8 334	85 162
7. Agricultural productivity	N	29 160	6 017	83 737	11 941	24 999	155 854
	I	—	1	8 358	222	456	9 037
	T	29 160	6 018	92 095	12 163	25 455	164 891
8. Industrial productivity	N	73 842	11 355	59 260	16 549	18 033	179 039
	I	...	53	144 831	—	159	145 043
	T	73 842	11 408	204 091	16 549	18 192	324 082
9. Computer science and automation	N	29 933	86	27 738	2 429	1 100	61 286
	I	—	—	58	—	—	58
	T	29 933	86	27 796	2 429	1 100	61 344
10. Social sciences	N	23 926	727	21 465	3 363	9 327	58 808
	I	...	128	154	810	636	1 728
	T	23 926	855	21 619	4 173	9 963	60 536
<b>Sub-total (1-10)</b>	N	<b>683 885</b>	<b>45 765</b>	<b>1 298 515</b>	<b>137 436</b>	<b>113 753</b>	<b>2 279 354</b>
	I	<b>143 141</b>	<b>14 998</b>	<b>246 037</b>	<b>50 252</b>	<b>17 053</b>	<b>471 481</b>
	T	<b>827 026</b>	<b>60 763</b>	<b>1 544 552</b>	<b>187 688</b>	<b>130 806</b>	<b>2 750 835</b>
11. General promotion of knowledge NES (excluding Higher Education)	N	118 831	11 394	177 627	37 959	13 802	359 613
	I	307	27	—	43	393	770
	T	119 138	11 421	177 627	38 002	14 195	360 383
12. General promotion of knowledge NES (Higher Education)	N	493 078	34 039	282 886	107 974	125 525	1 043 502
	I	—	—	—	—	—	—
	T	493 078	34 039	282 886	107 974	125 525	1 043 502
Not itemized	N	—	—	2 529	—	—	2 529
	I	—	—	810	—	—	810
	T	—	—	3 339	—	—	3 339
<b>GRAND TOTAL</b>	N	<b>1 295 794</b>	<b>91 198</b>	<b>1 761 557</b>	<b>283 369</b>	<b>253 080</b>	<b>3 684 998</b>
	I	<b>143 448</b>	<b>15 025</b>	<b>246 847</b>	<b>50 295</b>	<b>17 446</b>	<b>473 061</b>
	T	<b>1 439 242</b>	<b>106 223</b>	<b>2 008 404</b>	<b>333 664</b>	<b>270 526</b>	<b>4 158 059</b>

## ANNEX VI

## National projects and contributions to multilateral and bilateral projects

## b) In % in the Community

1969

OBJECTIVE		Germany	Belgium	France	Italy	Netherlands	Community
1. Nuclear R&D	N	31,7	2,6	51,3	11,4	3,0	100,0
	I	36,6	6,7	24,7	25,2	6,8	100,0
	T	32,5	3,4	46,7	13,8	3,6	100,0
2. Space	N	31,2	0,7	64,6	1,1	2,4	100,0
	I	43,9	5,8	29,4	14,3	6,6	100,0
	T	36,5	2,8	50,0	6,6	4,1	100,0
3. Defence	N	26,5	0,3	69,8	1,7	1,7	100,0
	I	63,1	0,1	36,7	—	0,1	100,0
	T	29,6	0,3	67,0	1,5	1,6	100,0
4. Earth and its atmosphere	N	43,6	4,7	33,8	9,3	8,6	100,0
	I	22,6	11,7	56,6	5,9	3,2	100,0
	T	43,1	4,9	34,3	9,3	8,4	100,0
5. Health	N	30,4	4,0	45,0	8,3	12,3	100,0
	I	6,5	—	18,9	74,6	—	100,0
	T	29,9	3,9	44,3	9,9	12,0	100,0
6. Human environment	N	17,8	2,2	62,3	7,9	9,8	100,0
	I	—	7,1	31,7	61,2	—	100,0
	T	17,7	2,2	62,2	8,1	9,8	100,0
7. Agricultural productivity	N	18,7	3,9	53,7	7,7	16,0	100,0
	I	—	—	92,5	2,5	5,0	100,0
	T	17,7	3,6	55,9	7,4	15,4	100,0
8. Industrial productivity	N	41,3	6,3	33,1	9,2	10,1	100,0
	I	—	—	99,9	—	0,1	100,0
	T	22,8	3,5	63,0	5,1	5,6	100,0
9. Computer science and automation	N	48,8	0,1	45,3	4,0	1,8	100,0
	I	—	—	100,0	—	—	100,0
	T	48,8	0,1	45,3	4,0	1,8	100,0
10. Social sciences	N	40,7	1,2	36,5	5,7	15,9	100,0
	I	—	7,4	8,9	46,9	36,8	100,0
	T	39,5	1,4	35,7	6,9	16,5	100,0
<b>Sub-total (1-10)</b>	N	<b>30,0</b>	<b>2,0</b>	<b>57,0</b>	<b>6,0</b>	<b>5,0</b>	<b>100,0</b>
	I	<b>30,3</b>	<b>3,2</b>	<b>52,2</b>	<b>10,7</b>	<b>3,6</b>	<b>100,0</b>
	T	<b>30,1</b>	<b>2,2</b>	<b>56,1</b>	<b>6,8</b>	<b>4,8</b>	<b>100,0</b>
11. General promotion of knowledge NES (excluding Higher Education)	N	33,0	3,2	49,4	10,6	3,8	100,0
	I	39,9	3,5	—	5,6	51,0	100,0
	T	33,1	3,2	49,3	10,5	3,9	100,0
12. General promotion of knowledge NES (Higher Education)	N	47,3	3,3	27,1	10,3	12,0	100,0
	I	—	—	—	—	—	—
	T	47,3	3,3	27,1	10,3	12,0	100,0
<b>TOTAL</b>	N	<b>35,1</b>	<b>2,5</b>	<b>47,8</b>	<b>7,7</b>	<b>6,9</b>	<b>100,0</b>
	I	<b>30,3</b>	<b>3,2</b>	<b>52,2</b>	<b>10,6</b>	<b>3,7</b>	<b>100,0</b>
	T	<b>34,6</b>	<b>2,6</b>	<b>48,3</b>	<b>8,0</b>	<b>6,5</b>	<b>100,0</b>

## ANNEX VI

## National projects and contributions to multilateral and bilateral projects

a) In 10<sup>3</sup> u.a.

1970

OBJECTIVE		Germany	Belgium	France	Italy	Netherlands	Community
1. Nuclear R&D	N		18 026		58 968	23 380	
	I		12 182		32 845	8 695	
	T		30 208		91 813	32 075	
2. Space	N		1 069		8 665	4 823	
	I		6 590		11 114	4 116	
	T		7 659		19 779	8 939	
3. Defence	N		2 703		12 800	14 067	
	I		69		—	61	
	T		2 772		12 800	14 128	
4. Earth and its atmosphere	N		2 919		5 533	5 093	
	I		99		67	36	
	T		3 018		5 600	5 129	
5. Health	N		4 278		7 928	11 873	
	I		140		2 472	—	
	T		4 418		10 400	11 873	
6. Human environment	N		1 721		6 763	10 097	
	I		13		117	—	
	T		1 734		6 880	10 097	
7. Agricultural productivity	N		7 124		12 226	28 213	
	I		18		254	557	
	T		7 142		12 480	28 770	
8. Industrial productivity	N		14 354		96 800	18 142	
	I		59		—	159	
	T		14 413		96 800	18 301	
9. Computer science and automation	N		105		2 400	1 616	
	I		—		—	—	
	T		105		2 400	1 616	
10. Social sciences	N		786		3 458	12 126	
	I		145		862	636	
	T		931		4 320	12 762	
<b>Sub-total (1-10)</b>	N		<b>53 085</b>		<b>215 541</b>	<b>129 430</b>	
	I		<b>19 315</b>		<b>47 731</b>	<b>14 260</b>	
	T		<b>72 400</b>		<b>263 272</b>	<b>143 690</b>	
11. General promotion of knowledge NES (excluding Higher Education)	N		12 831		73 561	14 602	
	I		28		39	452	
	T		12 859		73 600	15 054	
12. General promotion of knowledge NES (Higher Education)	N		38 774		120 800	147 343	
	I		—		—	—	
	T		38 774		120 800	147 343	
<b>TOTAL (1-12)</b>	N		<b>104 690</b>		<b>409 902</b>	<b>291 375</b>	
	I		<b>19 343</b>		<b>47 770</b>	<b>14 712</b>	
	T		<b>124 033</b>		<b>457 672</b>	<b>306 087</b>	
Not itemized	N		—		—	...	
	I		—		—	...	
	T		—		—	1 441	
<b>GRAND TOTAL</b>	N		<b>104 690</b>		<b>409 902</b>	<b>...</b>	
	I		<b>19 343</b>		<b>47 770</b>	<b>...</b>	
	T		<b>124 033</b>		<b>457 672</b>	<b>307 528</b>	

ANNEX VI  
National projects and contributions to multilateral and bilateral projects  
c) In % of total project expenditure  
1967

OBJECTIVE	Germany			Belgium			France			Italy			Netherlands			Community			OBJECTIVE
	N	I	T	N	I	T	N	I	T	N	I	T	N	I	T	N	I	T	
1. Nuclear R&D	16.7	40.9	19.5	8.3	68.1	22.6	20.1	21.3	20.3	25.5	69.1	34.6	7.1	60.6	11.1	18.3	35.9	20.7	1. Nuclear R&D
2. Space	3.5	27.2	6.3	1.0	30.0	7.9	5.0	11.8	6.0	2.4	26.6	7.4	0.8	31.4	3.1	4.0	19.4	6.1	2. Space
3. Defence	20.3	31.5	21.6	1.5	0.3	1.2	37.5	11.9	33.8	6.3	—	5.0	4.1	0.4	3.8	26.4	15.1	24.9	3. Defence
4. Earth and its atmosphere	2.1	0.2	1.8	3.4	0.6	2.7	0.7	0.2	0.7	0.9	0.1	0.7	2.1	0.2	1.9	1.3	0.2	1.2	4. Earth and its atmosphere
5. Health	2.3	0.1	2.1	4.4	...	3.4	2.0	0.2	1.8	1.4	1.7	1.5	3.6	—	3.3	2.2	0.3	2.0	5. Health
6. Human environment	0.9	—	0.8	2.9	0.1	2.3	2.9	...	2.5	2.4	0.2	2.0	3.0	—	2.8	2.2	...	1.9	6. Human environment
7. Agricultural productivity	2.6	—	2.3	6.7	...	5.0	4.5	3.4	4.3	1.9	0.3	1.5	10.9	—	10.1	4.1	1.8	3.7	7. Agricultural productivity
8. Industrial productivity *	4.5	...	4.0	17.0	0.5	13.1	3.0	50.9	9.8	1.9	—	1.5	8.8	1.1	8.2	4.1	26.6	7.2	8. Industrial productivity
9. Computer science and automation	1.6	—	1.4	—	—	—	0.7	...	0.6	0.3	—	0.3	—	—	—	0.9	...	0.8	9. Computer science and automation
10. Social sciences	1.9	...	1.7	1.0	0.3	0.8	1.1	...	0.9	1.9	1.5	1.8	4.0	4.2	4.1	1.6	0.4	1.4	10. Social sciences
<b>Sub-total (1-10)</b>	<b>56.4</b>	<b>99.9</b>	<b>61.5</b>	<b>46.2</b>	<b>99.9</b>	<b>59.0</b>	<b>77.5</b>	<b>99.7</b>	<b>80.7</b>	<b>44.9</b>	<b>99.5</b>	<b>56.3</b>	<b>44.4</b>	<b>97.9</b>	<b>48.4</b>	<b>65.1</b>	<b>99.7</b>	<b>69.9</b>	<b>Sub-total (1-10)</b>
11. General promotion of knowledge NES (excluding Higher Education)	7.6	0.1	6.7	13.5	0.1	10.3	9.1	—	7.8	15.9	0.5	12.7	5.0	2.1	4.8	8.9	0.2	7.7	11. General promotion of knowledge NES (excluding Higher Education)
12. General promotion of knowledge NES (Higher Education)	36.0	—	31.8	40.3	—	30.7	13.2	—	11.3	39.2	—	31.0	50.6	—	46.8	25.9	—	22.3	12. General promotion of knowledge NES (Higher Education)
Not itemized	—	—	—	—	—	—	0.2	0.3	0.2	—	—	—	—	—	—	0.1	0.1	0.1	Not itemized
<b>TOTAL</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>TOTAL</b>



*ANNEX VI*  
**National projects and contributions to multilateral and bilateral projects**  
**c) In % of total project expenditure**  
1969

OBJECTIVE	Germany			Belgium			France			Italy			Netherlands			Community			OBJECTIVE
	N	I	T	N	I	T	N	I	T	N	I	T	N	I	T	N	I	T	
1. Nuclear R&D	14.7	32.7	16.5	17.5	56.8	23.1	17.6	12.8	17.0	24.1	64.1	30.2	7.1	50.1	9.9	16.4	27.1	17.6	1. Nuclear R&D
2. Space	3.6	32.1	6.4	1.2	40.5	6.7	5.4	12.5	6.3	0.6	29.9	5.0	1.4	39.9	3.9	4.0	22.2	6.1	2. Space
3. Defence	17.3	34.7	19.0	2.7	0.4	2.4	33.4	11.7	30.8	4.9	—	4.1	5.8	0.3	5.4	22.9	16.7	22.2	3. Defence
4. Earth and its atmosphere	1.8	0.2	1.6	2.7	0.9	2.5	1.0	0.3	0.9	1.7	0.1	1.5	1.8	0.2	1.7	1.4	0.2	1.3	4. Earth and its atmosphere
5. Health	2.2	0.1	2.0	4.0	...	3.5	2.4	0.2	2.1	2.7	3.5	2.8	4.5	—	4.2	2.5	0.5	2.3	5. Health
6. Human environment	1.2	—	1.0	2.1	0.1	1.8	3.0	...	2.6	2.4	0.2	2.1	3.3	—	3.1	2.3	...	2.0	6. Human environment
7. Agricultural productivity	2.2	—	2.0	6.6	...	5.6	4.7	3.4	4.6	4.2	0.5	3.6	9.9	2.6	9.4	4.2	1.9	4.0	7. Agricultural productivity
8. Industrial productivity	5.7	...	5.1	12.5	0.3	10.7	3.4	58.7	10.1	5.8	—	5.0	7.1	0.9	6.7	4.9	30.7	7.8	8. Industrial productivity
9. Computer science and automation	2.3	—	2.1	0.1	—	0.1	1.6	...	1.4	0.9	—	0.7	0.4	—	0.4	1.7	...	1.4	9. Computer science and automation
10. Social sciences	1.8	...	1.7	0.8	0.8	0.8	1.2	0.1	1.1	1.2	1.6	1.2	3.7	3.7	3.7	1.6	0.4	1.4	10. Social sciences
<b>Sub-total (1-10)</b>	<b>52,8</b>	<b>99,8</b>	<b>57,4</b>	<b>50,2</b>	<b>99,8</b>	<b>57,2</b>	<b>73,7</b>	<b>99,7</b>	<b>76,9</b>	<b>48,5</b>	<b>99,9</b>	<b>56,2</b>	<b>45,0</b>	<b>97,7</b>	<b>48,4</b>	<b>61,9</b>	<b>99,7</b>	<b>66,1</b>	<b>Sub-total (1-10)</b>
11. General promotion of knowledge NES (excluding Higher Education)	9.2	0.2	8.3	12.5	0.2	10.8	10.1	—	8.8	13.4	0.1	11.4	5.4	2.3	5.2	9.7	0.1	8.7	11. General promotion of knowledge NES (excluding Higher Education)
12. General promotion of knowledge NES (Higher Education)	38.0	—	34.3	37.3	—	32.0	16.1	—	14.1	38.1	—	32.4	49.6	—	46.4	28.3	—	25.1	12. General promotion of knowledge NES (Higher Education)
Not itemized	—	—	—	—	—	—	0.1	0.3	0.2	—	—	—	—	—	—	0.1	0.2	0.1	Not itemized
<b>TOTAL</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>TOTAL</b>

*ANNEX VI*  
**National projects and contributions to multilateral and bilateral projects**  
 c) In % of total project expenditure  
 1970

OBJECTIVE	Germany			Belgium			France			Italy			Netherlands			Community			OBJECTIVE
	N	I	T	N	I	T	N	I	T	N	I	T	N	I	T	N	I	T	
1. Nuclear R&D				17.2	63.0	24.3				14.4	68.8	20.1	8.0	59.1	10.5				1. Nuclear R&D
2. Space				1.0	34.1	6.2				2.1	23.3	4.3	1.7	28.0	2.9				2. Space
3. Defence				2.6	0.4	2.2				3.1	—	2.8	4.8	0.4	4.6				3. Defence
4. Earth and its atmosphere				2.8	0.5	2.4				1.4	0.1	1.2	1.7	0.2	1.7				4. Earth and its atmosphere
5. Health				4.1	0.7	3.5				1.9	5.2	2.3	4.1	—	3.9				5. Health
6. Human environment				1.6	0.1	1.4				1.7	0.2	1.5	3.5	—	3.3				6. Human environment
7. Agricultural productivity				6.8	0.1	5.8				3.0	0.5	2.7	9.7	3.8	9.4				7. Agricultural productivity
8. Industrial productivity				13.7	0.3	11.6				23.6	—	21.2	6.2	1.1	6.0				8. Industrial productivity
9. Computer science and automation				0.1	—	0.1				0.6	—	0.5	0.5	—	0.5				9. Computer science and automation
10. Social sciences				0.8	0.7	0.8				0.8	1.8	0.9	4.2	4.3	4.2				10. Social sciences
<b>Sub-total (1-10)</b>				<b>50,7</b>	<b>99,9</b>	<b>58,3</b>				<b>52,6</b>	<b>99,9</b>	<b>57,5</b>	<b>44,4</b>	<b>96,9</b>	<b>47,0</b>				<b>Sub-total (1-10)</b>
11. General promotion of knowledge NES (excluding Higher Education)				12.3	0.1	10.4				17.9	0.1	16.1	5.0	3.1	4.9				11. General promotion of knowledge NES (excluding Higher Education)
12. General promotion of knowledge NES (Higher Education)				37.0	—	31.3				29.5	—	26.4	50.6	—	48.1				12. General promotion of knowledge NES (Higher Education)
Not itemized				—	—	—				—	—	—	—	—	—				Not itemized
<b>TOTAL</b>				<b>100,0</b>	<b>100,0</b>	<b>100,0</b>				<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>				<b>TOTAL</b>



## ANNEX VI

## National projects and contributions to multilateral and bilateral projects

## d) Breakdown within the Objective (in national currency and in %) )

## GERMANY

OBJECTIVE		1967		1968		1969		1970	
		DM 10 <sup>6</sup>	%	DM 10 <sup>6</sup>	%	DM 10 <sup>6</sup>	%	DM 10 <sup>6</sup>	%
1. Nuclear R&D	N	715.6	75.9	689.4	74.7	747.3	80.3		
	I	226.9	24.1	234.1	25.3	183.5	19.7		
	T	942.5	100.0	923.5	100.0	930.8	100.0		
2. Space	N	150.6	49.9	164.7	48.2	181.2	50.1		
	I	151.0	50.1	176.8	51.8	180.4	49.9		
	T	301.6	100.0	341.5	100.0	361.6	100.0		
3. Defence	N	868.7	83.2	801.2	81.3	875.8	81.8		
	I	175.1	16.8	184.8	18.7	194.9	18.2		
	T	1 043.8	100.0	986.0	100.0	1 070.7	100.0		
4. Earth and its atmosphere	N	87.5	98.9	78.5	99.0	89.3	98.9		
	I	1.0	1.1	0.8	1.0	1.0	1.1		
	T	88.5	100.0	79.3	100.0	90.3	100.0		
5. Health	N	98.9	99.4	111.0	99.5	110.6	99.5		
	I	0.6	0.6	0.6	0.5	0.6	0.5		
	T	99.5	100.0	111.6	100.0	111.2	100.0		
6. Human environment	N	39.5	100.0	42.0	100.0	59.0	100.0		
	I								
	T	39.5	100.0	42.0	100.0	59.0	100.0		
7. Agricultural productivity	N	109.0	100.0	108.4	100.0	114.2	100.0		
	I								
	T	109.0	100.0	108.4	100.0	114.2	100.0		
8. Industrial productivity	N	194.4	100.0	193.3	100.0	289.1	100.0		
	I								
	T	194.4	100.0	193.3	100.0	289.1	100.0		
9. Computer science and automation	N	67.8	100.0	73.7	100.0	117.2	100.0		
	I								
	T	67.8	100.0	73.7	100.0	117.2	100.0		
10. Social sciences	N	82.9	100.0	88.3	100.0	93.7	100.0		
	I								
	T	82.9	100.0	88.3	100.0	93.7	100.0		
<b>Sub-total (1-10)</b>	N	<b>2 414.9</b>	<b>81.3</b>	<b>2 350.5</b>	<b>79.7</b>	<b>2 677.4</b>	<b>82.7</b>		
	I	<b>554.6</b>	<b>18.7</b>	<b>597.1</b>	<b>20.3</b>	<b>560.4</b>	<b>17.3</b>		
	T	<b>2 969.5</b>	<b>100.0</b>	<b>2 947.6</b>	<b>100.0</b>	<b>3 237.8</b>	<b>100.0</b>		
11. General promotion of knowledge NES (excluding Higher Education)	N	324.7	99.8	355.3	99.9	465.2	99.7		
	I	0.7	0.2	0.5	0.1	1.2	0.3		
	T	325.4	100.0	355.8	100.0	466.4	100.0		
12. General promotion of knowledge NES (Higher Education)	N	1 538.1	100.0	1 725.2	100.0	1 930.4	100.0		
	I								
	T	1 538.1	100.0	1 725.2	100.0	1 930.4	100.0		
<b>TOTAL</b>	N	<b>4 277.7</b>	<b>88.5</b>	<b>4 431.0</b>	<b>88.1</b>	<b>5 073.0</b>	<b>90.0</b>		
	I	<b>555.3</b>	<b>11.5</b>	<b>597.6</b>	<b>11.9</b>	<b>561.6</b>	<b>10.0</b>		
	T	<b>4 833.0</b>	<b>100.0</b>	<b>5 028.6</b>	<b>100.0</b>	<b>5 634.6</b>	<b>100.0</b>		

## ANNEX VI

## National projects and contributions to multilateral and bilateral projects

## d) Breakdown within the Objective (in national currency and in %) )

## BELGIUM

OBJECTIVE		1967		1968		1969		1970	
		B.Fr. 10 <sup>3</sup>	%	B.Fr. 10 <sup>3</sup>	%	B.Fr. 10 <sup>3</sup>	%	B.Fr. 10 <sup>3</sup>	%
1. Nuclear R&D	N	279 643	28,0	624 694	55,2	799 145	65,2	901 294	59,7
	I	720 216	72,0	507 175	44,8	426 419	34,8	609 104	40,3
	T	999 859	100,0	1 131 869	100,0	1 225 564	100,0	1 510 398	100,0
2. Space	N	32 465	9,3	46 521	13,8	53 609	15,0	53 457	14,0
	I	317 312	90,7	291 706	86,2	303 903	85,0	329 483	86,0
	T	349 777	100,0	338 227	100,0	357 512	100,0	382 940	100,0
3. Defence	N	52 040	94,6	53 286	94,5	122 489	97,4	135 164	97,5
	I	2 989	5,4	3 075	5,5	3 244	2,6	3 450	2,5
	T	55 029	100,0	56 361	100,0	125 733	100,0	138 614	100,0
4. Earth and its atmosphere	N	113 108	94,7	114 191	97,0	123 928	94,9	145 946	96,7
	I	6 322	5,3	3 501	3,0	6 605	5,1	4 937	3,3
	T	119 430	100,0	117 692	100,0	130 533	100,0	150 883	100,0
5. Health	N	149 530	100,0	159 102	100,0	184 678	100,0	213 904	96,8
	I	10	—	10	—	10	—	7 010	3,2
	T	149 540	100,0	159 112	100,0	184 688	100,0	220 914	100,0
6. Human environment	N	99 496	99,4	75 888	99,2	95 120	99,3	86 046	99,2
	I	597	0,6	597	0,8	651	0,7	671	0,8
	T	100 093	100,0	76 485	100,0	95 771	100,0	86 717	100,0
7. Agricultural productivity	N	224 850	100,0	293 933	100,0	300 875	100,0	356 211	99,8
	I	30	—	30	—	30	—	890	0,2
	T	224 880	100,0	293 963	100,0	300 905	100,0	357 101	100,0
8. Industrial productivity	N	574 434	99,1	479 915	99,2	567 759	99,5	717 688	99,6
	I	5 198	0,9	4 028	0,8	2 647	0,5	2 937	0,4
	T	579 632	100,0	483 943	100,0	570 406	100,0	720 625	100,0
9. Computer science and automation	N	—	—	12 000	100,0	4 300	100,0	5 220	100,0
	I	—	—	—	—	—	—	—	—
	T	—	—	12 000	100,0	4 300	100,0	5 220	100,0
10. Social sciences	N	32 728	89,9	34 294	82,1	36 378	85,0	39 322	84,4
	I	3 694	10,1	7 462	17,9	6 392	15,0	7 245	15,6
	T	36 422	100,0	41 756	100,0	42 770	100,0	46 567	100,0
<b>Sub-total (1-10)</b>	N	<b>1 558 294</b>	<b>59,6</b>	<b>1 893 824</b>	<b>69,8</b>	<b>2 288 281</b>	<b>75,3</b>	<b>2 654 252</b>	<b>73,3</b>
	I	<b>1 056 368</b>	<b>40,4</b>	<b>817 584</b>	<b>30,2</b>	<b>749 901</b>	<b>24,7</b>	<b>965 727</b>	<b>26,7</b>
	T	<b>2 614 662</b>	<b>100,0</b>	<b>2 711 408</b>	<b>100,0</b>	<b>3 038 182</b>	<b>100,0</b>	<b>3 619 979</b>	<b>100,0</b>
11. General promotion of knowledge NES (excluding Higher Education)	N	456 449	99,7	516 362	99,8	569 732	99,8	641 555	99,8
	I	1 195	0,3	1 258	0,2	1 326	0,2	1 408	0,2
	T	457 644	100,0	517 620	100,0	571 058	100,0	642 963	100,0
12. General promotion of knowledge NES (Higher Education)	N	1 359 737	100,0	1 474 942	100,0	1 701 933	100,0	1 938 712	100,0
	I	—	—	—	—	—	—	—	—
	T	1 359 737	100,0	1 474 942	100,0	1 701 933	100,0	1 938 712	100,0
<b>GRAND TOTAL</b>	N	<b>3 374 480</b>	<b>76,1</b>	<b>3 885 128</b>	<b>82,6</b>	<b>4 559 946</b>	<b>85,9</b>	<b>5 234 519</b>	<b>84,4</b>
	I	<b>1 057 563</b>	<b>23,9</b>	<b>818 842</b>	<b>17,4</b>	<b>751 227</b>	<b>14,1</b>	<b>967 135</b>	<b>15,6</b>
	T	<b>4 432 043</b>	<b>100,0</b>	<b>4 703 970</b>	<b>100,0</b>	<b>5 311 173</b>	<b>100,0</b>	<b>6 201 654</b>	<b>100,0</b>

## ANNEX VI

## National projects and contributions to multilateral and bilateral projects

## d) Breakdown within the Objective (in national currency and in %)

## FRANCE

OBJECTIVE		1967		1968		1969		1970	
		F.Fr. 10 <sup>6</sup>	%	F.Fr. 10 <sup>6</sup>	%	F.Fr. 10 <sup>6</sup>	%	F.Fr. 10 <sup>6</sup>	%
1. Nuclear R&D	N	1 524.7	85.0	1 391.3	86.2	1 603.1	90.7		
	I	269.2	15.0	222.9	13.8	163.9	9.3		
	T	1 793.9	100.0	1 614.2	100.0	1 767.0	100.0		
2. Space	N	377.5	71.6	542.7	79.0	496.1	75.6		
	I	149.6	28.4	144.4	21.0	160.1	24.4		
	T	527.1	100.0	687.1	100.0	656.2	100.0		
3. Defence	N	2 835.2	95.0	2 920.0	95.1	3 050.0	95.3		
	I	150.0	5.0	150.0	4.9	150.0	4.7		
	T	2 985.2	100.0	3 070.0	100.0	3 200.0	100.0		
4. Earth and its atmosphere	N	55.9	95.4	78.5	96.2	91.9	96.5		
	I	2.7	4.6	3.1	3.8	3.3	3.5		
	T	58.6	100.0	81.6	100.0	95.2	100.0		
5. Health	N	154.2	98.7	207.7	99.0	216.1	98.9		
	I	2.0	1.3	2.0	1.0	2.3	1.1		
	T	156.2	100.0	209.7	100.0	218.4	100.0		
6. Human environment	N	220.7	99.9	259.6	99.9	274.1	99.9		
	I	0.3	0.1	0.3	0.1	0.3	0.1		
	T	221.0	100.0	259.9	100.0	274.4	100.0		
7. Agricultural productivity	N	339.8	88.7	400.8	90.2	433.8	90.9		
	I	43.1	11.3	43.4	9.8	43.3	9.1		
	T	382.9	100.0	444.2	100.0	477.1	100.0		
8. Industrial productivity	N	226.2	26.0	248.4	24.9	307.0	29.0		
	I	643.1	74.0	750.3	75.1	750.3	71.0		
	T	869.3	100.0	998.7	100.0	1 057.3	100.0		
9. Computer science and automation	N	56.2	99.5	141.7	99.8	143.7	99.8		
	I	0.3	0.5	0.3	0.2	0.3	0.2		
	T	56.5	100.0	142.0	100.0	144.0	100.0		
10. Social sciences	N	81.4	99.3	98.2	99.3	111.2	99.3		
	I	0.6	0.7	0.7	0.7	0.8	0.7		
	T	82.0	100.0	98.9	100.0	112.0	100.0		
<b>Sub-total (1-10)</b>	N	<b>5 871.8</b>	<b>82.3</b>	<b>6 288.9</b>	<b>82.7</b>	<b>6 727.0</b>	<b>84.1</b>		
	I	<b>1 260.9</b>	<b>17.7</b>	<b>1 317.4</b>	<b>17.3</b>	<b>1 274.6</b>	<b>15.9</b>		
	T	<b>7 132.7</b>	<b>100.0</b>	<b>7 606.3</b>	<b>100.0</b>	<b>8 001.6</b>	<b>100.0</b>		
11. General promotion of knowledge NES (excluding Higher Education)	N	684.9	100.0	815.1	100.0	920.2	100.0		
	I								
	T	684.9	100.0	815.1	100.0	920.2	100.0		
12. General promotion of knowledge NES (Higher Education)	N	998.1	100.0	1 234.3	100.0	1 465.5	100.0		
	I								
	T	998.1	100.0	1 234.3	100.0	1 465.5	100.0		
<b>Total (1-12)</b>	N	<b>7 554.8</b>	<b>85.7</b>	<b>8 338.3</b>	<b>86.4</b>	<b>9 112.7</b>	<b>87.7</b>		
	I	<b>1 260.9</b>	<b>14.3</b>	<b>1 317.4</b>	<b>13.6</b>	<b>1 274.6</b>	<b>12.3</b>		
	T	<b>8 815.7</b>	<b>100.0</b>	<b>9 655.7</b>	<b>100.0</b>	<b>10 387.3</b>	<b>100.0</b>		
Not itemized	N	16.9	82.0	10.0	71.4	13.1	75.7		
	I	3.7	18.0	4.0	28.6	4.2	24.3		
	T	20.6	100.0	14.0	100.0	17.3	100.0		
<b>GRAND TOTAL</b>	N	<b>7 571.7</b>	<b>85.7</b>	<b>8 348.3</b>	<b>86.3</b>	<b>9 125.8</b>	<b>87.7</b>		
	I	<b>1 264.6</b>	<b>14.3</b>	<b>1 321.4</b>	<b>13.7</b>	<b>1 278.8</b>	<b>12.3</b>		
	T	<b>8 836.3</b>	<b>100.0</b>	<b>9 669.7</b>	<b>100.0</b>	<b>10 404.6</b>	<b>100.0</b>		

## ANNEX VI

## National projects and contributions to multilateral and bilateral projects

## d) Breakdown within the Objective (in national currency and in %)

## ITALY

OBJECTIVE		1967		1968		1969		1970	
		It. Lire 10 <sup>6</sup>	%	It. Lire 10 <sup>6</sup>	%	It. Lire 10 <sup>6</sup>	%	It. Lire 10 <sup>6</sup>	%
1. Nuclear R&D	N	36 098	58.3	33 041	55.4	42 765	68.0	36 855	64.2
	I	25 771	41.7	26 643	44.6	20 156	32.0	20 528	35.8
	T	61 869	100.0	59 684	100.0	62 921	100.0	57 383	100.0
2. Space	N	3 339	25.2	1 579	14.9	989	9.5	5 416	43.8
	I	9 932	74.8	8 991	85.1	9 400	90.5	6 946	56.2
	T	13 271	100.0	10 570	100.0	10 389	100.0	12 362	100.0
3. Defence	N	8 957	100.0	8 943	100.0	8 631	100.0	8 000	100.0
	I								
	T	8 957	100.0	8 943	100.0	8 631	100.0	8 000	100.0
4. Earth and its atmosphere	N	1 251	97.7	2 975	98.7	3 060	98.7	3 458	98.8
	I	30	2.3	39	1.3	41	1.3	42	1.2
	T	1 281	100.0	3 014	100.0	3 101	100.0	3 500	100.0
5. Health	N	2 012	76.3	3 260	78.4	4 807	81.4	4 955	76.2
	I	625	23.7	900	21.6	1 095	18.6	1 545	23.8
	T	2 637	100.0	4 160	100.0	5 902	100.0	6 500	100.0
6. Human environment	N	3 424	97.9	4 540	98.4	4 220	98.4	4 227	98.3
	I	75	2.1	75	1.6	70	1.6	73	1.7
	T	3 499	100.0	4 615	100.0	4 290	100.0	4 300	100.0
7. Agricultural productivity	N	2 657	95.8	7 021	98.4	7 463	98.2	7 641	98.0
	I	115	4.2	115	1.6	139	1.8	159	2.0
	T	2 772	100.0	7 136	100.0	7 602	100.0	7 800	100.0
8. Industrial productivity	N	2 620	100.0	6 163	100.0	10 343	100.0	60 500	100.0
	I								
	T	2 620	100.0	6 163	100.0	10 343	100.0	60 500	100.0
9. Computer science and automation	N	496	100.0	1 186	100.0	1 518	100.0	1 500	100.0
	I								
	T	496	100.0	1 186	100.0	1 518	100.0	1 500	100.0
10. Social sciences	N	2 723	83.4	2 312	82.2	2 102	80.6	2 161	80.0
	I	543	16.6	501	17.8	506	19.4	539	20.0
	T	3 266	100.0	2 813	100.0	2 608	100.0	2 700	100.0
<b>Sub-total (1-10)</b>	N	<b>63 577</b>	<b>63.2</b>	<b>71 020</b>	<b>65.6</b>	<b>85 898</b>	<b>73.2</b>	<b>134 713</b>	<b>81.9</b>
	I	<b>37 091</b>	<b>36.8</b>	<b>37 264</b>	<b>34.4</b>	<b>31 407</b>	<b>26.8</b>	<b>29 832</b>	<b>18.1</b>
	T	<b>100 668</b>	<b>100.0</b>	<b>108 284</b>	<b>100.0</b>	<b>117 305</b>	<b>100.0</b>	<b>164 545</b>	<b>100.0</b>
11. General promotion of knowledge NES (excluding Higher Education)	N	22 476	99.2	23 615	99.9	23 724	99.9	45 976	99.9
	I	182	0.8	20	0.1	27	0.1	24	0.1
	T	22 658	100.0	23 635	100.0	23 751	100.0	46 000	100.0
12. General promotion of knowledge NES (Higher Education)	N	55 386	100.0	59 978	100.0	67 484	100.0	75 500	100.0
	I								
	T	55 386	100.0	59 978	100.0	67 484	100.0	75 500	100.0
<b>GRAND TOTAL</b>	N	<b>141 439</b>	<b>79.1</b>	<b>154 613</b>	<b>80.6</b>	<b>177 106</b>	<b>84.9</b>	<b>256 189</b>	<b>89.6</b>
	I	<b>37 273</b>	<b>20.9</b>	<b>37 284</b>	<b>19.4</b>	<b>31 434</b>	<b>15.1</b>	<b>29 856</b>	<b>10.4</b>
	T	<b>178 712</b>	<b>100.0</b>	<b>191 897</b>	<b>100.0</b>	<b>208 540</b>	<b>100.0</b>	<b>286 045</b>	<b>100.0</b>

## ANNEX VI

## National projects and contributions to multilateral and bilateral projects

d) Breakdown within the Objective (in national currency and in %)

## NETHERLANDS

OBJECTIVE		1967		1968		1969		1970	
		Fl. 10 <sup>3</sup>	%	Fl. 10 <sup>3</sup>	%	Fl. 10 <sup>3</sup>	%	Fl. 10 <sup>3</sup>	%
1. Nuclear R&D	N	48 492	59,3	56 235	59,6	65 049	67,3	84 637	72,9
	I	33 260	40,7	38 050	40,4	31 650	32,7	31 475	27,1
	T	81 752	100,0	94 285	100,0	96 699	100,0	116 112	100,0
2. Space	N	5 759	25,1	10 522	29,8	12 707	33,5	17 458	54,0
	I	17 200	74,9	24 800	70,2	25 200	66,5	14 900	46,0
	T	22 959	100,0	35 322	100,0	37 907	100,0	32 358	100,0
3. Defence	N	27 976	99,2	45 126	99,5	52 827	99,6	50 922	99,6
	I	220	0,8	220	0,5	220	0,4	220	0,4
	T	28 196	100,0	45 346	100,0	53 047	100,0	51 142	100,0
4. Earth and its atmosphere	N	14 323	99,1	11 188	98,8	16 238	99,2	18 437	99,3
	I	132	0,9	132	1,2	132	0,8	132	0,7
	T	14 455	100,0	11 320	100,0	16 370	100,0	18 569	100,0
5. Health	N	24 295	100,0	31 685	100,0	41 276	100,0	42 981	100,0
	I	—	—	—	—	—	—	—	—
	T	24 295	100,0	31 685	100,0	41 276	100,0	42 981	100,0
6. Human environment	N	20 325	100,0	24 677	100,0	30 170	100,0	36 550	100,0
	I	—	—	—	—	—	—	—	—
	T	20 325	100,0	24 677	100,0	30 170	100,0	36 550	100,0
7. Agricultural productivity	N	74 321	100,0	82 434	100,0	90 495	98,2	102 130	98,1
	I	—	—	—	—	1 650	1,8	2 016	1,9
	T	74 321	100,0	82 434	100,0	92 145	100,0	104 146	100,0
8. Industrial productivity	N	59 719	99,0	69 588	99,6	65 280	99,1	65 674	99,1
	I	576	1,0	288	0,4	576	0,9	576	0,9
	T	60 295	100,0	69 876	100,0	65 856	100,0	66 250	100,0
9. Computer science and automation	N	—	—	—	—	3 980	100,0	5 850	100,0
	I	—	—	—	—	—	—	—	—
	T	—	—	—	—	3 980	100,0	5 850	100,0
10. Social sciences	N	27 627	92,3	28 674	96,1	33 762	93,6	43 896	95,0
	I	2 304	7,7	1 152	3,9	2 304	6,4	2 304	5,0
	T	29 931	100,0	29 826	100,0	36 066	100,0	46 200	100,0
Sub-total (1-10)	N	302 837	84,9	360 129	84,8	411 784	87,0	468 535	90,1
	I	53 692	15,1	64 642	15,2	61 732	13,0	51 623	9,9
	T	356 529	100,0	424 771	100,0	473 516	100,0	520 158	100,0
11. General promotion of knowledge NES (excluding Higher Education)	N	34 300	96,7	40 200	97,4	49 965	97,2	52 859	97,0
	I	1 163	3,3	1 088	2,6	1 422	2,8	1 636	3,0
	T	35 463	100,0	41 288	100,0	51 387	100,0	54 495	100,0
12. General promotion of knowledge NES (Higher Education)	N	345 228	100,0	411 607	100,0	454 400	100,0	533 381	100,0
	I	—	—	—	—	—	—	—	—
	T	345 228	100,0	411 607	100,0	454 400	100,0	533 381	100,0
Total (1-12)	N	682 365	92,6	811 936	92,5	916 149	93,6	1 054 775	95,2
	I	54 855	7,4	65 730	7,5	63 154	6,4	53 259	4,8
	T	737 200	100,0	877 666	100,0	979 303	100,0	1 108 034	100,0
Not itemized		—	—	—	—	—	5 219	—	
<b>GRAND TOTAL</b>		<b>737 220</b>	—	<b>877 666</b>	—	<b>979 303</b>	—	<b>1 113 253</b>	—

ANNEX VI

National projects and contributions to multilateral and bilateral projects

e) Summary tables

1. In 10<sup>3</sup> u.a. and in % in the Community

YEAR	Expenditure	Germany		Belgium		France		Italy		Netherlands		Community	
		10 <sup>3</sup> u.a.	%	10 <sup>3</sup> u.a.	%	10 <sup>3</sup> u.a.	%	10 <sup>3</sup> u.a.	%	10 <sup>3</sup> u.a.	%	10 <sup>3</sup> u.a.	%
1967	N	1 069 423	34,7	67 489	2,2	1 533 646	49,7	226 302	7,3	188 499	6,1	3 085 359	100,0
	I	138 825	28,3	21 152	4,3	256 144	52,2	59 637	12,1	15 153	3,1	490 911	100,0
	T	1 208 248	33,8	88 641	2,5	1 789 790	50,0	285 939	8,0	203 652	5,7	3 576 270	100,0
1968	N	1 107 745	33,1	77 702	2,3	1 690 946	50,5	247 380	7,4	224 291	6,7	3 348 064	100,0
	I	149 400	29,2	16 377	3,2	267 649	52,4	59 655	11,7	18 158	3,5	511 239	100,0
	T	1 257 145	32,6	94 079	2,4	1 958 595	50,7	307 035	8,0	242 449	6,3	3 859 303	100,0
1969	N	1 295 794	35,1	91 198	2,5	1 761 557	47,8	283 369	7,7	253 080	6,9	3 684 998	100,0
	I	143 448	30,3	15 025	3,2	246 847	52,2	50 295	10,6	17 446	3,7	473 061	100,0
	T	1 439 242	34,6	106 223	2,6	2 008 404	48,3	333 664	8,0	270 526	6,5	4 158 059	100,0

2. In national currencies and in % of total expenditures

YEAR	Expenditure	Germany		Belgium		France		Italy		Netherlands		Community	
		DM 10 <sup>6</sup>	%	B.Fr. 10 <sup>3</sup>	%	F.Fr. 10 <sup>6</sup>	%	It.Lire 10 <sup>6</sup>	%	Fl. 10 <sup>3</sup>	%	10 <sup>3</sup> u.a.	%
1967	N	4 277,7	88,5	3 374 480	76,1	7 571,7	85,7	141 439	79,1	682 365	92,6	3 085 359	86,3
	I	555,3	11,5	1 057 563	23,9	1 264,6	14,3	37 273	20,9	54 855	7,4	490 911	13,7
	T	4 833,0	100,0	4 432 043	100,0	8 836,3	100,0	178 712	100,0	737 220	100,0	3 576 270	100,0
1968	N	4 431,0	88,1	3 885 128	82,6	8 348,3	86,3	154 613	80,6	811 936	92,5	3 348 064	86,8
	I	597,6	11,9	818 842	17,4	1 321,4	13,7	37 284	19,4	65 730	7,5	511 239	13,2
	T	5 028,6	100,0	4 703 970	100,0	9 669,7	100,0	191 897	100,0	877 666	100,0	3 859 303	100,0
1969	N	5 073,0	90,0	4 559 946	85,9	9 125,8	87,7	177 106	84,9	916 149	93,6	3 684 998	88,6
	I	561,6	10,0	751 227	14,1	1 278,8	12,3	31 434	15,1	63 154	6,4	473 061	11,4
	T	5 634,6	100,0	5 311 173	100,0	10 404,6	100,0	208 540	100,0	979 303	100,0	4 158 059	100,0

3. Rate of variation (on the basis of the data expressed in national currencies)

PERIOD	Expenditure	Germany	Belgium	France	Italy	Netherlands	Community (*)
1968/1967	N	+ 3,6	+ 15,1	+ 10,3	+ 9,3	+ 19,0	+ 8,5
	I	+ 7,6	- 22,6	+ 4,5	-	+ 19,8	+ 4,1
	T	+ 4,0	+ 6,1	+ 9,4	+ 7,4	+ 19,1	+ 7,9
1969/1968	N	+ 14,5	+ 17,4	+ 9,3	+ 14,5	+ 12,8	+ 11,8
	I	- 6,0	- 8,3	- 3,2	- 15,7	- 3,9	- 5,8
	T	+ 12,1	+ 12,9	+ 7,6	+ 8,7	+ 11,6	+ 9,5
1969/1967	N	+ 18,6	+ 35,1	+ 20,5	+ 25,2	+ 34,3	+ 21,3
	I	+ 1,1	- 29,0	+ 1,1	- 15,7	+ 15,1	- 1,8
	T	+ 16,6	+ 19,8	+ 17,7	+ 16,7	+ 32,8	+ 18,2

(\*) Arithmetic means weighted with the R&D expenditures for the initial periods.



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