

European Communities

EUROPEAN PARLIAMENT

Working Documents

1983-1984

30 November 1983

DOCUMENT 1-1110/83

Report

drawn up on behalf of the Committee on Budgetary Control

on efficiency and choice in Community financing of
research and industry

Rapporteur: Mr H. SABY

PE 85.919/fin.

By letter of 1 March 1982, the Committee on Budgetary Control requested authorization to draw up a report on efficiency and choice in Community financing of research and industry.

By letter of 6 April 1982, the committee was authorized to report on this subject.

On 2 November 1982 the Committee on Budgetary Control appointed Mr SABY rapporteur.

At its meetings of 2/3 and 21/22 November 1983, the committee considered the draft report. At the latter meeting it adopted the motion for a resolution as a whole unopposed, with one abstention.

The following took part in the vote: Mr AIGNER, chairman; Mrs BOSERUP, second vice-chairman; Mr PRICE, third vice-chairman; Mr SABY, rapporteur; Mr ALBER (deputizing for Mr FILIPPI), Mr ARNDT (deputizing for Mr KEY), Mr BATTERSBY, Mr GABERT, Mr GONTIKAS, Mr Edward KELLETT-BOWMAN, Mr LALUMIERE, Mr MARCK, Mr B. NIELSEN (deputizing for Mr JÜRGENS), Mr PROTOPAPADAKIS (deputizing for Mr FRÜH) and Mrs VAN HEMELDONCK.

This report was tabled on 23 November 1983.

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A.

The Committee on Budgetary Control hereby submits to the European Parliament the following motion for a resolution, together with explanatory statement :

MOTION FOR A RESOLUTION

on efficiency and choice in Community financing of research and industry

The European Parliament,

- A. having regard to the report of the Committee on Budgetary Control (Doc. 1-1110/83),
- B. recalling that the sums entered in the Community budget for research and industry represent less than 3% of Member States' research funding and that publicly-funded research is around half of the total research effort in Europe,
- C. recalling its previous support for a Community research effort, in particular its resolution on 'Common research policy : problems and prospects'¹ and its opinion on the first framework programme for Community research²,
- D. recalling that Europe's contribution to scientific and technical research has been historically central whereas today the position in regard to scientific and industrial research is becoming one of backwardness and dependency detrimental to its economic recovery,
 1. Considers that the Community's research and industrial policy calls for intra-Community cooperation as a matter of urgency if Europe is to be in on the third industrial revolution now beginning worldwide;
 2. Considers that a permanent way out of the crisis and a solution to the employment problem depend on the development of advanced technologies and high-value-added industries, these being dependent on substantial advance effort in the sectors of scientific research and the development of industries involving 'creativity' and innovation;
 3. Approves of the efforts that have recently been made to inject some coherence into the Community's research policy, but considers that a major political effort still has to be made to (a) create a stable policy environment,

¹ Linkohr report, OJ C 334 1982

² Sälzer report, Doc. 1-382/83

- (b) ensure that thoroughly useful projects are undertaken and (c) also ensure that research work is efficiently carried out; and believes that systematic and objective evaluation procedures can help achieve these objectives;
4. Considers it essential to create a broadly based consensus which would also involve Parliament (vital as a forum for sensitizing public opinion) as well as representatives of industry likely to use the results of Community research; considers that this consensus cannot be created in a plethora of paper, a multitude of programmes, and a diversity of dates for starting and finishing programmes;
5. Considers that the Commission should :
- (a) pursue to its logical conclusion the regular drawing up of a 'framework programme' so that the next such document contains an exhaustive overview of work in hand (both direct and indirect action),
- (b) make a strenuous effort to arrange all start and end dates for the individual research projects making up a programme of action to coincide with each other
- so as to provoke a regular and informed debate on all Community research activities relating to the same subject.
6. Insists that the Commission should make a greater and more systematic effort than it has done hitherto
- to study the various aspects of research which are best undertaken at Community level;
 - to explain in each proposal for an individual action programme what Member States are doing in the field and the logic behind Community involvement;
 - to develop an overview in each research sector of Member States' activity on a comparative quantified basis;
 - to present the first such report at the next interim revision of the 1984/87 framework programme;
 - to draw up an appropriate budgetary framework for these measures in order better to assess the cost of the programmes and their impact;
7. Agrees that the main thrust of Community-funded research will be goal-related but stresses that such goal-related research is effective only if buttressed by basic research and greater concern for the end users;

8. Observes that the close correlation between research, transfers of technology and industry cannot be achieved unless there is a pluralistic approach to science integrating the exact sciences, the social sciences and man's environment; appreciates the work done by its committees for this purpose;
9. Considers, that if the Community budget is to serve to stimulate and expand research and industry, it is essential to facilitate all possible initiatives, in particular those which could be implemented by two or three Member States in collaboration with the private European industries;
10. Points out in this connection that gross saving in the Community, which is equal to that of the United States, could be mobilized for the investment essential for advanced technology transfers;
11. Appreciates the fact that the Commission has now presented a first plan of action for evaluating research and that the Council has adopted a resolution on this subject¹; considers that certain improvements could be made in the following ways:
 - (a) it should pay greater attention to a proper external audit of direct action;
 - (b) it should not be based exclusively on 'peer evaluation', a technique whose deficiencies are being recognized elsewhere and which is being replaced by quantitative methods available to the Community today,
 - (c) major progress remains to be made on the central issue of evaluation of social and economic effects. In this context it is to be regretted that there is no attempt to coordinate the activities of the different services of the Commission (in particular the Social Affairs Division and the Research Division),
 - (d) it should resolve the problem of choosing research subjects and concentrate on involving industry closely in that process;
12. Endorses the proposals submitted recently to the Council, namely:

¹OJ C 213/1983

- to give a new boost to cooperation in the field of research,
- to define European norms and open public markets,
- to place the common commercial policy at the service of European industrial developments,
- to encourage links and cooperation between European firms,
- to launch European infrastructure projects to foster exchanges between undertakings and de facto cooperation;

13. Notes in this connection that the European small and medium-sized undertakings offer great scope for innovation and that it is important

- (1) to widen the research and industrial investment programmes to include the SMU sectors,
- (2) to protect their industrial property rights,
- (3) to simplify the administrative procedures,
- (4) to create organizational and management infrastructure to enable them to utilize the export opportunities available;

14. Approves the idea of setting up a research centre for advance training in information technology as an essential complement to the ESPRIT project;

15. Recommends that Parliament's Committee on Budgetary Control takes care to ensure in the discharge procedure for the coming budgetary years that the budget funds released are utilized with the optimum degree of efficiency;

16. Instructs its President to forward this resolution to the Council and Commission of the European Communities.

B.

EXPLANATORY STATEMENT

I. INTRODUCTION

1. When debating the discharge for 1981 the Committee on Budgetary Control concluded that in the field of research, investment and industry, the objectives agreed on by the institutions were far from realization. Since concern for efficiency is an essential aspect of Parliament's budgetary control responsibilities, the committee decided that it must submit a report on the subject.

2. The development of science and technology, the fruit of man's insatiable desire for knowledge in face of the unknown, is characterized today by the new interrelatedness of different fields as industry adjusts to the 'sunrise' technologies. The conventional classification of the sciences into 'exact sciences' or 'social sciences' and research into 'fundamental', 'experimental', or 'applied' is breaking down.

3. The demands of our radically changing world highlight the need for scientific pluralism, the need to take into account in analysis and research the new findings of the social sciences, the need to consider the human environment and for close coordination of research, technological transfer and industry.

4. As the Commission's proposal on the framework programme 1984-1987 reveals, 20% of all funds spent on research and development (public and private sector) are spent in the European Community, and more than one million scientists of all levels are currently engaged on research. The Community's R and D capacity is half that of the United States and twice that of Japan. For the first time in its history Europe has for some time now ceased to be the main source of scientific and technological innovation.

The potential in Europe is nonetheless substantial, although there is clearly considerable duplication, a decline in creativity, an absence of pluridisciplinary research, virtually no technological transfer between research and industrial requirements, scant exploitation of results and inertia on the part of public bodies.

5. As the French memorandum (September 1983) submitted to the Community on the revival of European industry and research states : 'The Commission's and the experts' investigations have clearly shown the disturbing and widening gap between

Europe's economy and the dominant economies of the United States and Japan. It is not necessary to dwell at length here on the numerous indications of this, it is sufficient to point out certain facts.

Europe's information technology industry controls only 10% of the world market and 40% of its own market. Eight out of ten personal computers sold within the Community are imported from the United States and nine out of ten video-recorders come from Japan. In the case of robots, the level of penetration of the European market is as high as 55% (1982) while the respective shares are as follows : Japan - 55%; USA - 25%; EEC - 17%. For electronic chips, the level of penetration is even higher at 60%. No European firm is producing the most advanced circuits.

For almost all the technologies which will make up the industrial landscape of the future, European firms have fallen far behind American and Japanese undertakings. The only major exceptions are telecommunications and receptional electronics.

Thus Europe is tending to become technologically dependent, a fact which is directly reflected in the Community's substantial trade deficit in relation to the United States for high-added value products.

While the world crisis of the seventies slowed down economic growth, the rate of scientific and technological progress actually accelerated. Because it failed to keep pace with this movement Europe has been more seriously affected by the crisis than the United States or Japan.

Thus between 1973 and 1981 industrial production increased by 26% in Japan, 16% in the United States and 8% in Europe. In relation to the situation at the outset unemployment has increased much more in Europe than in the United States, while Japan is maintaining a situation of almost full employment. European investment has delined more in relative value terms and the average profitability of European firms seems far inferior to that of their American and Japanese competitors. In 1980 profits in the EEC averaged 1.4% of sales, as against 2.4% in Japan and 4.8% in the USA.

Europe's industrial decline is all the more worrying since public opinion is as yet hardly aware of it. Because of the fast growth which dominated the postwar period up to the end of the seventies, Europe has acquired a standard of living comparable to that of the United States and superior, in the case of many countries, to that of Japan. But this situation is bound to be reversed unless Europe embarks resolutely on the road to recovery.'

6. The Community industrial area and its decline are paralleled today by the fragmentation of Europe. A policy based on cooperation would enable the Community to catch up and assume its place in international competition and thereby resolve the fundamental problem of unemployment. It is significant that 25 years after the Treaty of Rome not a single European transnational group has been formed. Collaboration between industries is to be found more often outside Europe than inside it.

7. The most serious illustration of Europe's division is undoubtedly to be found in the research sector, although the potential in that sector is comparable with if not superior to that of our competitors. In the field of microprocessors, for example, Europe controls hardly 10% of the world market, whereas the number of research workers in the Community exceeds that of Japan and is comparable to that of the United States. Only a small percentage of research workers in the Community work together. Most of the R and D programmes in sunrise sectors are national, so that the economies of scale of the Common Market cannot operate here. The result is that European programmes cannot achieve the dimension which is crucial in this field so the major discoveries are made in countries outside Europe. European patents are becoming rare compared with those of Japan and the United States.

8. On the other hand it is evident that where there is good cooperation the results are very favourable. One need only mention AIRBUS, ARIANE, the JET and CERN.

9. In these circumstances Europe's divisions are a major handicap and the creation of a scientific and industrial Community is becoming a matter of fundamental concern and urgency.

10. The present situation shows that Community expenditure (0.5% on research and investment) represents a negligible outlay compared with research activity overall in Europe and given the needs of the present time (500 million ECUs compared with overall spending of 50,000 million).

11. In the report on the discharge, we laid stress on the inadequacy of this percentage, but even more on the fact that the rate of utilization of appropriations was unsatisfactory.

12. The present report takes account, for the substance, of Parliament's views in particular the Linkohr report on the problems and prospects of the common research policy and the Sälzer report on the framework programme or the individual programmes.

II. THE EFFICIENCY OF THE INDUSTRIAL AND RESEARCH POLICY

13. In the light of the foregoing observations, it is clear that the research effort, if it is to be effective, must proceed from political not technocratic decisions. As the Community has learnt to its cost, it is pointless to propose programmes if the political will to support them does not exist. The essential problem is therefore to create a European consensus.

14. The demands of the present time in regard to research and industry show that all possible means must be used to prepare for the third industrial revolution. We must not therefore try at all costs to make the Community budget directly responsible for every possible form of cooperation in the field of research and industry. Although it is important that it provides the necessary encouragement, it must also leave the door open for initiatives which, initially, could involve two or three Member States in collaboration with private European industries.

The situation in regard to gross savings in the Community - which amounted to 420,000 million ECU in 1980 compared with 340,000 million only in the United States, whereas only a small part of this saving is invested in the Community - shows the importance of mobilizing it in badly needed investments.

15. The problems encountered at ISPRA (leaving aside the reorientation of the JRC between 1969 and 1973) indicate a certain continuity in various programmes. However, some of the criticism of this centre regarding shortcomings in basic research need to be seen in context. It should not be forgotten that the JRC recruited most of its research staff between 1955 and 1965 for applied, not fundamental, research for the ORGEZ project. Since there has been little subsequent renewal of the scientific staff one cannot but observe that the staff of the JRC is and will remain ill-suited to fundamental research. It is very difficult to second research workers of 50 years of age and over, still more so when the real solution is staff mobility and the recruitment of young specialist scientists of a very high level.

16. Most of the Community's research expenditure is allocated to the nuclear field and, despite the present lack of enthusiasm for this among Member States, it must be said that they have left the Community to do what they did not want to or could not do themselves. This is shown by the fact that the programmes are decided by the Council unanimously (Euratom or Article 235 of the EEC Treaty).

17. The inflated advisory services which surround the Community's research activities, and deplored in paragraph 11 of Parliament's resolution on the LINKOHR report¹, seem not to have assisted the generation of this necessary consensus. A necessary, but not sufficient, condition for generating this consensus is agreement on worthwhile subjects. The Commission's FAST (Forecasting and Assessment in Science and Technology) programme, which has recently been renewed, is widely recognized as a thorough effort to look at future possibilities in a systematic way; its iterative consultation of experts leads not to a prescriptive view but rather signposts to the main lines of technical evolution. Clearly the allocation of funds for research should not follow these signposts in a slavish fashion and has to take account of existing realities, but the distance between the FAST assessment and the framework programme for 1984-87 is striking.

18. Another necessary but not sufficient condition is agreement on the modalities for carrying out the research agreed on. Here, the Community has not even a putative instrument (such as FAST in the choice of subjects) to guide policy decisions. The organization of Community research has evolved in a very ad hoc fashion, very different types of action (direct, indirect and concerted) being advocated with no prior consideration of which types of action are best carried out at Community level and which by Member States.

19. It remains essential to consult all the actors contributing to the consensus, and to consult in a manner that also provides reasonably quick and sound decisions. Of the actors, the scientific community contributes to exercises such as FAST and to the system of peer evaluation being put into effect by the Commission. The Member States have, as usual, a predominant voice not only in Council itself but also in the plethora of Advisory Committees on Programme Management etc. Two groups of actors have inadequate influence: firstly, what one might call the 'users', i.e. industry and other scientists who benefit, or should benefit, from the results of research done; secondly, the population at large as represented in Parliament.

20. This need fully to involve Parliament is not merely a question of respecting the formalities of its consultative and budgetary powers. It is rather that no real consensus can exist without the sort of political legitimacy only Parliament can provide. As paragraph 43 of the resolution in the LINKOHR report¹ stressed, no amount of evaluation or expert advice can absolve the political authorities such as the Commission and Parliament of their political responsibilities. The Parliament is also a means of sensitizing public opinion.

¹ OJ C 334 1982

21. The Community tends not to debate research policy frequently or in an ordered way. The LINKOHR report of 1982 was the first such report in Parliament for many years, and the current debate in Council is the first really wide-ranging discussion since the mid-1970s. Part of this derives from inadequate documentation. The framework programme¹ proposal was the first attempt to form an overall view, for 1984-87, with priorities, of the whole of the Community's research effort.

22. Under the umbrella of the framework programme, the Commission has, as before, produced a JRC programme for the same 1984-87 period; it is in addition making proposals for action programmes in particular fields which not only comprise direct and indirect actions but which also sometimes cover other periods. This profusion creates confusion, which in the long run is of no help achieving stability of policy-making. Moreover, the level of support for any particular action is subject to decisions on two or three occasions, as well as during the annual budget procedure - in the framework programme, in the action programme and perhaps in the JRC programme. This hardly promotes clarity or consistency.

The need for integration

23. In the course of 1982 Mr J. F. Delpech (Directeur de Recherche at the CNRS) prepared for the Court of Auditors an 'Evaluation of scientific research activities in the establishments of the JRC'². This outlined the chequered history of the JRC and, whilst going on to make a number of substantive criticisms and proposals for change, nevertheless underlined that good work was being done at the JRC and that, above all, what was required was some stability, and a sense of mission leading to greater confidence and self-respect. It is undoubtedly true that the trauma of the early 70s, in which the early raison d'être of the JRC (namely to develop a particular type of European reactor) was dropped and the very existence of the Centre was called into question, has left its mark. The subsequent difficulties of the Centre in finding a new role, as well as the many specific criticisms that have been made, have given rise to a degree of defensiveness about the validity of a European research effort and the role of the JRC in that.

24. One result of the difficulties and doubts has been to put Community research - and particularly direct action - into a kind of 'ghetto'. A vicious circle has been created in which researchers do not move on from the JRC to other research bodies, no new blood has been recruited, an ageing research workforce produces less interesting work, defensiveness has led to a low rate of publication, the work of the JRC is therefore not recognized, and so on.

¹COM(82) 865

²Although Mr Delpech's report concerned exclusively the JRC, many of his observations would apply equally to indirect actions.

25. The crucial psychological step, therefore, is to integrate the Community's research effort with its environment. Looking closely at how best to integrate the Community's research effort will also throw a light on what specific activities it might undertake. The environment for the Community's research effort comprises, fairly obviously, what Member States themselves do but also the range of other activities - in particular industrial policy.

26. The approach of exhaustion of Community own resources is concentrating minds in this regard, as in many others. In the biotechnology sector, for example, the Commission has now produced a communication¹ on 'The Community's role', backed up by a background note setting out national initiatives in this field. This is an important development which should be applied more systematically for other sectors also. Similarly, although the Community has been supporting energy demonstration projects since 1978, it is only now that it has collected information on Member States' efforts and, partly as a result, has reduced its proposed five-year programme from 900 mECU to 490 mECU; this information has not been published.

27. Nevertheless much remains to be done in ensuring coherence between what the Community does and what Member States do. The ESPRIT programme is a substantial and desirable initiative which the Commission has promoted in conjunction with industry. It is foreseen as a ten-year programme with a budget of around 750 mECU for the first five years. To take but one Member State, the United Kingdom has recently decided on a substantial programme of support also in this sector, following the Alvey report, and no doubt other Member States have similar schemes. A degree of overlap does go on and indeed may be stimulating, but - without at all wishing the Community to become merely an inter-governmental organization - it is worrying that these initiatives seem to be totally independent.

28. The advisory committees on programme management were intended to provide a link between Member States' research and Community research, but following a catalogue of the problems of the present system, Mr Delpech concludes that it should be fully reappraised, so as to improve the quality of representatives, to ensure greater regularity of attendance and to underline their role in the formulation of the pluriannual programme through the provision of information on Member States' activities. The Commission has now made a proposal in this regard².

29. Moreover, one finds that in certain fields the ACPM³ experts most often act as research lobbies charged with the task of winning the best 'fair returns' possible.

¹COM(83) 328

²OJ C 113 1983

³ACPM : Advisory Committees on Programme Management

30. There is no doubt that a substantial effort would be required to collect the necessary information to form an overall picture of what Member States are doing and to compare it with the Community's research. Not only does budget nomenclature differ between Member States, but the fact that some expenditures are undertaken at a regional level is only one of many problems. This effort, which is also dependent on cooperation of Member States, cannot however be avoided. It was suggested earlier that there be a biennial report of the Community's own research activities; this might be the vehicle for including information on Member States' activities.

31. As Mr Delpech pointed out (page 99) :

'A more rigorous budgetary process would probably be made easier if the following two requirements were kept in mind

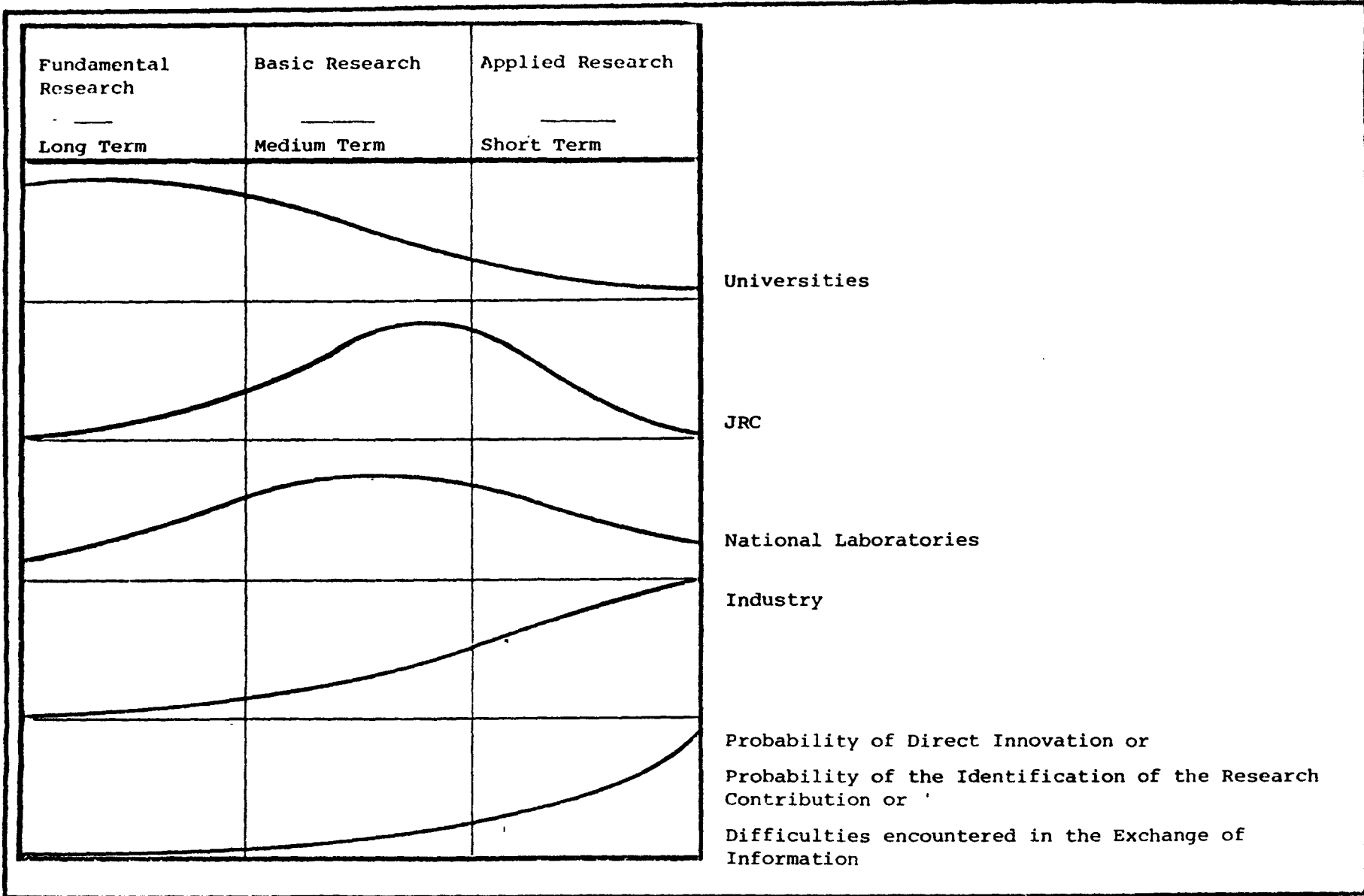
- an activity should be carried out only if it is possible to concentrate on it in sufficient critical mass,
- priority must be given to centres of excellence.'

Certainly this critical mass is attained in programmes such as the nuclear fusion programme where the Community effort comprises virtually the whole European effort in this field. On the other hand, it is difficult to avoid the suspicion that certain Community programmes are themselves duplicates of Member State activities or insufficiently funded as to be of marginal utility; whilst no hard and fast rules should be laid down, some parameters ought to be worked out to underpin those actions which the Community should undertake.

32. The Community's research is 'objective-related research'. The framework programme outlined the challenges facing Europe today and concluded that an objective-based approach should be used to orient the Community's research effort aimed at meeting these challenges. On the one hand this implies that little or no attention is given to basic research. On the other hand, the Community is not an industrial enterprise aiming to bring products to the market, so its R and D effort cannot become too commercially oriented either.

33. Nor should it be overlooked that many advances have been made as a result of apparently 'useless' research and that these have progressed to commercial exploitation surprisingly rapidly. Much of the spectacular progress in electronics and materials science over the last two decades has come about from a much improved understanding of molecular and atomic structures, and a similar observation might be made on the potential of biotechnology. It may therefore be shortsighted to minimize the Community's involvement in basic research. Parliament's resolution¹ on the common research policy : problems and prospects, states (paragraph 13) :

¹Linkohr report OJ C 334 1982



'Parliament expects and supports an extension of research policy activities of the European Community beyond the field of applied research to that of basic research in subjects directly connected with the Community's objectives and requirements'.

FIGURE 1 PROFILE OF THE RESEARCH IN THE VARIOUS ORGANIZATIONS

34. Certain European institutions for basic research already exist; one thinks particularly of CERN, but centres of excellence in other fields are well known. Whilst the aim of the Linkohr resolution (paragraph quoted above) and Mr Delpech's criticisms was to increase the attention given to fundamental or basic research in the Community's own programmes, the Community could usefully

- survey the main scientific fields, assess where there are already centres of excellence operating at an international level, and act to promote the creation of such centres where they do not exist,
- look carefully at creating links with these centres of excellence.

35. Despite this need to inject more fundamental research into the Community's research effort, it is not perverse also to insist that the Community's research effort be integrated with its other policies, in other words to pay attention to the ultimate aim of the research. There is considerable evidence in some Member States that the selection of promising subjects where research is to be supported has been done quite competently. This has not led to corresponding success at the industrial level¹. Experience in the United Kingdom, for example, shows that whilst promising areas can be selected, research projects too often lead to results which are irrelevant to industry or commercially unsuccessful. This problem can only be overcome if there is a strong link with the needs of end users, for it is only they who have the experience to orient usefully any programme.

36. This integration of supported research with other policy objectives has been very successfully carried out in Japan where the research is only a means to the end of promoting the health of certain high technology sectors. The Community's ESPRIT programme is a step in this direction, but as outlined in the Delpech report there remains a long way to go. The smaller JRC establishments tend to have direct links with industrial users, but the figures for innovations made at the JRC which might have industrial application make dismal reading. In the whole 1968-82 period, 144 so-called innovation files (i.e. potential applications) were opened, of which 29 found commercial exploitation; the number being exploited seems to be tailing off.

37. As with fundamental research, a number of European level organizations exist which have the effect of promoting certain high technology sectors : the European Space Agency, together with the ARIANE programme which is now run separately; the Airbus and PANAIA consortia which have made a considerable impact in the aerospace sector; even the JET programme, which is closely linked with the Community,

¹ See report of ACARD (Advisory Council for Applied Research and Development) and ABRC (Advisory Board for the Research Councils) July 1983

has been set up as a separate institution, but must be regarded favourably in the context of the plurality of the Community's research potential.

38. Each of these organizations seems to have been relatively successful, despite specific problems, and it is instructive to consider why. It may well be because each has both a relatively limited scope and a relatively clear functional objective. The JET programme, for example, is dealing with the single field of nuclear fusion, and is aiming at a particular stage of scientific evolution to self-sustaining reaction.

39. Once again, the Commission might usefully look beyond its preoccupation with its own research programmes to see where other initiatives, quite possibly outside the Community context, could achieve the same end of promoting a particular technological sector. The framework programme envisages six or seven main technical themes and an emphasis on action programmes comprising both direct and indirect action. Might these themes provide the basis for individual or quasi-individual JRC institutions?

Evaluation

40. The need for systematic evaluation of the Community's support for research and industry is now unquestioned and is exemplified by the Council's invitation to the Commission, the latter's plan of action in response, plus continual demands from Parliament. The main questions which result are when to evaluate, how and for whom.

41. Selecting promising areas for research is only half of the battle. Research in the United Kingdom for the Advisory Committee on Applied Research and Development (ACARD) indicates that while general areas for research can be intelligently chosen the projects selected in those areas can give very meagre results indeed. In the Community context, of course, research projects are proposed by the Commission and, to a greater or lesser extent government and academic experts from Member States are able to influence the choice of projects undertaken. However, there is very little involvement in this process of putative end users, for example representatives of industries which might provide applications for research results. This is exactly the sort of input that is needed to ensure that research projects within general areas of interest are likely to give useful results.

42. The Community and in particular Council is notorious for its inability to take decisions. This can have especially deleterious effects on research programmes which need to be undertaken promptly if technological leads are to be preserved.

The most recent example is of course the Super Sara project on which a substantial amount of preparatory money was spent, but by the time the Council was ready to take a decision on implementing the programme in full the usefulness of the project had been overtaken by events.

43. The problem is therefore to ease decision-making within the current framework. At present, apart from the four-year programme for the JRC, programmes are presented individually for Council decision; as Council discussions tend to be dominated by national civil service attitudes, particularly on esoteric subjects such as research, the need is to inject greater scope for political compromise. Game theory would suggest that several subjects should be considered together, which allows more scope for finding an overall compromise¹. The Council does at present manage to debate and adopt the multiannual JRC programme without too much difficulty and one approach to ease decision-making may be to integrate all direct and indirect actions into a single multiannual programme on which there is a single decision with revision after, say, two years.

44. A complex and indeed inflated structure of advisory committees on programme management has grown up over the years which might have been expected to fulfil this role; they are normally composed of experts or civil servants nominated by Member States. The fact that there is a Community plan of action for evaluating Community research and the stress in that evaluation on peer evaluation, is testimony to the fact that the ACPMs have very inadequately fulfilled this role. Mr Delpech's report commented adversely on the poor rate of attendance of most members of ACPMs and the apparently declining level of representation. The drawing together of Community research into a number of main themes as set out in the framework programme, and comprising both direct and indirect actions, should provide the opportunity for a drastic simplification of the MCC structure²: at least this is what the Commission has proposed³, but it is unclear if this rationalization will find favour in Council.

45. Evaluation of a research programme after it has been completed may at first seem a little pointless, but such evaluation needs to be reinforced: it is usually only at this stage that any idea can be got of the eventual benefits accruing from a project (for example, employment resulting from industrial application, etc.),

¹This logic of presenting Council with fewer, but more important decisions, is one followed in part in the proposal (COM(83) 111) to revise the JRC administrative structure so as to remove the need for reference to Council in a number of minor instances. Council has agreed in principle to this proposal (10 March 1983) although Parliament has yet to give its opinion.

²MCC : Management Coordination Committee

³COM(83) 143

and indeed that all the information necessary for a thorough audit of this expenditure of public funds is available. Both aspects are the concern of Parliament as it performs its budgetary control role.

46. There is increasing recognition of the important role of evaluation of the research funded by the Community. The Commission has organized two seminars on the subject (in 1978 and 1982), and one lesson to be clearly drawn from both of them is that there is no simple formula for carrying out such evaluations. While a certain flexibility of approach is therefore vital, it is also necessary to be reasonably systematic and to build the evaluation process into the Community's decision-making and management procedures.

Evolution of the Commission's plan of action

47. Current Community practice in evaluating research and development in the case of direct action programmes comprises two major aspects : 'programme evaluation' and 'result evaluation'. The former is applied while the programme is underway and internally involves channelling information on technical and financial progress to management; external evaluation derives from the opinions of the ACPMs.

48. In its communication of 19 January 1983¹ the Commission set out its plan of action relating to the evaluation of Community R and D programmes. This is designed to cover the years 1983-85 inclusive and comprises four main actions :

- continued strengthening of existing internal evaluation methods;
- the retrospective assessment of programmes by external experts. This will be done by peer evaluation for indirect actions, while for JRC programmes there will be an assessment of how the programme fits into Community activity in the field and a stress on using permanent control bodies such as ACPMs etc. Hearings will be arranged for concerted action programmes;
- studies and research into evaluation methodology;
- exchange of information on evaluation methodology.

49. A choice of research to fund in the future, i.e. evaluation of possibilities. The Commission's seminars and communication deal at some length with the assessment of work underway and the retrospective assessment of work completed; very little is said on a choice of future programmes, yet it is clearly vital not only to identify promising areas for research but also to create a consensus so that work in any particular area can be carried out in a stable political and financial

¹COM(83) 1

environment. The FAST exercise goes some way to identifying possibilities but does not deal with how the scientifically-profitable projects within those possibilities are picked out; end-users must be closely involved.

50. Economic, social and other objectives. Council's resolution of 20 December 1979 stressed the need for Community research to contribute to these objectives, yet the Commission's communication in response¹ admits that the pilot projects have given inadequate answers to this central question. The available methodology is clearly insufficient and there are considerable time lags before results can be evaluated. Nevertheless such evaluations are vital to assessing the usefulness of a programme, as opposed to the efficiency with which it is carried out, and Mr Delpech's conclusion in his report was quite unequivocal (p. 90) :

'In spite of a few improvements, I consider that the Commission has not yet given a satisfactory answer, concerning direct action, to the Council's request; the results of research carried out by the JRC for the Community and the Member States must be the subject of a serious and detailed evaluation.'

51. Evaluation of direct actions. The general emphasis in the Commission's proposal has been to stress external evaluation, but it does not stress this aspect with regard to its own direct actions. One of the lessons the Commission drew from the 1978 seminar was that it should develop its own evaluation criteria to suit the specific characteristics of Community R and D programmes and it is not necessary or even advisable to apply the same methods to direct actions as to indirect actions. Nevertheless it is also striking that of the pilot evaluation programmes undertaken by the Commission, these all concerned indirect or concerted actions apart from the special case of the fusion programme.

52. Clearly a system of peer review relies on there being a constituency of disinterested scientists who are nevertheless expert in the field. This may be easier to find at the Community rather than national level, but - as the SPRU report documents - peer review tends to operate smoothly when research funds are in plentiful supply and scientists are not in competition for them. It is a fairly quick and cheap method of evaluation, but is best suited to evaluation within fields rather than comparing performance between them. In addition, however, peer review has three particular shortcomings which are relevant to Community research :

(a) It is an essentially conservative process which tends to encourage the reproduction of 'establishment views' (a Research Council official quoted in the SPRU report). About the last thing the Community's research effort needs is to continue in its old rut;

¹COM(80) 889

- (b) With its emphasis on evaluation within a given field, the method tends to preclude the introduction of assessments of economic and social impact which are not only relevant to reaching balanced decisions but actually what Council asked the Commission to look at;
- (c) It is being overtaken by quantified methods of assessment, so just when the Community is embracing this method, progress is being made elsewhere, leaving it behind. The Delpech report sets out in some detail the services which already exist, and which could be applied quite simply in the Community; the SPRU supports the same tendency but recognizes that a base of data needs to be built up.

53. Scope of application of the procedures. The Commission proposal concerns its research activities, narrowly defined. Similar procedures could well apply to certain energy programmes, and programmes in the information market and industry chapters of the budget. Indeed, the artificiality of any distinction between the Commission's support for research and for new industrial sectors is demonstrated by the preparatory measures for the ESPRIT programme being entered in the budget under 'industry' (Ch 77) with the programme itself under 'research' (Ch 73). With regard to cost of evaluation, although the review procedures may take time their direct cost need not be massive; the shadow costs of not evaluating are potentially enormous.

C.

III. COMMUNITY RESEARCH IN 1981

54. An outline of the research activities supported directly or indirectly by the Community in 1981 is given in the table below:

TABLE

1981 Budget: Research and Investment (Ch 33)

Direct Action		Payment Approps.
Article		(in million ECU)
330	JRC - nuclear safety	53 mECU
	- new sources	21
	- environment	14
	- nuclear measurements	11
	- sectoral activities	10
331	JRC - HFR reactor	14
333	JRC - Super Sara etc.	16
Indirect Action		
334	Energy - new sources	16
	- fusion	26
	- JET	40
	- diverse nuclear	2
335	Raw materials	3
336	Environment	14
337	Technological development	1
338	Horizontal activities	1
339	Non-programme activities	3
	TOTAL	249

From this it will be seen that activity was more or less evenly divided between direct actions and indirect actions and that most spending was on nuclear-related topics.

55. When the Council invited the Commission, in December 1980, to look more closely at methods of evaluating the Community's research activity, it had in mind the contribution made by that activity to meeting the Community's economic and social objectives. The two seminars organized by the Commission covered many aspects of research evaluation but paid very little attention to these aspects : the methodology for evaluating research in this way is very underdeveloped and displays all the classic problems of cost-benefit analysis, in particular the difficulty that quantifiable costs and benefits form only a part of the overall picture. In addition, it is difficult to estimate, even qualitatively, the contribution made by a healthy research environment to general economic activity and industrial renewal.

56. Thus it is hardly surprising to find that the Commission's 'plan of action' on research evaluation pays little attention either to social and economic effects (and its emphasis on peer evaluation will do nothing to correct this narrow-mindedness) or to Mr Delpech's observation that the Commission has failed to respond to this central aspect of the Council's invitation.

57. A different approach to evaluation adopted by the United Kingdom has led to the following conclusions :

1. it is easier to estimate the internal problems and possibilities in carrying out research than to estimate its external usefulness;
2. the programmes achieving a higher total score did so largely because they combined both a real external need without suffering major technical problems;
3. high-scoring programmes often have relatively low funding, e.g. environment, raw materials, nuclear measurements;
4. the JRC new energy sources programme and the indirect fusion programme score badly because they deal with subjects likely to give major technical difficulty and where the external need cannot yet be defined.

58. The Community's support for research in practical terms is modest and although there continue to be, despite the progress that has been made, problems both over selection of projects and management of programmes, Parliament has consistently worked to see the Community's research effort enlarged.

Nevertheless, there is much scope for increasing the usefulness and efficiency of Community research. Ideally, this ought to be done by looking at all the steps; the innovative process, not just the research programmes themselves, but also at all the links such as those between basic research and objective-related research and between the latter and industrial application. Not all the factors affecting innovation fall within the Community's competence (e.g. taxation allowances).

IV. CONCLUSIONS

59. It must be stated unequivocally once again that the development of European industry depends on the undertakings themselves. It is they that must take the initiatives and they that are responsible for satisfying the requirements of the markets and continually adjusting to social and technological change. In addition, the Community must create a favourable environment for the undertakings' activities and back up their efficiency by clear, dynamic and purposeful cooperation.

The recent proposals presented in the Council on this subject succinctly sum up the objectives to be achieved, namely :

- to give a new boost to cooperation in the field of research,
- to define European norms and open public markets,
- to place the common commercial policy at the service of European industrial developments,
- to encourage links and cooperation between European firms,
- to extend the Community's means of intervention,
- to launch European infrastructure projects to foster exchanges between undertakings and de facto cooperation.

60. Community preference must be used to create a cohesive market which will enable savings to be directed towards profitable investment, to allow competition to develop between the banking services so as to reduce the financial costs of investments and to permit the introduction of new instruments to mobilize savings.

61. The implementation of arrangements to enhance the position of the small and medium-sized undertakings; these represent 90% of industry and 60% of the active population and show great capacity for innovation.

The SMUs suffer from a lack of market cohesion and are subject to obstacles to the free movement of goods (in particular bureaucratic procedures).

It is desirable therefore :

1. to widen the research and industrial investment programmes to include the SMU sectors;
2. to protect their industrial property rights;
3. to simplify administrative procedures;
4. to create organizational and management infrastructure to enable them to utilize the export opportunities available.

Moreover, measures should be taken to encourage mobility among management personnel in industry in the different Member States.

62. Day by day we are lagging further and further behind and becoming more dependent in the matter of information technology (in particular in the field of super computers), we import most of our components and have the greatest difficulty in transforming our inventions into finished products; this is why the motion for a resolution¹ on setting up as a matter of urgency a European research centre for advanced training in information technology merits immediate consideration. As an essential link between fundamental research and industrialization, such a centre for technological transfers and advanced training will be able, in collaboration with industry, to make available to the Community the thousands of specialists of the highest level which it needs. As a complement to the ESPRIT project it will allow the Community to take its place in the world market during the next two decades of the third industrial revolution.

63. Parliament's Committee on Budgetary Control must take care to ensure during the discharge procedure for the coming years that the modest budget funds released under the research and industry policy can be utilized with greater efficiency.

¹Motion for a resolution tabled by Mr Saby on the creation of a European scientific computer centre, of 17 March 1983 (Doc. 1-46/83).

