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(Information)

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on

the utilization of the results of community research work accompanied by the replies of the Commission

(91/C 133/01)

(Observations pursuant to Article 206 (a) *paragraph 4 of the EEC Treaty)*

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1. INTRODUCTION

1.1. Research is one of the Community's main policies. It is planned on a multi-annual basis, using 'framework programmes', which determine the main areas of research for a period of four or five years and set the corresponding budget. Three framework programmes have so far been adopted. These were for the periods 1984-1987, 1987-1991 and 1990-1994 (the third framework programme, adopted on 23 April 1990, therefore overlaps to some extent with the second one).

1.2. Community research work is carried out in two ways. Some is done by the Commission itself, at the Joint Research Centre (JRC), and at the Commission's cost. This is known as 'direct action' and in the 1989 budget 225,7 Mio ECU, that is, 15,7 % of the total sum of 1 441,4 Mio ECU, was allocated to it. The rest of the research is carried out mainly via contracts whose costs are shared by the Commission (Directorates-General XII and XIII) and third parties (research centres, universities and industries) and, to a lesser extent, by means of 'concerted projects' carried out in the Member States, for which the Commission does no more than provide and fund the coordination, without providing any funds for the research itself. Shared-cost research and concerted projects constitute 'indirect action', for which 1 215,7 Mio ECU was allocated in the 1989 budget, that is 84,3 % of the above-mentioned total.

1.3. Broadly speaking, the utilization of the results of research work can take three forms:

a) the dissemination of information. This includes not only the production of publications, but also the setting-up and management of data-banks and communication networks, participation in fairs, exhibitions, symposia etc. and training;

b) the protection of intellectual property rights in respect of inventions, that is, for the most part, the filing and management of patents;

c) the promotion of the exploitation of inventions, that is to say, the industrial and commercial development and promotion of them.

1.4. At the Commission, the utilization of research results is assigned principally to Directorate C of Directorate-General (DG) XIII, which administers budget headings B 7388 (formally heading B 7306) and B 7530 for this purpose. The Directorate consists of three departments, which correspond to the three activities mentioned above:

a) for the dissemination of information, Unit XIII-C.3 (scientific and technical communication);

b) for patents, the first sector of Unit XIII-C.1, which also deals, in another sector, with innovation and technology transfer;

c) for the promotion of exploitation, Unit XIII-C.2.

1.5. Over the period 1987-1991 (5 years), research and the utilization of its results were allocated, by a decision of the Council adopting the second framework programme for research and development measures [1] 5 396 Mio ECU, 5 358 Mio ECU of which was for research and 38 Mio ECU for the utilization of results, that is, a ratio of 141:1. The third framework programme, which covers the five year period 1990-94 [2], was granted 5 700 Mio ECU, 5 643 Mio ECU of which was for research and 57 Mio ECU of which was for the utilization of results, that is, a ratio of 99:1.

1.6. When it came to carry out the investigation dealt with in this report, the Court chose not to restrict itself to

[1] Council Decision 87/516/Euratom, EEC of 28 September 1987, concerning the framework programme for Community activities in the field of research and technological development (1987 to 1991) (OJ No L 302, 24. 10. 1987, p. 1).

[2] Council Decision 90/221/Euratom, EEC of 23 April 1990, concerning the framework programme of Community activities in the field of research and technological development (1990 to 1994) (OJ No L 117, 8. 5. 1990 p. 28).

auditing one department or a given budget heading, but to examine more generally how the Communities have carried out a particular task.

2. LIMITED IMPACT OF MEASURES TO UTILIZE RESEARCH RESULTS

Publications

The number of scientific and technical publications

2.1. Scientific and technical publications are entered in the Commission's annual publication programme and then produced, at the request of the various departments which wrote or commissioned them, via DG XIII-C.3, the publications department. In principle, all publications have to pass through that department.

2.2. The number of scientific and technical documents (periodicals, reports, books and conference papers) which the Commission, in its annual programme, decided to publish rose from 534 in the 1979 programme (50,6 % of the total) to 847 in the 1985 programme (73,5 % of the total).

2.3. The number of scientific and technical documents actually published via unit XIII-C.3 is lower than the programme forecasts, but it is rising: it increased from 485 in 1987 to 581 in 1988.

2.4. The actual number of publications is, moreover, higher than the recorded figures. In practice, a number of documents are printed, published and circulated directly by the departments that wrote them (which enjoy a measure of publishing autonomy) but independently of the programme, and without going through Unit XIII-C.3 or, moreover, through the Publications Office. Cases of this sort occur quite frequently at DG XII and at the JRC.

Dissemination policy

2.5. A study of a sample of 38 publication files dealt with by unit XIII-C.3 in 1988 revealed that the number of copies ordered from the Publications Office for free distribution by the Commission was of the order of 150 to 400.

2.6. The situation was quite different for publications sold by the Office. In a sample of 25 reports in the EUR collection which were published by the Office and became available between 1 July 1987 and 31 December 1988, the average number of copies sold as at 14 November 1989 was slightly over four per report. The best-selling report in the sample had sold only 17 copies. The number of sales is a reliable litmus test and an indisputable criterion of the interest aroused by a publication. On the other hand, it is always possible to distribute publications widely on a gratis basis, but then the impact is difficult to gauge without carrying out a special investigation.

2.7. On the other hand, when publishing is placed in the hands of a private publisher, the volume of sales per publication is much higher (several hundred). The sharp drop in sales from a few hundred to a few single copies when one compares private publishing with publishing by Publications Office suggests that the promotion of sales is not effective enough when carried out by the Community.

2.8. The Commission should therefore take a close look at the effectiveness of its dissemination methods. The only way the Office can promote sales is in a standardized, fairly unsophisticated manner. It has a single network of approved outlets for all Community publications. Only the department which wrote a particular publication could, thanks to its knowledge of the groups concerned, draw up and propose a specific type of promotion, that is, one better targeted to suit the type of publication. After all, the readership of a highly technical publication will always belong to a very restricted, relatively well-defined group.

Patents

2.9. If the scale of Community activity in the filing and maintenance of patents is to be grasped, it has to be put in context:

— the geographical context, since the performance of a body can only be assessed on a relative basis, and

— the temporal context, since knowledge of trends is needed to complement and, where appropriate, adjust the appraisal of a recent situation.

First element of technological power: the amount of accumulated knowledge

2.10. Technologies are bought and sold, or even hired, and the state of a country's 'balance of technological payments' can be used as an indicator to identify major 'veins' of technological resources, those countries that tend to be suppliers and those that tend to be customers. The state of affairs is clear: in 1985, according to the Organization for Economic Cooperation and Development (OECD) (1), the rate at which expenditure on technology abroad was covered by revenue of the same kind stood at 268,2 % in the United States, 79,9 % in Japan and only 61,4 % on average in the EEC Member States (2), which, as a group, were at the bottom of the league of OECD members.

Second element of technological power: inventive creativity

2.11. The filing of applications for patents can be viewed as an indicator of inventive creativity, provided, however, that inventions filed successively or simultaneously in a number of countries are counted only once. To prevent their being counted more than once, the OECD keeps separate statistics on 'indigenous patents', i.e. patents filed in a particular country by residents of that country, and 'foreign patents', i.e. those filed by non-residents. In 1986, EEC countries had to their credit 18,0 % of the total number of indigenous patents of all the OECD countries, compared with 14,1 % for the United States and 62,9 % for Japan alone.

2.12. More interesting are the statistics on the number of indigenous patents applied for per million dollars spent on research, since they give an idea of the returns on research, in terms of inventions. In 1986, the figure stood at 7,0 in Japan, 1,2 in the EEC Member States taken as a whole (3), 0,6 in the United States and an average of 1,9 in the OECD as a whole.

2.13. Is it possible to attempt to establish the position of Community activity in this respect? For Community action, the statistics enable a distinction to be made between the first time an invention is filed (in a given country) and subsequent filings of the same invention in other countries. Although they are not entirely identical, the 'first filings' of Community patents can be compared with the OECD's 'indigenous filings'. When inventors file patents in one or more countries, they rarely omit their own. In 1986, the number of first filings of patents in the Community per million dollars (4) of research expenditure on direct action (5) amounted to 0,11, a record 11 times worse than that of the EEC Member States taken as a whole and 17 times worse than that of the OECD countries taken as a whole.

Third element of technological power: trends

2.14. Between 1982 and 1986, the number of applications for indigenous patents rose by 22,3 % in the OECD countries and by just 4,9 % in the EEC Member States, whereas the Community's first filings fell by 24,1 %. Viewed in absolute terms, rather than as percentages, and over the longer period of 1972 to 1988, annual first filings fell from 67 to 19.

Fourth element of technological power: external diffusion

2.15. The only aspect in which the Community is seen to be setting the pace is in the geographical area in which inventions are protected. The Community often files a particular invention in quite a large number of Member States and even outside the Community (United States, Canada and Japan). For every first filing, the Community made 7,5 applications for extension to other countries in 1986 and 10 in 1988. By comparison, in 1986, inventors in the OECD countries requested 1,2 patents abroad for every indigenous patent, Japanese inventors requested 0,3, those of the United States 2,5 and those of EEC Member States 2,8.

Overall appraisal

2.16. The sum total of Community action as regards patents can therefore be seen to be extremely limited. The main reason for the fall in the number of inventions patented by the Community seems to lie in the reduction in the number of patentable inventions coming out of the JRC. Added to that is the increasingly restrictive practice as regards the renewal of patents, given the fairly high cost involved and the fact that only a small proportion of patents find any industrial application whatsoever (2 to 4 % according to JRC officials). Finally, indirect action still accounts for only a limited part of the activities of the patents department (see paragraphs 4.16 and 4.17).

(1) The arguments set out in paragraphs 2.10 to 2.14 and paragraph 4.9 are based in particular on statistics provided by the OECD during a Court visit in April 1989.
(2) Except for Greece, Ireland and Luxembourg.
(3) Except for Luxembourg.
(4) The comparison with OECD statistics needs to be qualified. As regards the Community data, the ECU are converted into US dollars, whereas the OECD uses notional dollars based on the US dollar but with the same buying power in all countries.
(5) Since it was primarily invention patents of the JRC that were involved, only expenditure on direct action was taken into account.

Promotion of Exploitation

Few productive files

2.17. In the 21 years between 1968, when the promotion of exploitation department was set up, and 31 March 1989, 340 files were opened, which is an average of 16 files a year. In fact, the rate has fluctuated: three files were opened in 1968 and nine in 1973. In 1974, there was an isolated peak of 47 and another in 1984 of 45. However, generally speaking, since 1975 the annual number has ranged from around 10 to 20 a year, with 23 in 1988.

2.18. These figures should be compared with the number of research projects. In 1986, DG XII signed 1 672 shared-cost research contracts; in 1987 it signed 1 395. The JRC research programmes for the 1984-87 period covered 43 research subjects, those concerning the 1988-91 period covered 46. Each subject is sub-divided into projects.

2.19. It is clear from these few figures that very little research work is exploited downstream.

2.20. However, the fact that a file has been opened does not always mean that measures to exploit the research practically have been launched, let alone that they will succeed. A random selection of files revealed that most of them were no more than a few millimetres thick. Some consisted of only two sheets: the forms for opening and closing the files. Clearly, for some files, exploitation had been no more than an idea, with the work of the department being limited to collecting a few pieces of basic information.

2.21. At 31 December 1988, of the 327 files that had been opened, 121 had been abandoned, 41 were dormant and only 165 were considered as current by the Commission. The Court noted that some of the files referred to as current concerned at least provisional failures, pending their full development, which was itself sometimes hypothetical.

2.22. Since it was set up, the promotion of exploitation department has enabled a total of about 50 inventions of all kinds and origins to be put on the market and has led to the direct creation of some 280 jobs (1).

(1) According to an internal note of the promotion of exploitation department of March 1988 summing up the promotion of exploitation files for the beginning of 1988.

Few licences granted

2.23. The number of contracts for the grant of licences or know-how or for the transfer of technology stands at around five per year (one in 1984, five in 1985, four in 1986 and six in 1987). Taking the 1987 figures, this represents one contract for every 177,9 Mio ECU of financial commitments entered into for research.

Very low level of royalties

2.24. ***Table 1*** provides a few figures on the royalties paid on licences and the remuneration of technical assistance. Already very small, the number of revenue-producing files is sharply decreasing. As for the amount of revenue, in 1988 it represented 1 ECU for every 204 ECU of expenditure on the exploitation of the findings of research (headings B 7306 and B 7530 of the general budget) and every 45 762 ECU of expenditure on research (chapter 73 of the general budget). The Court confirmed the weakness of these results (2) during its audit visits to various Member States (3).

Table 1 — Royalties Received

Financial Year	Number of files producing revenue	Amounts of revenue (in ECU)
1984	15	19 563
1985	13	15 310
1986	15	79 782
1987	11	28 308
1988	4	21 043
1989	4	18 299

(2) The national research exploitation organizations visited by the Court during the investigation carried out for this report were:
— British Technology Group (BTG) (UK);
— Fraunhofer Gesellschaft (FhG) (D);
— Gesellschaft für Strahlen- und Umweltforschung (GSF) (D);
— Garching Instrumente (GI) (D);
— Agence nationale de valorisation de la recherche (Anvar) (F).
— The Court has drawn up a document describing these organizations and their working methods, which is available from it at its address in Luxembourg.

(3) For instance, in one Member State, a research company working in the field of the environment received 1 ECU in royalties for only 85 ECU of expenditure (taking all research and promotion of exploitation expenditure together). In another Member State, an important research exploitation agency received 1 ECU in royalties for every 2,9 ECU spent on the promotion of exploitation (the basis for comparison is therefore more restrictive here and does not, as in the previous case, include all expenditure). The main research exploitation organization in a third Member State is currently profit-making.

The impact of the research programmes of the Brussels departments of DG XIII

Results worthy of attention

2.25. The industrial results of the ESPRIT programmes [1], which are not exploited by the promotion of exploitation department but as part of the research project itself, have already achieved a scale that is well beyond that of other research programmes. An external assessment of the ESPRIT programme was carried out from October 1988 to May 1989. This included a sample survey of the participants in the projects. In all, 949 replies were analysed. To the question 'What kind of economic benefit has your organization gained from this project?', 69 % replied 'Improvement of know-how', 45 % stated that it had resulted in new products, 35 % had improved their products, 29 % had developed standardization, 25 % had reduced their costs or their production time and 12 % had improved their production methods. Only 15 % said they had not benefited at all from participating. It should be noted that these are practical results, at industrial level.

2.26. The ESPRIT programme was launched in 1984. Less time has elapsed in which to assess the impact of the RACE [2], AIM [3], DELTA [4] and DRIVE [5] programmes (1987 and 1988), which were implemented by the same departments as the ESPRIT programme (DG XIII-Brussels) and according to the same procedure. However, a progress report on the RACE programme in September 1989 revealed that 58 % of the participants had succeeded in developing products, 42 % had filed patents, 28 % had created and developed services and 79 % had pushed forward the state of the art.

A new approach

2.27. The much greater and more rapid success of the exploitation of this type of programme can, to a large extent, be attributed to its nature and the approach chosen. In this type of programme, utilization of the research results forms part of the programmes themselves. This is done in two ways. Firstly, some projects included in the programme are instruments for the utilization of other projects in the programme, particularly as regards the dissemination of information. This is true of the 'information exchange system' (IES) project and its data base, which simplify the exchange of information between participants in the ESPRIT programme, and the Eurokom 'electronic mailing system', a mail distribution service intended for current and potential users of data concerning the programme. Secondly, the research procedure in the ESPRIT programme is fully integrated and the objectives are defined in terms of the achievement of concrete results, for example, market shares to be won. While it is true that the research funded by the Commission does not extend to the stage of high-class commercial products, remaining pre-competitive, it does reach a stage of sufficient development to enable industrial participants to go on and perform, this time in their own names, additional research and develop procedures and products intended for the market.

2.28. The reasons for the success of this type of programme must be analysed in greater depth:

a) in these programmes, the projects are generally closely allied to their applications. Basic research accounts for only a small minority of projects;

b) industrial manufacturers are the main participants in the programme. In the ESPRIT programme, 12 very big companies took part in 70 % of the projects. Small and medium-sized enterprises (SME) (fewer than 500 employees) took part in 65 % of the projects. SMEs can not afford the luxury of carrying out research without having the determination to carry the results through to viable applications. In the conventional programmes of DG XII, in contrast, the large majority of contracting parties consists of research centres and universities;

c) industry's participation is not confined to the stage of implementing projects under shared-cost contracts, but begins at the stage of programme and subject definition, whereas the scientific content of conventional programmes is defined by administrative departments.

For all of these reasons, the research has every chance of leading to concrete results. The approach adopted for the ESPRIT programmes has also been adopted for other

(1) For ESPRIT II, Council Decision 88/279/EEC of 11 April 1988, concerning the European strategic programme for research and development in information technologies (Esprit) (OJ No L 118, 6. 5. 1988, p. 32).

(2) Council Decision 88/28/EEC of 14 December 1987 on a Community programme in the field of telecommunications technologies — research and development (R&D) in advanced communications technologies in Europe (RACE programme) (OJ No L 16, 21. 1. 1988, p. 35).

(3) Council Decision 85/577/EEC of 4 November 1988 on a Community programme in the field of information technology and telecommunications applied to health care — Advanced informatics in medicine (AIM) — Exploratory action (OJ No L 314, 22. 11. 1988, p. 22).

(4) Council Decision 88/417/EEC of 29 June 1988 on a Community programme in the field of learning technologies — development of European learning through technological advance, exploratory action (OJ No L 206, 30. 7. 1988, p. 20).

(5) Council Decision 88/416/EEC of 29 June 1988 on a Community programme in the field of road transport informatics and telecommunications (OJ No L 206, 30. 7. 1988, p. 1).

recent industry-orientated programmes managed by DG XII (BRITE-Euram and Biotechnology).

2.29. As far as the dissemination of results is concerned, it is enough simply to visit an event such as the 'Annual ESPRIT conference' to appreciate the scope and influence of the programme (in 1989, over 100 projects were presented, participants numbered several thousand and the conference speakers were of the highest scientific and political standing). It would be impossible to find anything on a par with this as a result of Directorate XIII-C's efforts to promote the exploitation of research.

3. THE SEARCH FOR CAUSES: 1. DELIBERATE ACTION OR PASSIVE PROCEDURES

Introduction

3.1. Utilization of the results of research work is just one specific type of technology transfer, which is by nature, and viewed as a whole, promotional and requires a driving force behind it. If those in charge take no initiative, nothing will happen. The exposition that follows is aimed at establishing to what extent the actual activities of the departments bear witness to this essential dynamism.

Shortcomings upstream of Directorate XIII-C

3.2. The framework programme assigns DG XII something of a role as regards the utilization of research results (see paragraph 5.20). This role is not adequately performed.

Dissemination of information

3.3. DG XII shoulders its responsibilities fairly systematically as regards the dissemination of research results. Virtually all the results are published, either by the contracting party or by the Commission.

3.4. DG XII also makes very frequent use of media other than publications to disseminate information. For instance, it creates data bases, draws up abstracts in fields of research of varying scales, and is involved in the exchange of experiences between researchers and in the organization of symposia open to third parties, including academics, politicians and also industrialists, that is, the people who will potentially make commercial use of the research, and in the training of researchers and consumers (e.g. the setting up of a European climatology school).

3.5. However, the approach to the problem of publications (choice of documents, nature and choice of media, publishing arrangements, print-runs, targeting of public, etc.) varies considerably within DG XII and generally depends on the scientific units and the dynamism and preferences of those in charge of them. These departments make the results known to the scientific circles involved in the subject, which they know well, but which are small, and do not systematically carry out more ambitious steps to promote the results. The impact of the publications is not assessed. There is a pressing need at DG XII for guidelines aimed at setting up uniform methods, revitalizing dissemination and optimizing impact.

Promotion of Exploitation

3.6. Though it is aware of its responsibilities as regards the dissemination of information, DG XII is less attentive to the role it should play in promoting the exploitation of results. There is a lack of continuity between the action of Directorate XIII-C, which, in its present circumstances, is able to identify the results that can be exploited in only a very incomplete fashion, and that of DG XII, which does not consider the identification of such results as its responsibility. However, in the link between research and exploitation, that is, in the process of transforming research findings into useable inventions, DG XII and Directorate XIII-C have complementary roles to play.

3.7. First, DG XII should ensure that it sends all shared-cost research contracts and all the final reports of the contracting parties to Directorate XIII-C. This requirement has never been completely satisfied. The submission of final reports depends, in this particular directorate-general, on the various scientific departments, whose practices vary considerably in this respect. However, for some time now there appears to have been a marked improvement. The Directorate-General ought — and this is far from being the case — to properly monitor the contracting parties on completion of the contracts, require that they submit their declaration of intent as regards the utilization of the results, if necessary make this a condition for the release of the final payment due and ensure that all these declarations really are notified to Directorate XIII-C. Here, too, DG XII's practices depend on the scientific units.

3.8. However, that would still not be enough. Although *exploitation* as such is not, in the main, the responsibility of DG XII, the *objective* of exploitation does have to be an essential consideration at every stage of its work: at the programme definition stage, in the choice of subjects, which should correspond to the actual needs of the

economy; at the project selection stage, when the prospects of commercial exploitation have to become an important criterion for eligibility; at the progress monitoring stage, when researchers have to be directed along the most practical courses of work; on the completion of contracts, when checks are made to ensure that the former contracting parties are observing their obligations to exploit the research, and in the work of the assessment panels, to ensure that they make more effort to discover the impact of the results on the contracting parties and even, as far as possible, the indirect impact, which is more dispersed, on the economy.

3.9. Here again, the situation varies considerably from one scientific department to another and a lot remains to be done if DG XII is to understand its role in this way. Admittedly, DG XII's extending the life-span of its research is frequently useful, but this is by recycling the results within research itself, when the results can be used as a new starting point for subsequent research. On the other hand, it can be seen from project files that, in most cases, as soon as the final report and its formal approval have been received and the final payment due has been settled, no more entries are made in the file. However, the recent industry-orientated programmes, mentioned in paragraph 2.8 above, have given rise to more promising initiatives (the BRITE-Euram technical seminar; 'T' projects and 'European Laboratories without walls', which are part of the biotechnology programme and are close to the stage of application).

Limited dynamism of the patents and publications departments

3.10. In the 'promotion of exploitation-protection of inventions-dissemination' triangle, it is the promotion of exploitation department which most requires the promotional drive referred to in paragraph 3.1. The other two departments are satisfied with a more passive type of intervention. The patents department is admittedly only subsidiary to the promotion of exploitation; it ought, however, to concentrate on inventions resulting from indirect action, which have been too much neglected in the past (see paragraphs 4.16. and 4.17.).

3.11. The publications department of Directorate XIII-C plays a largely passive role in the Commission's publication system. The department acts at the request of the departments which have written the documents, as regards both annual programming and the actual publication of each individual document. Publications are obliged to pass through the publications department, yet it has no great influence on publication policy as such. At most, the department can prevent certain publications, for instance, if a research contract provides for publication by the contracting party itself, and, above all, it can postpone them when a patent has to be filed beforehand. Its role, therefore, is the limited and often temporary one of screening material. The department is not responsible for finding manuscripts to publish, except in rare cases, or for analysing production costs. Nor does it assess the impact of the publication on readers (see paragraph 3.55).

3.12. The production, reproduction and dissemination of written documents — in other words, the act of publishing — is just one type of scientific and technical communication. Microfiches, audio or audio-video magnetic data-carriers, and above all computerization are in the process of changing the scale of communication. It is this area that holds the greatest potential for vastly increasing in the future the impact of scientific documents resulting from research.

3.13. Unit XIII-C.3 already uses microfiches and, in particular, it manages the periodical 'Euroabstracts' and its computerized counterpart, the data base EABS, in which some 80 000 summaries or analyses of published documents are stored along with their references. All publications for which the department has identified the publisher are included in Euroabstracts and the EABS, the contents of which are the same. However, the information stored in this data base is not comprehensive enough. Many Community documents which are useful but have limited circulation, for example, those addressed only to members of an advisory committee, are missing. The EABS reflects the output of DGs XII and XIII and the JRC, but does not contain enough on the research and technical documents of other departments. Furthermore, it is often difficult, on the basis of the references given in the 'abstracts', to find an actual document, since there is no corresponding documentation centre at the Commission. Finally, although the main benefit of data-processing is to broaden the area of dissemination, the EABS base has few users.

3.14. It is more likely to be the Value programme, adopted by the Council on 20 June 1989 [1], that will bring about a decisive change in the scale of science communication policy. In addition to the traditional medium of publication, the programme provides for the creation of the Cordis data base and the linking of the computer networks used for the communication of scientific and technical information across the Community. These two projects are now in progress. As regards the nature of the information, the Cordis base will be much broader and more diverse, since it will contain data concerning not only research results but also programmes, projects, prototypes, information centres, possible partners etc. As regards communication, the launching of Cordis should provide the opportunity to define bigger and bigger 'target groups' (eg. researchers, national administrations, companies etc.), with the result that although access would have to be paid for, it would be totally unrestricted.

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[1] This programme covers 1989-93 and not 1989-92 as the title states: Council Decision 89/412/EEC of 20 June 1989, adopting a specific programme for the dissemination and utilization of scientific and technological research results (Value) 1989 to 1992 (OJ No L 200, 13. 7. 1989, p. 23).

3.15. However, these matters can at present be discussed only in the future, or even conditional, tense. The Cordis data base is not operational, nor is the network link, which is even less developed. And, above all, there is still no clear-cut answer for the most part as to how these projects would be managed and funded once they were properly under way. As regards funding, various options can be considered: Cordis could be managed without operating costs by Commission departments, as part of their administrative activities; or, funds could be taken at regular intervals from the appropriations earmarked for research programmes; or, consumers could be invoiced, at cost price, for the services offered; or, finally, there could be a compromise between the three solutions. As regards the management of the system, the choice is between creating an administrative structure and setting up an independent unit connected to the Commission by some sort of public service contract. However, no choice has yet been made between all these solutions.

Promotion of exploitation in an upstream direction

3.16. Out of a sample of around 30 promotion of exploitation files, those which were opened at the request or suggestion of the inventor — i.e. the JRC or the contracting party — form the minority. Unlike publications, most of the files are opened as a result of initiatives taken by the promotion of exploitation department. However, the Court is of the opinion that the effectiveness of the promotion of exploitation department is limited, first by its relatively inadequate size in Directorate XIII-C, and then, and above all, by its somewhat passive approach, since it always starts with research then looks downstream at productive activities. If this were complemented by a more deliberate process in an upstream direction, starting with the needs of productive activities and then turning to research, it would gain in dynamism.

Preponderance of staff in the least dynamic departments

3.17. In January 1989, of the 57 officials working in Directorate XIII-C, only 12 were allocated to unit XIII-C.2, the promotion of exploitation, compared with 19 to unit XIII-C.3 (publications) and 21 to unit XIII-C.1, which, admittedly, includes both the patents department (six employees) and the transfer of technology department (14 employees). Of the 34 officials in categories A and B, only eight had been posted to the promotion of exploitation department. It is paradoxical that this should be the situation in what is the spearhead department of Directorate XIII-C, whose activity requires a variety of competences and permanent monitoring of files, and involves many missions, both to the JRC and to partners, industrialists or consultants scattered throughout the Member States.

Sometimes passive attitude of the promotion of exploitation department

Time-lags

3.18. Obviously, the exploitation of research is a long-term activity, which may, in a complex case, take over 10 years to complete. Nonetheless, the time taken to implement certain measures is somewhat surprising.

3.19. It is not unusual for two or three years to elapse between the end of a research project and the moment when, sometimes following an assessment study carried out by a consultant selected via an *ad hoc* tendering procedure (the 'Expect procedure'), the decision whether or not to take action is made. In the case of the V267 project (1), the file was opened on 11 June 1985 to utilize the results of a research contract which had formally ended on 31 December 1983.

3.20. On the other hand, the Commission should be congratulated when, in order to gain time, it opens a file and begins to exploit a promising line of research even before it is completed. This was the case, for example, of files V275 (2) and V307 (3), the former being the result of JRC research and the latter the result of a shared-cost research contract.

3.21. Following the opening of file V247 (4) on 28 March 1985, it took a year and a half to finally commission the technical and economic study under the Expect procedure, and then a further 15 months to sign a technology transfer contract. Some negotiations are interminable; for instance, it took two years (June 1985 to July 1987) to conclude a technology transfer contract concerning file V267 (1). One tenderer for a study to verify the accounts of the licensee of file V42 (5) was notified on 22 May 1987, after a wait of seven months, that his offer had been rejected.

3.22. The department sometimes reacts much too slowly to an event. The report on a mission carried out on 28 July 1988 to prepare market surveys for files V316 (6) and V317 (7) was not produced until seven months later, on 2

(1) Two-screw extruder for the mechanical production of paper pulp of a quality comparable to that obtained by a chemical process.
(2) System for airtightness between two metal flanges.
(3) Expert system for the selection of heat exchangers.
(4) Hydrolysis of smallwood into simpler polymers.
(5) Welding and shaping by magnetic pulses.
(6) X-ray fluorescence analysis equipment.
(7) Neutron activation analysis equipment.

March 1989, thus causing a corresponding delay in the conclusion of the study contracts, which had still not taken place at the time of the Court's audit in May 1989. The Commission did not react until September 1987 to the unfavourable market prospects for the invention dealt with in file V61 (1). This was despite the fact that as early as June 1982, the potential customers had declared the price of the equipment, a thermostatic oven, much too high and, in particular, that the market survey carried out in 1984 had warned the Commission and the licensee company of the severe limitations of the market in the range of temperatures the latter had selected for its products. However, the Commission has high hopes of successfully relaunching this project on a different basis.

3.23. Admittedly, as regards the question of delays and hold-ups, the promotion of exploitation department is often dependent on its external partners. A large number of study contracts are carried out with considerable delays. There was a delay of seven months added to the expected duration of just three months of the commercial development plan for a solar drier (file V295) (2). A technology transfer contract concerning the invention dealt with in file V268 (3) was carried out in 18 months, which was twice the time expected.

Prevention of litigation

3.24. The Commission has not always had the wisdom to include clauses in contracts it has awarded as part of its work of promoting exploitation that enable the respective rights of the contracting parties to be defined unambiguously in all eventualities. Technology transfer contract No CTT 136 of 31 December 1985 was not sufficiently precise either as to the nature of the invention or as to the event that would mark the start of the marketing period subject to the payment of royalties. As a result, the recipient body refused to pay royalties because it had changed the size specified for the equipment, whereas merely doing that did not in any way alter the principle of the patented invention. After expressing its disagreement, the Commission failed to take the matter any further.

3.25. In the case of file V42 (4), on 24 June 1975, the Commission proposed to the licensee concerned the case-by-case negotiation of the basis of calculation of royalties, that is, the precise technical mechanisms on which they would depend — a formula that made for disputes and time-wasting. Having realized the weakness of such a solution, the Commission renegotiated and clarified it on 24 January 1986.

3.26. Also in connection with file V42, a scientist from the Joint Research Centre was seconded for two years from 1 July 1978 to 30 June 1980 to the Commissariat français à l'Energie Atomique (CEA). Instead of determining in advance the legal position as regards the proprietorial rights in respect of any inventions that might result from the joint work of the CEA and this researcher, the agreement provided for negotiations on a case-by-case basis between the JRC and the CEA. Fairly predictably, this lack of foresight led to a dispute over the proprietorship of a patent (5).

3.27. The departments that commission a study should themselves determine the terms of reference and not leave them up to the candidate consultant. However, this is what the promotion of exploitation department regularly does, often informing the candidate in very general, brief terms of the subject of the study. For instance, the marketing development plan for file V225 (6) was commissioned on 11 December 1987 with the following brief: 'To draw up a marketing development plan which will give us a better idea of the economic viability of the invention and of its potential to create jobs'. It was on this somewhat summary basis that the consultant was invited to submit his project (7). In case V61 (1), it was the licensee himself who drew up the specifications of the market survey commissioned by the Commission on 21 July 1983. Without taking any action, the Commission deplored the fact that technical aspects had been accorded greater importance than commercial ones. In fact, the company under licence had restricted the consultant to the areas that it had already explored technically, thus ensuring that it would be told only what it wanted to hear.

Verification of the recovery of sums due and debt monitoring

3.28. The Commission is not always sufficiently careful in its monitoring of the turnover on which royalties are due and, generally speaking, in its monitoring of the basis for assessment of royalties in licence or technology transfer contracts. Of course, it is not easy to find out exact turnover figures when, for example, a partner might be concealing all or some of them. However, the Commission should endeavour to find out and, if fraud has been committed, it should react.

3.29. The licensee in case V 42 (4) concealed some sales subject to royalties. Following frequent reminders by the

(1) Heat chamber with high precision of temperature through the control of gas pressure.
(2) Fresh fruit solar drier.
(3) Hydrogen generator using electrolysis.
(4) Welding and shaping by magnetic pulses.
(5) Patent no. 1974. Equipment for the welding of plugs of nuclear fuel pins.
(6) Method for the production of compounds based on cellulose and ligno-cellulose materials and plastics.
(7) Letter no. 10605 of 27 October 1986.

Commission between 1984 and 1986, the licensee provided some of the missing declarations. However, a contract for the verification of the accounts awarded by the Commission on 16 December 1986 proved that the Commission's continuing suspicions were justified. During the financial year 1982 alone, several sales, of a total value excluding taxes, of 954 570 FF (around 140 000 ECU), had not been declared. The loss of royalty revenue for the Commission amounted to around 14 000 ECU.

3.30. In that respect it was the licensee and not the Commission that was at fault. However, on 23 January 1986, the Commission still did not know the figures for turnover from 1980 onwards. Can it be that the Commission's system of management makes it possible to forget all about the existence of a debtor for several years? In addition, the consultant commissioned to carry out the financial audit of the fraudulent company audited only the financial year 1982, although such a restriction was not laid down in his contract. There is therefore every reason to assume that undetected concealments were also committed in other financial years. The Commission neither completed the audit for the other financial years (the licence was valid from 1975 to 1986) nor, despite a number of warnings and the withdrawal of the licence contract in 1986, did it recover, by instituting legal proceedings if necessary, the unpaid royalties due.

3.31. At the same time, the company in question was under licence to a French university, which, more intelligently than the Commission, had included a clause on the payment of interest on arrears in the licence contract. Such a clause should be included in contracts involving royalties (contracts granting licences and technology transfer contracts).

Priority given to technical rather than commercial aspects

Main cause of failures — commercial rather than technical

3.32. A few years ago, the promotion of exploitation department analysed the reasons for the failure to exploit research. It discovered that over half the failures were connected with commercial factors. The Court has drawn similar conclusions from its control sample. Of the 13 failures discovered in the 29 files in the sample, three were partly due to commercial factors and six others mainly or even entirely due to commercial factors (sale price clearly too high, limited market, did not really correspond to what was wanted on that market etc.).

Over-optimism concerning commercial results

3.33. It quite regularly happens that not only the JRC or the promotion of exploitation department, but also the authors of market surveys and the companies under licence are over-optimistic about the likely results of an invention, particularly as regards the commercial aspects.

3.34. On 24 January 1978, the promotion of exploitation department valued the magnetic welding market (file V42) (1) at 6 Mio FF (about 1 050 000 ECU) over five years. However, the sales declared by the licensee amounted to a total of about 1,4 Mio FF, after which the project was shelved. The company which obtained a licence in March 1987 to exploit the invention of file V282 (2) forecast the sale of five appliances in 1987 itself and a total of 20 in the following four to eight years. It has not yet sold any. The market forecasts given in market surveys and drawn up by the licensee with respect to file V61 (3) have consistently proved wide of the mark. The 1984 study referred to a world market of 30 appliances a year, which seems small, but is high compared with the actual results achieved since the conclusion in 1978 of the licence contract: so far a sum total of seven appliances have been sold.

A technical rather than a commercial standpoint

3.35. Most of the staff of the promotion of exploitation department are scientists. Several of them have in the past worked as researchers at the JRC. However, the purpose of exploitation of research is to link the world of research and the world of industry. Scientific abilities are therefore only one part of the necessary profile: knowledge of industry and the economy, attention to legal aspects and a keen sense of commercial requirements are also necessary.

3.36. This may perhaps explain the technical, rather than commercial, attitude displayed on some occasions. Of course, the Commission is not required to intervene in the commercial strategy adopted by the companies concerned, but it does concern itself — rightly, moreover — with the projects' commercial prospects. In a substantial number of cases, however, the impression is that the project is well-devised from the technical point of view but has been inadequately assessed and prepared on the commercial side. This was apparent chiefly in the market surveys.

(1) Welding and shaping by magnetic pulses.
(2) Device for the production of a specified mixture of gas and dust.
(3) Heat chamber with high precision of temperature through the control of gas pressure.

Shortcomings of market surveys

3.37. A large number of technical and commercial studies and even market surveys contain too short an economic and commercial assessment. This was the case for the second market survey for file V42 (1), the first and even the second market survey for file V225 (2) and the first market survey for file V61 (3). The latter was carried out when the project was still at an early technical stage, which affected the study and made it necessary to carry out a second study, which, for its part, was carried out somewhat too late and was still not commercial enough. However, this is not a general shortcoming. The technical and commercial studies concerning files V275 (4) and V247 (5) are just as much commercial as technical.

3.38. In the case of file V61 (3) since the licensee was a German company, market research was focused almost entirely on Germany. In both the market surveys funded in this case, since the Commission had chosen German consultants and wanted to save money, the geographical coverage of the survey was limited to the Federal Republic of Germany, and the assessment of the European and world markets was made by simple proportional extrapolation. However, the invention is such that its commercial success can be considered only in terms of very large markets.

3.39. Moreover, it often happens that the limitations and inadequacies of the first market survey make it necessary to fund a second one (see paragraph 3.37 for file V61). The terms of reference of the first market survey carried out for file V42 (1) were much too short and it is clear why a second one was necessary, although, unfortunately, the instructions for this were scarcely any more detailed.

3.40. The promotion of exploitation department has frequently noticed these shortcomings and has taken action. In the case of file V225 (2), the department required the office that had drawn up the second survey to provide further details on the likely outlets (4 March 1986). Sometimes, the department draws the attention of the licensee to his obligations concerning commercial aspects (file V167 (6), note of 8 June 1982) or makes recommendations in this respect (file V267 (7), letter of 7 December 1988). Nevertheless, the lack of precision in the terms of reference of the requests for surveys is no doubt largely responsible for the dissatisfaction with the reports when they are delivered.

3.41. File V216 (8) is a classic example of an invention that is very worthwhile from the technical point of view, but which failed because of the lack of attention paid to commercial limitations. The invention in question consists of data-transmission software. According to the JRC, the invention was a 'remarkable achievement of Community research' (10 June 1986), 'the standard-bearer of European policy on data-processing standards' which 'constitutes a text-book example that can be used to discover whether the results of European high-technology research can be transformed into commercial reality' (12 November 1986). Enthusiasm was such that the JRC adopted the invention for its own internal needs.

3.42. Unfortunately, however, marketing was a total failure. The licence contract negotiations, which began as early as July 1983, were postponed for almost two years, until March 1985, pending the finalization of a new standard contract (9), as though administrative proceedings had to stand still pending the introduction of better legal instruments. Once the licence contract had been concluded, in March 1986, the indispensible market survey had to wait a further 20 months (November 1987). But it was already too late. The system was seen to be too costly and was technically out-classed by another software design promoted by the licensee himself.

3.43. This unfortunate example also illustrates the consequences of the fragmented administration of exploitation promotion, which will be criticized in Chapter 5 of this report. Alongside the work of Directorate XIII-C, and without warning it, the Brussels departments of the same Directorate-General and the JRC, in an effort to speed things up, agreed to carry out other measures, even going so far as to carry out a demonstration of the software in the People's Republic of China.

Research not sufficiently geared to the needs of exploitation

3.44. Exploitation extends the life of research downstream, towards productive activities. However, in return, the exploiter of research must also be able to request the research worker to carry out the adjustments and tests necessary to adapt the invention to industrial and market requirements. If the system prevents such upstream contact

(1) Welding and shaping by magnetic pulses.
(2) Method for the production of compounds based on cellulose and ligno-cellulose materials and plastics.
(3) Heat chamber with high precision of temperature through the control of gas pressure.
(4) System for airtightness between two metal flanges.
(5) Hydrolysis of smallwood into simpler polymers.
(6) Monitoring device for simplified ultrasonic transductors.
(7) Two-screw extruder for the mechanical production of paper pulp of a quality comparable to that obtained by a chemical process.
(8) Software for the transmission of 'dual network' data.
(9) Report of 12 April 1985 on the audit visit of 29 March 1985 to Aix-lès-Milles.

with research, exploitation loses a lot of its flexibility and the users of the research have to make up for this weakness by obtaining outside assistance, which is expensive. Such access to research workers is available at the Commission, since licence contracts provide for technical assistance to the licensee, which is generally provided by the JRC. However, it comes up against a number of obstacles, which are analysed below.

Research workers' lack of time

3.45. One of the reasons for the failure of files V134 (1) and V164 (2) recorded on the forms closing the files is 'lack of support for the invention'. Since the JRC researchers who created the invention on which file V275 (3) is based did not have enough time to carry out the necessary tests in 1988-89, the Commission had to come to a technical assistance agreement in March 1989 with an external laboratory.

3.46. In August 1985, staff movements in the invention department of the JRC, which was supporting the V61 project (4), led to a reduction in staff availability and assistance from this department. In addition, the departure of staff in 1982 from the licensee company had already made the continuation of the project more difficult. The promotion of exploitation department is clearly very dependent on the availability of the relevant people, both in industry and in the research departments — so much so that sometimes it has to stop a project for this reason alone.

End of programmes

3.47. Might there be greater flexibility in the Commission's cooperation with researchers not involved in indirect action? Project V247 (5) would appear to support this idea. Its promotion gave rise to joint financing between DG XII, as part of the non-nuclear energy research programme, and Directorate XIII-C, the former financing the part of the project that was technically the most developed and the latter the part furthest away from the competitive stage. However, whether it is a question of direct action or indirect action, the possibilities for cooperation end with the completion of the research programmes in question. As regards direct aid, the reduction in the support of the JRC in project V42 (6) was due to the fact that the invention resulted from a research project that the JRC had stopped financing several years earlier. A similar problem arose for the invention of project V268 (7) which, for its part, was the result of the shared-cost research programme on the production and use of hydrogen. The conclusion of this programme had prevented DG XII from continuing funding the project that had led to the invention (see report 6189 on an audit visit of 7 June 1985).

Prohibition of the use of exploitation appropriations to fund research

3.48. The worst example of the 'downwards ratchet-effect' is to be found in the fact that the promotion of exploitation department is forbidden to fund work it would like the JRC to carry out from its own appropriations. This obstacle will be explained in detail in paragraphs 5.41 — 5.45.

Promotion of the exploitation of research step-by-step

3.49. The present procedure, which moves downstream from research to industry, has one effect: action is taken invention by invention. Each research result is taken separately and assessed. If the assessment is favourable, the search begins for a future industrial partner. The Commission has no strategy whereby it attempts to give the promotion of exploitation an overall role as mediator between the world of productive activity and that of research. The insufficiency of funds, criticized in chapter 4, is one of the main causes of this shortcoming, which particularly affects policy on the granting of licences.

Licences non-exclusive in legal terms, exclusive in practice

3.50. The present practice as regards the granting of licences is unsatisfactory:

a) all licences are granted as non-exclusive, although only the Euratom Treaty lays down that licences should be of this nature (Article 12 and 17). The EEC Treaty makes no specific stipulation and gives the Council responsibility for determining the arrangements for disseminating information. In fact, neither the framework programme nor the Value programme nor the specific research programmes contain any details in this respect;

b) despite this disparity, the promotion of exploitation department has only one standard contract, which is closely modelled on the provisions of the Euratom Treaty;

c) in practice, although the contracts grant only non-exclusive licences, the promotion of exploitation department unofficially informs the licensee candidate

(1) Chemical treatment for photoselective deposits on copper.
(2) Use of an energy light beam for surface treatments.
(3) System for airtightness between two metal flanges.
(4) Heat chamber with high precision of temperature through the control of gas pressure.
(5) Hydrolysis of smallwood into simpler polymers.
(6) Welding and shaping by magnetic pulses.
(7) Hydrogen generator using electrolysis.

that it will not actively look for other licensees for the same invention, provided the licensee in question observes his contract and his obligation to carry out exploitation. Licences are therefore ***de facto*** exclusive (see, for example, for file V42 (1) the letter of 5 March 1975 to the future licensee).

3.51. The ambiguity of the present situation provides exploitation with neither the advantages of exclusivity nor those of non-exclusivity. The lack of legal exclusivity sometimes deters candidates who wish to have long-term guarantees before making the necessary investments (see, for example, the refusal of Kernforschungszentrum of Karlsruhe to sign a cooperation contract with the Commission, letter of 29 June 1989, file V275) (2). However, if it ties its hands beyond its strict legal obligations by unofficially granting exclusivity, the Commission deprives itself of any safety net should the licensee fail to meet his obligations. This is what happened in the cases of files V42 (1) and V61 (3). In the case of file V42, a company had sought the opinion of the Commission in 1983 on the possible grant of a licence for the invention. The promotion of exploitation department already had a licensee, and therefore did not follow up the inquiry, even though the failure of that licensee and the abandonment of the project had already been envisaged. Shortly afterwards (16 February 1984), the department warned the licensee that it would terminate the contract (which it did in 1986).

3.52. There is no clear solution to the problem. However, the Court urges the Commission to pay greater attention to both the legal aspects and those concerning the effectiveness of current practices and to improve its policy in this area.

A few suggestions

3.53. It is clear from the above how the process permits movement only in a downwards direction: the department is interested in industry only insofar as a particular invention it considers worthy of exploitation depends on it. It would be preferable if the process were two-way. In addition to systematically seeking out useful research results, the promotion of exploitation department would also be in regular contact with companies and their trade organizations. It would thus become the administrator of an invention portfolio and its activity would resemble that of a kind of 'invention exchange'. Of course, the Commission could object that its promotion of exploitation department does not have a large enough invention portfolio for it to take such steps. Since it was set up, the promotion of exploitation department has handled some 340 files, including failures. Some national agencies currently administer portfolios containing several thousand transferable technologies and disseminate their information to thousands of companies. But why not make use of precisely these national agencies, so as to take advantage of their dissemination and prospection networks? To take a concrete example, the national research exploitation organizations of five countries (BTG in the United Kingdom, Fraunhofer Gesellschaft in the Federal Republic of Germany, Anvar in France, TNO in the Netherlands and DIC in Denmark) have set up a club, called Eurotech, to pool exploitable projects. Each organization provides the club with projects and the other members are invited to propose licensees, but although this club was set up as part of the Sprint programme, which is administered by Directorate XIII-C, the promotion of technology department, which belongs to the same Directorate, is not actively involved in it, having only observer status! 'Light-weight structures', with limited means, are supposed to try to support themselves using the logistic means of the 'heavy' structures.

Inadequate assessment of the impact of measures

Sparsity of statistical indicators

3.54. As regards the exploitation of research results, the statistical indicators are both hard to come by and difficult to interpret. This does not simply apply to the Commission: the Court encountered this weakness in all the national research exploitation organizations that it visited. Nevertheless, some of them, aware of this weakness, are endeavouring to make improvements. The Court therefore recommends that the Commission should broaden its groundwork as regards estimating the number of jobs created and turnover produced, and extend it to other indicators (e.g. added value, market shares and, more generally, the cost-benefit aspects of exploitation).

Failure to assess the impact of publications

3.55. The publications department of Directorate XIII-C does not assess the impact of scientific and technical publications. How indeed could it do so, given that it is not informed, from the outset, of all those who receive the documents published? The distribution lists are in fact divided between unit XIII-C-3 itself, the Brussels departments of DG XIII, DG XII, the JRC and the Publications

(1) Welding and shaping by magnetic pulses.
(2) System for airtightness between two metal flanges.
(3) Heat chamber with high precision of temperature through the control of gas pressure.

Office. Added to this, where they arise, are sales by private publishers, on which there is more information. Unit XIII-C-3 does not systematically receive statistics from the Publications Office on distribution and sales. Not only is information poor as regards quantity, but qualitative assessments of impact are not carried out either, and the department does not ask the addressees and readers for their opinions on the documents published by the Commission. Given that publication policy is an entirely separate part of the utilization of research results, a minimum amount of assessment is imperative.

Failure to break down revenue and expenditure by project or operation

3.56. Since there are various types of intervention, it is not possible, in present circumstances, to identify the expenditure and, where applicable, the revenue, arising from a given exploitation project, or to break these down by project according to the type of transaction, such as study costs or the cost of participating in shows and exhibitions. In general, it is not possible by examining exploitation files to draw up a definite statement of revenue and expenditure arising from a project, or even to ascertain what patents have been applied for, obtained or abandoned in connection with it. Even worse, there are no regular statistics breaking down expenditure between the three sectors of activity — publications, creation and maintenance of patents and the promotion of exploitation, to which should be added expenditure specific to the Cordis project and expenditure on subprogramme II of the Value project (integrated computer networks). In order to provide access to this information, a very simple system of codifying budgetary transactions for internal use ought to be introduced.

4. THE SEARCH FOR CAUSES: 2. MEANS DISPROPORTIONATE TO REQUIREMENTS

Introduction

4.1. Whatever the total commitment agreed by the Community for research and its exploitation, there are many relations — technical, human, economic and financial — between these two stages of scientific and technical progress, and it is essential to seek an appropriate balance between the resources allocated to each. The resources allocated to utilization must not be under-used because there are too few exploitable research results, and inventions worth exploiting must not end up confined to filing cabinets because of inadequate means to exploit them effectively. In Chapter 4, the Court will endeavour to assess whether a proper balance is being observed in Community action.

Human resources allocated to the utilization of research results, compared with research

4.2. In January 1989, the number of permanent officials in Directorate XIII-C dealing with the utilization of research results amounted to 43, taking into account all categories from A to D. In comparison, there are 3 176 posts for research and investment in the budget for the financial year 1989. According to these figures, the number of staff allocated to the utilization of research results corresponded to 1,4 % of research staff. Even this percentage is somewhat overestimated, since it takes into account only those research posts funded under part B of the budget, although there is a minority of posts funded under part A (administrative appropriations).

4.3. These figures mean that if staff were the only production factor for both research and its utilization, it would take, for instance, only a very small percentage change in the allocation of this factor to research to change, in the opposite direction and in much bigger proportions, the resources devoted to utilization activities.

Financial resources

4.4. A similar calculation can be carried out as regards the financial resources allocated to research and to the utilization of its results.

Research: utilization ratio in the allocation of funds under the second framework programme

4.5. The sum of 5 396 Mio ECU was allocated to the framework programme for the period 1987-91 (five years) (1). Heading 8.4 of the programme, 'dissemination (2) and utilization of S/T research results' received an allocation of 55 Mio ECU and even so 17 Mio ECU of this allocation was given over to financing the Eurotra programme, although this constitutes research rather than the utilization of research. The utilization of results has therefore received only 38 Mio ECU, the remainder, that is,

(1) Council Decision 87/516/Euratom, EEC of 28 September 1987, concerning the framework programme for Community activities in the field of research and technological development (1987 to 1991) (OJ No L 302, 24. 10. 1987, p. 1).

(2) The French version of the text uses the word 'dissémination' — a lazy and incorrect translation of the English word 'dissemination'.

5 358 Mio ECU, being allocated to research itself. The result is a research:utilization ratio of 141:1. Again, this means that, for instance, a very small percentage change in the appropriations allocated to research would be enough to cause a big change in the percentage of resources earmarked for the utilization of results, with the total budget of the framework programme remaining the same. The objection might be raised that, in addition to Community funding, the utilization of the results of indirect action is probably also funded nationally. However, assuming that a figure can be put on this, the share borne by the contracting parties in the overall cost of the same indirect action should also be taken into account. In that case, it would not be 5 358 Mio ECU that would have to be entered against research, but some 10 016 Mio ECU!

4.6. Furthermore, the allocation of the 38 Mio ECU should be looked at in detail. The specific programme known as 'Value' is a programme for the dissemination and utilization of scientific and technological results and covers a period of four years, beginning on 27 June 1989 (1) It has been allocated the sum of 38 Mio ECU, that is, all the resources earmarked by the framework programme for the utilization of results. However, 2 Mio ECU of this is reserved for 'work on requirements for confidentiality and integrity of information', work which is aimed at defining a legal framework rather than utilizing concrete results. The sum of 6 Mio ECU has been allocated to the collection and dissemination of information *on research programmes* and not on the dissemination of results. Finally, 2 Mio ECU has been set aside until the fifth half-year of the programme. This means that, in real terms, for the time being 28 Mio ECU has actually been allocated to the utilization of results. A breakdown of this is given in ***Table 2***. The Commission's wishes were different: in its proposal, of the 38 Mio ECU, it had allocated 31 Mio ECU (instead of 28) to the utilization of results, 17 Mio ECU of which for promotion of exploitation (instead of 10).

Table 2 — 'Value' programme — Breakdown of resources allocated to the exploitation of research results

Mio ECU

— dissemination of results	14,0(1)
— legal protection of results (patents)	2,0
— promotion of exploitation	10,0
— common tasks (identification, characterization and selection of results)	2,0

(1) Of which 6 Mio ECU for the creation of communication networks in computer systems.

(1) This programme covers 1989-93 and not 1989-92 as the title states: Council Decision 89/412/EEC of 20 June 1989, adopting a specific programme for the dissemination and utilization of scientific and technological research results (Value) 1989 to 1992 (OJ No L 200, 13. 7. 1989, p. 23).

Ratio at budgetary level

4.7. Viewed in budgetary terms (financial year 1989), research received 1 436,0 Mio ECU of commitment appropriations and the utilization of results received 8,85 Mio ECU (including the appropriations retained in Chapter 100), which produces a ratio of 162:1.

Ratio under the third framework programme

4.8. In the third framework programme (2), which has just been adopted for the period 1990-94, of a total allocation of 5 700 Mio ECU, research received 5 643 Mio ECU and the utilization of research 57 Mio ECU, which gives a more favourable ratio of 99:1.

A few bases for comparison

Expenditure on experimental development according to the OECD

4.9. ***Table 3*** shows how, according to the OECD, the research expenditure of the state sector is broken down in some of the OECD Member States. It can be seen that a substantial part is granted to experimental development, particularly in the United States and Japan, two world leaders in technology, whose governments devote over half of their R&D funds to experimental development. The OECD's definition of this concept of experimental development (3) coincides very broadly with what the Community calls 'innovation and technology transfer', including the utilization of research results. These OECD figures therefore greatly reinforce the impression that one of the keys to technological progress lies in the importance attached to the final stage of innovation and that the low

(2) Council Decision 90/221/Euratom, EEC of 23 April 1990, concerning the framework programme of Community activities in the field of research and technological development (1990 to 1994) (OJ No L 117, 8. 5. 1990 p. 28).

(3) The OECD defines this concept as follows:
'Experimental development is systematic work, drawing on existing knowledge gained from research and practical experience, that is directed to producing new materials, products and devices, to installing new processes, systems and services, and to improving substantially those already produced or installed.' (The Measurement of Scientific and Technical Activities, 'Frascati Manual', OECD, Paris 1981, p. 55).

Table 3 — Breakdown of public-sector research expenditure between the three stages of research and development, according to the OECD (1)

(in percentage terms)

Country	Basic Research	Applied Research	Experimental Development	Total
France (1983)	12,4	31,9	5,6	49,9 (2)
Spain (1985)	29,6	54,5	15,9	100,0
Italy (1985)	30,0	47,0	23,0	100,0
Netherlands (1985)	29,3	54,7	16,0	100,0
Portugal (1986)	7,3	53,6	39,1	100,0
United States (1985)	14,9	24,2	60,9	100,0
Japan (1985) (natural and engineering sciences only)	12,9	27,5	56,3	96,7 (3)

(1) National research only. The OECD in fact identifies a sector made up of international research centres or those working abroad, which is not included in this table.
(2) Not specified = 50,1 %.
(3) Not specified = 3,3 %.

level of resources granted by the Community for the utilization of research fails to match the importance of what is really at stake.

The energy demonstration programme

4.10. The sum of 500 Mio ECU was allocated to fund demonstration projects in the energy sector for the period 1986 to 1989 (four years). Up to the end of 1992 (in two and a half years), the Commission may commit 350 Mio ECU to the 'Thermie' programme (1), which will cover the period 1990-94. This amounts to an average of 140 Mio ECU a year, almost 15 times the average annual allocation for 'Value'. This is despite the fact that energy demonstration projects are very similar to the projects which can be developed under the 'Value' programme. In addition, 'Thermie' is a programme for a specific sector, whereas 'Value' can take action in all sectors, including, where appropriate, energy! Compared with the sum of 350 Mio ECU (which does not take into account appropriations that will be granted in 1993 and 1994), the framework programme grants 1 173 Mio ECU in research appropriations for the energy sector, that is, a research:experimental development ratio of 3,35:1, compared with the ratio of 141:1 in the 'Value' programme (see paragraphs 4.5 and 4.6). There is no question of the Court's calling into question the budgetary allocation of the 'Thermie' programme, which would not reflect its opinion, or come within its mandate, but of confirming the extent to which the appropriations for the exploitation of research are low compared with research funds and exploitation requirements.

The operational consequences of the lack of resources

4.11. The measures taken to utilize and promote the exploitation of research are far from covering all such research results. First, a significant proportion of the results is not even examined or assessed for the purpose of deciding what action should be taken, even if the decision were to be negative.

4.12. From the point of view of information sources, first of all, Directorate XIII-C does not receive, as we have seen, all the contracts and final reports of DG XII's contractors and does not see any of the contracts and final reports

(1) Council Regulation (EEC) No. 2008/90 of 29 June 1990 concerning the promotion of energy technology in Europe (Thermie programme) (OJ No L 185, 17. 7. 1990, p. 1).

connected with the research programmes administered by the Brussels department of DG XIII (ESPRIT, RACE, AIM, DELTA and DRIVE programmes). Nor does it receive, as a rule, the final reports on the work of the JRC. Since, owing to insufficient resources, it cannot carry out an exhaustive screening of final reports, until recently, Directorate XIII-C had protested little about this situation. Initially, therefore, the information on which the work of Directorate XIII-C was based in practice was considerably less extensive than the total amount it could in theory deal with.

4.13. Whole areas of the theoretical field of competence of Directorate XIII-C are quite simply ignored. To date, the Directorate has not dealt with the BRITE and Euram programmes or the biotechnology programme. On the grounds that the Brussels departments of DG XIII intend to promote the exploitation of the ESPRIT, RACE, AIM, DRIVE and DELTA programmes themselves, it has not dealt with these programmes apart from in rare exceptions (e.g. the project to improve combustion in fuel-driven engines; the Cristal operation etc.) and has scarcely any contact with the departments that administer them, even though they belong to the same Directorate-General. Nevertheless, there is no legal obstacle to Directorate XIII-C's taking action in these fields. The Directorate now takes very little action in the promotion of exploitation in demonstration projects, in particular those of DG XVII (Energy). This is despite the fact that, strictly speaking, it is competent, underArticle B 753 of the budget, to take joint action with DG XVII in these projects.

4.14. In fact, as can be seen from ***Table 4***, the promotion of exploitation department concentrates to a large extent on a small number of areas, which are the only ones for which its staff possesses the necessary expertise. Consequently, it deals either not at all or very little with health, nuclear energy, data-processing, telecommunications, agricultural and agro-industrial research, fisheries and the exploitation of marine resources, or development technologies.

4.15. Even in the fields in which Directorate XIII-C does take action, analysis of the results is far from exhaustive.

Table 4 — Breakdown of promotion of exploitation files by research sector concerned

Research sector	%	cumulative %
1. JRC	33	33
2. ECSC	22	55
3. Non-nuclear energy	15	70
4. Raw materials and recycling	14	84
5. Environment	4	88
6. Miscellaneous	12	100

Even with the help of the consultants chosen in connection with the Expect procedure, the Directorate's staff are physically unable to read all the final reports on contractual research. On the other hand, one member of the staff does manage to examine most of the progress reports and final reports of the JRC, which are either studied in Ispra itself or collected from there.

4.16. The work of the promotion of exploitation and patents departments has so far dealt mainly with the results of the JRC. Indirect action is much more divided between a large number of projects than is the work of the JRC. It is also less well known, because it is external to Community departments. The contracting parties, which are obliged to inform the Commission of measures to utilize results, do so only to a very limited extent, and the patents and promotion of exploitation departments possess only a limited knowledge of what the contracting parties have by way of inventions to be protected or exploited. Consequently, compared with direct action, indirect action would be bound to use up more resources — probably financial but particularly human — and could therefore not be systematically utilized. It is therefore easy to understand that, given the shortage of resources, the departments have tended to utilize and promote the exploitation of the less diverse, more familiar work of the JRC first. In addition, the rather rare interventions of the patents department in favour of contracting parties have been limited to technical assistance. The department does not allow any funding in this area, although there is no rule against it.

4.17. Admittedly, as regards the patents department, there is another reason why its activity is concentrated on direct action. Unit XIII-C.1 is alone competent at the Commission for the filing of patents for inventions belonging to the Community. The JRC has to make use of this unit. In contrast, the contracting parties of shared-cost research projects are free to file their patents without Community assistance. Moreover, direct action is gradually beginning to be less dominant. While, between 1972 and 1982, 64,6 % of the proposed patents recorded concerned direct action, between 1983 and 1988 this was true for only 54,3 % of them. However, it should also be borne in mind that, in the 1983 to 1988 period, the share of research appropriations earmarked in the initial budgets for direct action fell from 36,3 % to 20,1 % (13,3 % for 1989).

4.18. However, this drop, at least in relative terms, in the appropriations granted to the JRC, the decline in inventive creativity which indisputably arises from it, and also, it must be said, the fact that the JRC does not rule out the possibility of some day carrying out the task of ***intra muros*** exploitation, and, finally, the rapid increase in the appropriations earmarked for shared-cost research, must all constitute sufficient urgent grounds for Directorate XIII-C to transfer a sizeable portion of its resources to indirect action.

4.19. There is one final yardstick by which to gauge the limitations of the Department's action due to the lack of available resources: that of the number of missions carried out per promotion of exploitation file. In a significant

sample, compiled by the Commission itself, out of 100 promotion of exploitation files, the average number of missions carried out per file amounted to 3,5. Furthermore, 43 of the files had been the subject of just one mission.

Conclusion

4.20. There is, therefore, a body of data pointing to the same conclusion: the ratio between resources allocated to research and resources allocated to the utilization of research results is so unfavourable to the latter that a large proportion of research work is condemned never to achieve its practical potential. The third framework programme [1] has already done much to redress the situation. However, an improved distribution of appropriations between research and its utilization is not the only conceivable solution. Chapter 5 of this report highlights the considerable 'vein' of resources available in the budget for innovation in general, which could, in part, possibly be used for the utilization of research results.

5. THE SEARCH FOR CAUSES: 3. EXTENSIVE DISPERSION OF THE ACTIVITIES OF UTILIZATION OF RESEARCH RESULTS AND OF TECHNOLOGY TRANSFER

Dispersion of the responsible departments

Dissemination of results

5.1. To all appearances, unit XIII-C-3 has the prime responsibility for the dissemination of research results. In the context of the Commission's annual publications programme, Unit XIII-C-3 is responsible for what could be called the sub-programme of publications of a scientific and technical nature. Each year, unit XII-C-3 gathers together and screens the proposals for publication from the various departments, and passes them on to the Publications Coordination Committee, which is an interdepartmental committee. The secretariat of the Committee was recently made the responsibility of the General Secretariat [2]. In the course of the year, unit XIII-C-3 may take a decision to publish on its own initiative, and any publication of a scientific and technical nature, from any department whatsoever, requires its approval. This unit also manages the periodical 'Euroabstracts', in which a resumé or summary of any scientific and technical publications is published, and the EABS database, which collates and disseminates the same material as 'Euroabstracts' in computerized form. In actual fact, however, the responsibilities in matters of scientific and technical publications are very widely dispersed.

The publications service and research bodies

5.2. For the bulk of research results publications, the choice of which documents are to be published is made by the researchers and the departments of the Commission which manage the programmes in question. In matters of direct research action, it is the JRC itself which chooses which documents are to be published. In the case of indirect action, since the research results are the property of the contracting parties, it is normally up to them to publish the results, subject to compliance with the contractual clauses on confidentiality. For the DG XIII programmes, overall, that is indeed the case. A good proportion of DG XII's reports are published on the initiative and at the expense of the Commission by DG XII, which reserves that option by contract (Article 6.6 of Annex II to the standard contract).

Originating departments and Publications Office

5.3. Unit XIII-C-3's decision-making autonomy is encroached upon from two sides. On the one hand, the originating departments control the choice of titles and, with the Publications Coordination Committee, share the power to opt for free dissemination or sale; even if they choose the sale option, they are free to draw up a list of recipients who are subject to no charge, and can themselves approach a private publisher of their choice. On the other hand, the Publications Office, as the Community's logistical publications agency, provides the formal quality control for manuscripts, makes the management decision between internal and contracted-out printing work, fixes the selling price and is partly responsible for the distribution of, or the sales promotion for, the printed document.

5.4. It is then up to the publications department to carry out quality control on manuscripts (quality of presentation, to the exclusion of any check on the scientific value), to indicate the correct publication medium ('EUR' document,

[1] Council Decision 90/221/Euratom, EEC of 23 April 1990, concerning the framework programme of Community activities in the field of research and technological development (1990 to 1994) (OJ No L 117, 8. 5. 1990 p. 28).

[2] Until October 1989, the committee was called the 'Consultative Publications Committee', and its secretariat was provided by DG IX.

photocopy runs from microfiches, choice of private publisher insofar as the originating department has not already made this choice), to negotiate with the Office regarding the setting of prices, to ensure free distribution other than that decided by the originating department and better targeted sales promotion than that carried out by the Office.

Ordinary publications and priority publications

5.5. In the Commission's annual publications programme, each Directorate General and each department has its share of publications according to its own responsibilities, while the Publications Coordination Committee, via the General Secretariat of the Commission, plays the role of screening, planning and budget planning. Once the coordination committee has given its opinion, the Commission adopts the programme which is presented to it by its President and by the Member of the Commission with responsibility for information policy. On 30 October 1986, however, the Commission decided that, each year, its publications would, as a matter of priority, focus on its policy concerns at the time. Hitherto, the priority subject has been the realization of the single market by 1993. Thus, for some scientific and technical publications, the decision to publish and the management of the corresponding resources do not fall to the management departments (DG XII, DG XIII and JRC) but are in fact the responsibility of the General Secretariat.

Unnotified publications

5.6. Although the Publications Office is, in principle, the technical body responsible for publishing all Commmunity publications, or having them published, the Commission has recommended that its departments commission private publishers directly. This recommendation has been taken up on a vast scale where scientific and technical publications are concerned. Furthermore, DG IX has reproduction workshops serving all the departments of the Commission and the JRC is technically capable of colour-printing documents.

5.7. To set up these facilities is not to authorize the departments that make use of them to evade the rules regarding the programming of publications. In practice, however, the facilities have been the source of a considerable number of publications produced without the knowledge of unit XIII-C-3, the Publications Coordination Committee or the Publications Office. This means that the publications in question are not subject to planning, do not feature in the Commission's catalogue of publications and are not deposited with the official distributors of the Community. Nor is their sales promotion carried out by the Office.

The new approaches to the dissemination of research results

5.8. For the moment, the initial stages of implementation of the 'Value' programme [1] cannot fail to result in a considerable increase in the dispersion of responsibilities for dissemination of knowledge. The data-bases and networks to permit the dissemination of data complement each other, but while the computer networks come under 'Value' sub-programme II, oddly, the 'Cordis' data bank comes under sub-programme I. While the 'Cordis' project is to be set up and run by Directorate XIII-C, as the overseer of the 'Value' programme, sub-programme II is to be implemented by Directorate XIII-A, in view of its links with the ESPRIT programme. Furthermore, the supervision of the 'Cordis' programme by Directorate XIII-C, which is located in Luxembourg, is to some extent theoretical, inasmuch as the project head is an official of Directorate XIII-A, which is located in Brussels, and remains physically and administratively linked to this Directorate.

5.9. At the very least, close coordination might be expected between the 'Cordis' manager and the managers of sub-programme II, since they belong to the same Directorate and are located in adjacent offices. In fact, though, the two measures are being carried out separately and are not synchronized. In all probability, the 'Cordis' data-base will be operational before the work on the networks is completed. This being so, it is planned to link the Cordis base, at least temporarily, to the networks which are being set up for the purposes of the participants in the ESPRIT programme through the IES ('Information Exchange System') project.

5.10. Lastly, three quite broadly discrete types of measure are being implemented in the context of the same 'Value' programme: the traditional publication activity, the creation of the 'Cordis' base and the setting up of the interconnected communication networks.

The promotion of the exploitation of results

5.11. At first sight, there would seem to be two channels of responsibility for the commercial exploitation of the results of Community research. The results of direct action by the JRC belong to the Community and their exploitation is promoted by Directorate XIII-C. The results of indirect action are the property of the contractors, whose responsibility it is to utilize them under the contractual arrangements agreed by the Commission.

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[1] This programme covers 1989-93 and not 1989-92 as the title states: Council Decision 89/412/EEC of 20 June 1989, adopting a specific programme for the dissemination and utilization of scientific and technological research results (Value) 1989 to 1992 (OJ No L 200, 13. 7. 1989, p. 23).

Directorate XIII-C and departments which manage indirect action programmes

5.12. In fact, the Commission does play a part in the utilization of the results of indirect action. Its rôle vis-a-vis the contractors can and must be to provide assistance in terms of promoting exploitation. This requires a level of expertise and professionalism which research institutes, universities and small and medium-sized enterprises (SMEs) do not always possess. In their efforts to protect inventions by patent, to assess market prospects or to obtain financing for developing prototypes and for the industrial launch of products or processes, they may need the technical and financial aid of the Commission. It is usually the responsibility of Directorate XIII-C to provide this assistance.

5.13. But, in accordance with the model contract, contractors are obliged, as far as possible, to promote the exploitation of the results of their research (Article 7.1.) within a period to be agreed by contract (Article 17(2) of Annex II). In order to allow the Commission to monitor this obligation, 'details on the possibilities for the exploitation or commercialization of the results are to be provided (by the contractor) at the latest simultaneously with the final report' concerning the research project in question (Article 6.1). The contractor must also 'keep at the disposal of, and if required make available to, the Commission information and documents permitting the latter to verify if the obligations to exploit or commercialize the results' have been complied with (Article 17.6 of Annex II).

5.14. These are the regulations. Hitherto, in fact, the contractor's declaration of intent has had to be sent not to Directorate XIII-C, which is responsible for measures to promote the exploitation of results, but only to the departments which manage the programmes. This entails an element of risk, at least where the staff of DG XII are concerned. Since they have no particular responsibilities in matters of promotion of exploitation, they can have no real incentive to monitor the contractors' efforts to ensure the promotion of exploitation or to oversee the reception of declarations of intent. This lack of incentive is doubtless one of the reasons for the poor level of compliance by contractors with the obligation to declare their intentions.

5.15. Directorate XIII-C does, however, try to make up for this risk: its aim is systematically to contact the contractors some time before the end of their contracts so as to make them aware of the possibilities it can offer. A very recent internal DG XII circular (20 February 1990) requires the heads of the scientific units to pass all the final reports and the declaration of intent to Directorate XIII-C. Directorate XIII-C ought also to be given notice of all contractor meetings held under the programmes managed by DG XII and ought to be officially able to take part in them. This is far from being the case.

Programmes entailing a large degree of industrial participation and traditional programmes

5.16. In the ESPRIT programme [1] and the other DG XIII research programmes, the large degree of industrial involvement, already cited at 2.28, leads to some promotion of exploitation by the contractors as a continuation of the research work, involving close monitoring by DG XIII (Brussels staff). It is therefore hardly surprising that involvement by Directorate XIII-C in the utilization of these programmes has been non-existent or extremely limited.

5.17. Certain DG XII programmes, e.g. the BRITE [2], BRITE-Euram [3], Eclair [4] programmes, and the revised version of the biotechnology programme [5], are close to the ESPRIT model, particularly in view of the marked involvement of enterprises, including SMEs, in the projects. But DG XII has not been as active in utilizing these programmes as DG XIII (Brussels) has in those for which it is responsible. And while the BRITE and Biotechnology programmes have been running for long enough to have produced a large proportion of their exploitable results already, Directorate XIII-C has only very recently concerned itself with them.

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[1] For ESPRIT II, Council Decision 88/279/EEC of 11 April 1988, concerning the European strategic programme for research and development in information technologies (Esprit) (OJ No L 118, 6. 5. 1988, p. 32).

[2] Council Decision No 85/196 of 12 March 1985 concerning a multiannual research and development programme of the European Economic Community in the fields of basic technological research and the applications of new technologies (1985-1988) (OJ No L 83, 25. 3. 1985, p. 8), amended by Decision (EEC) 11/108 (OJ No L 59, 4. 3. 1988 p. 23).

[3] Council Decision 89/237/EEC of 14 March 1989 on a specific research and technological development programme in the field of industrial manufacturing technologies and advanced materials application (1989-1992) (OJ No L 98, 11. 4. 1989 p. 18).

[4] Council Decision 89/160/EEC of 23 February 1989 on a first multiannual programme (1989-1993) for biotechnology-based agro-industrial research and technology development (OJ No L 60, 3. 3. 1989 p. 48).

[5] Council Decision 88/420/EEC of 29 June 1988 revising the multiannual research programme for the European Economic Community in the field of biotechnology (1985-1989) (OJ No L 206, 30. 7. 1988 p. 38).

5.18. In the context of the traditional DG XII programmes, which are first and foremost professional researchers' programmes, with a lesser degree of participation by enterprises and universities, no serious guarantees exist that the results will be systematically utilized and promoted, unless powerful assistance to this end is forthcoming. There therefore remains wide scope for action which Directorate XIII-C has yet to explore adequately.

Final observation

5.19. To conclude, the promotion of exploitation is divided, on conditions and to a degree which varies from one programme to another, between four bodies: Directorate XIII-C, the contractors, DG XII and the Brussels staff of DG XIII. Only the JRC plays no part in this process for the moment. The sole activity in support of the promotion of exploitation which is rigorously centralized is the filing and use of Community patents, for which the patents staff of unit XIII-C.3 have responsbility.

Share of responsibility for the framework programme

Duplication of activity for the utilization of results in the framework programme

5.20. The framework programme for research activities for the period 1987-1991 [1] introduces a dual element in the work to utilize results. On the one hand, it includes a special allocation for the dissemination [2] and the utilization of results (heading 8.4 of Annex 1), which is at the root of budget line B7388 and specific activity to utilize results. On the other hand, it provides for 'dissemination of knowledge' to be carried on in the context of the specific programmes (Article 2.3). This provision gives no clear indication as to whether it includes promotion, but Community terminology, which may be open to discussion, lends itself to this interpretation: in Chapter II of the Euratom Treaty, entitled 'Dissemination of information', aspects of the promotion of exploitation are discussed in terms of the granting of licences and the transfer of know-how. To say that the utilization can be defined in the context of the programmes is also to say that the departments which manage these programmes — DG XII, DG XIII and the JRC — can themselves carry on utilization activities in addition to the departments which were specially set up to that end. The new framework programme for 1990-1994 [3] maintains the two poles of management and the ambiguity as to their respective responsibilities (15th preamble and Article 4), but announces a Council decision which, it is to be hoped, should remove this ambiguity. This decision remains to be taken.

Separation of demonstration activities

5.21. In some technological areas (non-nuclear energy and the environment), the Community provides financial aid for the execution of pilot projects, i.e. one-off innovative developments which are, however, generally likely to be exploited by a manufacturer or user and which are also likely to be disseminated to some extent to their users. These are 'demonstration activities'.

5.22. Unlike the first framework programme, applicable to the period from 1984 to 1987 [4], the second framework programme [1], covering the period from 1987 to 1991, excludes demonstration activities from its scope. This solution, which separates research and demonstration, was arrived at at a time when, in February 1986, the Single Act had, by contrast, just provided that the framework programme would embrace all research, technological development and demonstration activities as a whole (Article 24, creating the new Article (EEC) 130 I). However, the budget for 1990 made anticipatory provision for certain demonstration projects to come under the 1990-1994 framework programme [5]. Yet the latter, which has recently been adopted [3], does not include demonstration activities. This is all very inconsistent.

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[1] Council Decision 87/516/Euratom, EEC of 28 September 1987, concerning the framework programme for Community activities in the field of research and technological development (1987 to 1991) (OJ No L 302, 24. 10. 1987, p. 1).

[2] The French version of the text uses the word 'dissémination' — a lazy and incorrect translation of the English word 'dissemination'.

[3] Council Decision 90/221/Euratom, EEC of 23 April 1990, concerning the framework programme of Community activities in the field of research and technological development (1990 to 1994) (OJ No L 117, 8. 5. 1990 p. 28).

[4] Council Ruling of 25 July 1983 on framework programmes for Community research development and demonstration activities and a first framework programme 1984-1987 (OJ No C 208, 4. 8. 1983, p. 1).

[5] Item B 7391 — See also how item B 7388 includes the demonstration projects in the scope of the Value programme, thus contradicting the official text of this programme.

Limited organic links between departments

5.23. Overall, the three departments of Directorate XIII-C act in parallel, each within its area and in no hierarchical order. Certain minimum functional links do, however, exist. The main one is certainly the subordination of any authorization for publication by unit XIII-C.3 to assent by the patents department, in order to avoid a possible usable invention falling prematurely into the public domain and to give the patents department the time to file the invention.

5.24. The promotion of exploitation and patents departments also carry out a review of their portfolio of pending files each year. This annual review is carried out for each department with the participation of the other. When the patents department plans to file for a patent, it informs the promotion of exploitation department accordingly. The results of a small market study carried out, at its request, by the promotion of exploitation department are often among the factors leading to its decision. Similarly, when the exploitation department plans to exploit an unprotected invention, it occasionally informs the patents department of the case for registering the invention.

5.25. Inasmuch as each department discharges different responsibilities, which correspond to distinct objectives, the Court sees no need to replace the current arrangement with an unwieldy system of central planning and full hierarchical stratification. It nevertheless considers that the current organization could usefully be reworked, as indicated in the following paragraphs.

Common sources of information

5.26. The three departments work on the basis of the same fundamental sources of information — the research results; it is therefore to be recommmended that the acquisition and storage of this information should themselves be joint activities. This is not so currently. Only the publication department uses additional sources of information which are unique to it: the requests for publication from the originating departments. Likewise, the study department, if it is set up, ought to be common to the three departments.

5.27. While the final research reports are filed in the records with the corresponding research contracts, there is no link between the filing of the contracts, the filing of the promotion of exploitation dossiers and the filing of the patent department's invention records. It ought to be possible to link every dossier to the original dossier created following the research contract (or, where the JRC is concerned, the research project) without difficulty.

5.28. Similarly, it is hardly satisfactory for two searches to be carried on in parallel, one for the identification of patentable inventions and the other for the identification of promotable inventions. The patent is in substance no more than a prerequisite for possible promotion of exploitation. Moreover, the promotion of exploitation itself entails a whole series of very different steps: market surveys, technical studies and financing packages. It seems distinctly preferable for the choice of measures to be taken to be determined by a single, initial, global assessment, even if this involves carrying out gradual evaluations in each department downstream which allow the sequence and conditions of the measures to be taken to be specified.

Need to locate departments by related activities

5.29. It is difficult to justify the administrative separation of the patents department from the promotion of exploitation department, given that these two are mutually dependent, if the sole aim is to relocate the former closer to the innovation and transfer of technology department, with which its working relations are currently practically non-existent.

5.30. The driving force will always be the promotion of exploitation department, the others' actions being either autonomous but more passive, or ancillary to the promotion of exploitation. This remark ought to be considered for the location in the establishment plan of the common departments cited above.

Separation of responsibilities from resources

Splitting up publication appropriations between several departments

Originating DGs and the General Secretariat

5.31. The appropriations for publishing documents of a scientific and technical nature are divided between an ordinary programme, for which the appropriations are left in the hands of the various originating departments, and a priority programme, which entails centralization of resources.

5.32. However, this division of the appropriations does not follow a budgetary approach but a purely administrative one, whereby the various budget headings which could bear publication expenditure are tapped, in the context of the annual publications programme approved by the Commission, of a fraction of their available resources for the purposes of the priority programme. In

1989, DG XII had to contribute 100 000 ECU from its own appropriations to the priority programme and DG XIII 250 000 ECU (1). If these tapping operations are not to constitute hidden transfers, the expenditure effected under each budget heading thus contributed should observe the allocation provided by the budget. But this is not the case. With all these resources, the Commission publishes at its pleasure such documents as it considers have political priority, whether or not they have any relation to the budget heading to which they are charged, while formally upholding the powers of the individual authorizing officers for publications which are often unrelated to the area of their responsibility. Thus, against Article B 753, which is reserved for the exploitation of research, documents were published in 1988 and 1989 on 'audiovisual resources in the single market', the 'free movement of persons', 'the single market with no borders', the 'common agricultural policy for 1990s', 'the European financial space' and a 'guide to the professions with a view to the single market'. The Court is surprised that this mode of management, which is in breach of the principle of budgetary specificity (Articles 202 of the EEC Treaty and 29(1) of the Financial Regulation), has been sanctioned by the Financial Controller.

Originating DGs and DG XIII-C

5.33. The research appropriations of the originating departments — JRC, DG XII and the Brussels departments of DG XIII — may be used for the dissemination of the results of research, i.e. for publication. This is clearly stated in the second framework programme (see paragraph 5.20). But Directorate XIII-C can also effect publication expenditure against the appropriations of headings B 7388 and B 753. The remarks relating to these two budgetary headings admit this explicitly. Thus, unit XIII-C.3's role is not only one of coordinating and screening the proposals from the originating departments: it can publish documents on its own initiative, which it does rarely. It can also co-finance them with the originating departments, and this is a fairly systematic practice, at a rate which varies between programmes and projects, but which is generally between 40 and 50 %.

5.34. Unless there is a profound change in the duties assigned to it, there are hardly any grounds for the financial power of unit XIII-C-3. This unit's role is administrative and logistical: the insertion of publications in the Commission's programme, presentation for the approval of the patents departments, choice of the publication medium and working on the quality of presentation. It is the research departments which control the content of the material for publication and they must retain this control, for they alone have responsibility for the subjects dealt with. Of course, this must not lead to the dispersion of the responsibilities for publication at the level of every department which is managing a programme: the research Directorate Generals have to define a policy and control standards in this area. The publication department of Directorate XIII-C must remain the compulsory administrative channel which it has always been, particularly in requiring prior approval for any expenditure in this area.

Originating DGs and the Publications Office

5.35. The assertion that XIII-C.3 is a simple logistical department is all the more applicable to the Publications Office, which is a technical instrument for Community publications, but has no responsibility for publication policy. Here again, however, the consequence of the present regulations is that ordinary, every-day management decisions by a purely logistical body have a by no means negligible effect on the distribution between departments of appropriations earmarked for publications. The Office's external expenditure on work it commissions from printers and suppliers of services, is invoiced to the institutions, which must finance it from their own publication appropriations. Its internal expenditure, however, is financed by the Office from its own budget and only broken down among the institutions according to its origin in the Office's analytical accounts. This system entails the dilution of responsibilities in matters of budgetary management.

5.36. In the first place, the distribution of the Office's appropriations between the institutions is not laid down budgetarily but is simply estimated by the Office itself (even if this breakdown is reproduced in the budget) on the strength of the figures recorded for previous financial years. It is therefore only a guideline, rather than serving any policy purposes.

5.37. Secondly, the demarcation between external expenditure (which is really billed to the institutions) and internal expenditure (which is not billed to the institutions but only divided amongst them for analysis) depends partly on the Office's day-to-day management decisions, which, *per se*, have nothing to do with the Community publications policy.

(1) Commission publications programme for 1989. Document SEC (88) 1929 of 12 December 1988.

5.38. Third, this analysis of the Office's appropriations and expenditure is reproduced globally in a single heading per institution, while the Commission's publication appropriations are spread over a fairly large number of budgetary headings. The managing departments do not therefore know exactly what amount of appropriations is available to each.

5.39. For all these reasons, this system has the effect of stripping first the Budgetary Authority and then the originating departments of part of their responsibilities for publications policy, and makes the distribution of resources dependent on past figures, on the one hand, and on circumstantial management decisions by the Office, on the other. The Court wishes to emphasize that none of this is intended to criticize the Office's management, which is merely applying the legal system at present in force, as is its duty. The inconveniences pointed out by the Court are inherent in the legal system itself.

5.40. The principle that a department which bears a responsibility should dispose of the corresponding resources must be clearly stated. The current system leads to the partitioning of financial power for publications, and scientific publications in particular. This financial power over scientific publications should be restored to the departments which are responsible for the research. If the current system were to change along the lines recommended by the Court, the latter is aware that a reform of that kind would imply a revision of Article 124 of the Financial Regulation, the basis of the system.

Directorate XIII-C appropriations and JRC appropriations for support for the Commission's departments

5.41. The Joint Research Centre has always had a budgetary heading intended for financial operations in support of the Commission. In the budgets for 1989 and 1990, this was item B 7306. In the context of the reform of the JRC, this activity, which still represented only 3 % of its expenditure in 1987, is required to be carried on in parallel with the activities on behalf of third parties, and to rise to 14 % towards 1991 and even higher subsequently [1].

5.42. According to the Commission, this is an 'evident' 'application of the supplier-customer principle' [1]. This should be clarified: what results in practice is a relationship by virtue of which the supplier is able to dispose of his customer's purchasing budget. The conditions of management of the appropriations for support of the Commission are in fact the following: the Commission departments present their requests to the JRC in the context of an interdepartmental committee and the decision-making authorities of the JRC decide between the requests. Thus, it is the JRC which manages and distributes the fundings. The Budgetary Authority no doubt appreciated the paradoxical nature of such a situation, since, in the 1988 budget, it itself distributed the appropriations for support of the Commission over five budgetary headings, specialized by common policy. But it reverted to the single global heading in the 1989 and 1990 budgets. The Commission provided for the exploitation of the JRC results being included among the support activities [2]. But the JRC programmes and the budget remarks do not mention this. Thus, Directorate XIII-C has had to negotiate with the JRC each year to define the operations which were to receive this type of appropriations.

5.43. This situation is unsatisfactory. Since Directorate XIII-C is responsible for the utilization and promotion of research, it would be logical for it to dispose of all the appropriations which are reserved to this end, without excluding the possibility of its using those appropriations to allocate some work to the JRC since, under the reform which is under way, the JRC is supposed to develop its commercial activities on third-party orders [1].

5.44. Unfortunately, this is forbidden because the Commission is not a third party vis-à-vis the JRC, which leads to unfortunate situations where the Commission is stymied. Seen from the JRC side, on the one hand, it is allowed an amount of guaranteed business by obliging the Commission to draw on its services through the support appropriations mechanism. On the other, it is penalized by being forbidden to sell work to the Community institutions while it may sell it to any other party who might request it. From the point of view of the promotion of exploitation department, or the other departments of the Commission, there is no reason why the JRC could not be a partner like any other. The ban is doubtless based on the fear that healthy competition might not be upheld and that the Commission might tend to give preference to the JRC even in cases where its offer was not economically the most advantageous. But there would be nothing to prevent the Commission's submitting the JRC to the ordinary law of competition by putting it on an equal footing with external

[1] New prospects for the Joint Research Centre. Document COM(87) 491 final/2 of 20 April 1988, paragraph 232 p. 13 (support for the other departments of the Commission) and paragraph 233 pp. 15 and 16 (services for third parties).

[2] Document COM(87) 491 final/2 as cited above. Table No 2, p. 14.

bidders during the procedures for placing orders or awarding contracts.

5.45. The Court therefore considers that it would be highly desirable:

a) to convert the support appropriations into appropriations spread over the existing budgetary headings and managed by the departments which are currently likely to be 'supported' by the JRC [1]; as it acknowledged in its last annual report (paragraph 9.25 [2]), the Court is not unaware of the fact that the Financial Regulation will eventually have to be slightly amended in order to achieve such an aim;

b) to combine the rules governing the JRC's activities on behalf of third parties and on behalf of the Commission;

c) for all these non-programme activities, to make the JRC subject to the same system of competition as third-party research centres.

Directorate XIII-C Appropriations and ECSC measures

5.46. In accordance with the Merger Treaty of 8 April 1965, the operating expenditure of the ECSC is assigned to a separate budget. In part B (operating appropriations), the general budget is only an EEC/Euratom budget. There is therefore no reason for the remarks in Article B 753 to refer each year not only to the Treaties establishing these two Communities but to the ECSC Treaty, too.

5.47. Conversely, it is regrettable and pointlessly restrictive for the 'Value' programme to take only the EEC Treaty as its legal basis, when the framework programme, under which 'Value' is organized, correctly refers to the two EEC Communities and Euratom, and Directorate XIII-C, which manages the appropriations derived from the 'Value' programme (item B 7388) was always intended, by virtue of Article B 753, to operate within the framework of both these Communities.

5.48. In the spirit of the Merger Treaty, it is entirely correct for the Directorate which is responsible for the exploitation of research results also to be responsible for the three Communities, including the ECSC. But Directorate XIII-C does not manage any ECSC credits. In practice, there are always areas of overlap between the ECSC operating budget and the general budget of the Communities, and at two levels. On the one hand, certain measures which normally come under the ECSC are carried out by Directorate XIII-C and financed by it against the appropriations from Article B 753: 22 % of the promotion of exploitation dossiers come under the ECSC by virtue of their subject matter.

5.49. On the other hand, the scientific and technical publications of the ECSC, which are financed from its operating budget, are, like the Commission's other scientific and technical publications, the responsibility of Directorate XIII-C in terms of programming and approval. When the Office sells some of these publications, it passes the revenue back to Directorate General XIII and there is therefore every chance of its being redeployed on Article B 753, i.e. within the context of the general budget, even though this revenue is generated by the ECSC operating budget.

5.50. The Court's aim in citing these few anomalies is not so much to criticize the Commission's practices as to suggest that it should recommend to the respective Budgetary Authorities of the ECSC and of the two other Communities the steps to be taken to ensure total budgetary transparency and a clear demarcation of the two budgets.

Multiplicity of related activities which are managed separately

Introduction

5.51. The Community carries on separately a great number of activities aimed at technology transfer. The utilization of research results is only one of them. It may well be asked whether all or part of these activities ought not to be more closely coordinated amongst themselves, or even integrated in a common structure, under single management, in view of the fact that their intrinsic natures

[1] This solution would offer another advantage: it would justify the current practice of re-use of the remuneration for the technical assistance of the JRC on the 'promotion of exploitation' budget lines which are managed by Directorate XIII-C, which is in line with sound financial management but which, from the legality point of view, runs counter to the principle according to which only the line which bore the expenditure can benefit from the re-use (Article 27, paragraph 2 of the Financial Regulation). Currently, the expenditure is charged against the support appropriations in the JRC. In the system which complies with the Court's wishes, it would be charged to Directorate XIII-C, against the promotion of exploitation appropriations.

[2] OJ No C 313, 12. 12. 1990, p. 164.

are identical or closely related and, in any case, in view of their common final objective, which is innovation.

The demonstration projects of DGs XI and XVII

5.52. The similarity between an exploitation project and a DG XI (environment) or DG XVII (energy) demonstration project is very marked. There exist two similar, yet competing, solar fruit-drier projects. One is financed by DG XVII as a demonstration project and the other (dossier V 295) [1] by Directorate XIII-C. Of course, certain conditions in their rules distinguish them. The demonstration projects are sectoral and do not systematically derive from research results. However, around 20 % of the energy demonstration projects do derive from them and DG XI cooperates fairly actively with the JRC.

The 'Sprint' programme

5.53. The 'Sprint' programme (1989-93) [2] is a 'strategic programme for innovation and technology transfer'. The 'strategic' character of 'Sprint' means that this programme tackles the question of technology transfer at a more global level than the 'Value' programme. It is not first and foremost concerned with carrying out particular operations but with promoting the conditions which favour technology transfer in general, especially by setting up mutual information and cooperation programmes, on a transnational basis, between bodies which are concerned in one way or another with technology transfer, and this explains why specific research results are not at the root of the measures which are carried through. However, the identity of the final aims, and the necessary development of the departments which are responsible for exploiting the research towards a more strategic approach, would justify closer cooperation between these departments. Even though they belong to Directorate XIII-C, such cooperation has to date been decidedly limited.

Innovation and different common policies

5.54. There is a complex of measures and fairly numerous programmes which, while budgetarily linked to various common policies, are all aimed at innovation and technology transfer, occasionally on the basis of Community research. Exchanges of scientific experiments and of researchers are carried on on the basis of the 'Science' programme (stimulation or strengthening of European scientific and technical potential) [3]. Item B 7397 of the budget for 1990 is intended to finance measures in support of common policies other than research by the strengthening of the infrastructure and the scientific and technological potential. The 'Plan of action for the information technologies' comes under industrial policy (item B 7706). Under the same policy, the stimulation of small and medium-scale enterprises (item B 7770 in the budget) includes measures promoting cooperation between businesses and pilot schemes to improve competitiveness. The training policy contributes to the dissemination of technological knowledge by the Comett [4] and Eurtechnet [5] programmes. The regional policy sets up the enterprise and innovation centres which will provide assistance to enterprises on a regional basis (Article B 543 of the general budget) [6]. In the context of the ERDF, in November 1989, the Commission approved the 'Stride' programme, to a sum of 400 Mio ECU, which is intended to strengthen regional research and development capacities.

5.55. All these activities represent a considerable financial potential compared with that of the 'Value' programme. The above-mentioned measures account for over 87 Mio ECU in the 1989 budget and for over 109 Mio ECU in the 1990 budget. By comparison with this figure, the

(1) Fresh fruit solar drier.

(2) Council Decision 89/286/EEC, of 17 April 1989, on the implementation at Community level of the main phase of the strategic programme for innovation and technology transfer (1989-1993) (OJ No L 112, 25. 4. 1989, p. 12).

(3) Council Decision 88/419, of 29 June 1988 on a programme plan to stimulate the international cooperation and interchange needed by European research scientists (1988 to 1992) (OJ No L 206, 30. 7. 1988, p. 34).

(4) Council Decision 86/365/EEC, of 24 July 1986, adopting the programme on cooperation between universities and enterprises regarding training in the field of technology (OJ No L 222, 8. 8. 1986, p. 17) and Decision 89/27/EEC of 16 December 1988, adopting the second phase of the programme on cooperation between universities and industry regarding training in the field of technology (1990-1994) (OJ No L 13, 17. 1. 1989, p. 28).

(5) Council Ruling of 2 June 1983 concerning vocational training measures relating to new information technologies (OJ No C 166, 25. 6. 1983, p. 1) and Proposal for a Council Decision relating to the adoption of a Community action programme in the field of vocational training and technological change (EUROTECNET II), submitted by the Commission on 27 July 1989 (document COM(89) 355 final and OJ No C 242, 22. 9. 1989, p. 7).

(6) Council Decision 83/624/EEC of 25 November 1983 concerning a plan for the transnational development of the supporting infrastructure for innovation and technology transfer (1983 to 1985) (OJ L 353 of 15.12.1983, p. 15).
Amended proposal for a Council Decision submitted by the Commission on 7 July 1988, concerning a Community measure for the creation and development of business and innovation centres and their network (OJ C 214 of 16.8.1988, p. 65).

'Value' programme involved only 5,35 Mio ECU in 1989, including provisional appropriations from Chapter 100, and only involved 10,15 Mio ECU in 1990.

Conclusion

5.56. There are, case by case, rational explanations for the surprising dispersion of the activities of utilization of research results and technology transfer, and of the financial resources allocated to them. Programmes were added to other programmes, successively covering new aspects of the activity of innovation. Rather than attachment to a common stem of innovation, the Commission and the Budgetary Authority have often preferred attachment to the nearest common policy. It nevertheless remains true that, when the situation as a whole is considered, such a lack of integration of activities and resources is far from satisfactory.

Principle of the unity of the position of manager and authorizing officer

5.57. Given sectoral responsibilities must be linked to the power to dispose of the corresponding budgetary resources. It is nonsense to declare one department responsible for the management of a programme of measures and then confer the spending power on another department. A series of cases of this kind, where responsibility was separated from resources, were noted in paragraphs 5.31 to 5.50. Before bringing these activities together again, some thought should be given to amalgamating the appropriations.

Synergy effects obtained from integrated activity

5.58. More thoroughgoing integration of the technology transfer activities, including the utilization of research results, would produce synergy effects by which the overall effectiveness of the activities thus integrated would be considerably greater than the sum of the partial effectiveness obtained from each activity under separate management. In this way, it will be possible to attempt to build up a powerful pole of attraction around the subject of technological innovation.

6. RECOMMENDATIONS AND CONSIDERATIONS FOR THE FUTURE

Budgetary transparency and rigour

6.1. The utilization of research results shows some signs of inadequate transparency, and even irregularities in financial and budgetary matters, which need to be corrected.

6.2. In the first place, the Commission should make an effort to identify more accurately the cost of the operations which it carries out, by a minimum of analytical accounting (paragraph 3.56), as well as assessing the positive impact of its action, particularly in matters of publications (paragraph 3.55), and establishing guideline figures for assessing its promotion of research results (paragraph 3.43).

6.3. The Commission ought to make decisions, or present proposals to the budgetary authority, with a view to abolishing overlaps between the ECSC operating budget and the general budget (paragraph 5.46 to 5.50), and it ought also to seek ways of implementing its priority publications programme (paragraph 5.32) which meet the requirements of budgetary legality.

6.4. Finally, the Commission ought to make an effort to be more rigorous in the defence of its intellectual and financial rights (paragraphs 3.28 to 3.31) and should make sure, particularly in its contracts, that legal provisions are carefully drafted, so as to prevent disputes and litigation (paragraphs 3.24 to 3.27).

Better allocation of resources

6.5. The Court favours a shift in the distribution of human and financial resources between research and its utilization so as to favour the latter more (Chapter 4). The present situation results in a substantial part of the research results being left unutilized (paragraphs 4.11 to 4.20).

6.6. Even within the task of utilizing research results, a greater proportion of the means and efforts should, as a matter of urgency, be shifted to indirect action, since direct action contributes a constantly diminishing amount to the overall results of Community research (paragraphs 4.18 and 5.18).

The utilization of results: the final stage of research or a different occution?

6.7. The work of utilizing research results, and the promotion of exploitation in particular, must as a general

rule be approached as a separate activity from research, requiring qualifications and a mind-set which a researcher generally does not possess. The researcher's task is to advance knowledge; the person who is to utilize research results must have a strong commitment to promoting them. While not a specialist, he has the special task of bringing together all the specialists needed for the success of a project — the researchers, marketing, legal or financial staff and entrepreneurs — and to get them working together. As the crossroads between industry and research, the promotion of exploitation cannot be the exclusive domain of either.

6.8. This fundamental principle must be qualified by three restrictions. In the first place, the activity of publishing research results must be linked more to the research itself than to the other activities which are directed at exploiting the results. The dissemination of the results is the logical conclusion of the research (5.34). The research departments should therefore be invested once again with full financial power in matters of publication (5.40); at present this power is shared with the Publications Office (paragraph 5.39) and with unit XIII-C-3 in particular (paragraph 5.34). At the same time, however, the administrative role of XIII-C-3 must be maintained or even strengthened (paragraph 5.34), so as to ensure the planning and general coordination of scientific publications, and in particular to restrict the unauthorized practice of unnotified publications (paragraph 5.7). But this full restoration of the power to publish to the research departments must be accompanied by a more dynamic approach on their part and by central rationalization (paragraph 3.5).

6.9. The second restriction concerns research programmes in which the participants are predominantly industrial concerns. The successful promotion of exploitation of the ESPRIT programme and others like it shows that in areas very close to specific industrial applications there is a clear case for achieving the active involvement, from the planning stage on, of the enterprises which are likely to benefit from the technological advances obtained from the research. They will generally be able to offer the best guarantees that the pre-competitive results are seen through to the commercial stage, particularly in SMEs (paragraph 2.28 and 2.29). This 'promotion by industry' approach has indisputably helped to educate entrepreneurs. Autonomous exploitation will, however, remain necessary to discourage the tendency by large undertakings to hold on to information which has exploitation potential. It will also certainly remain useful for exploiting what is called the 'spin-offs' from the main exploitation, i.e. the by-products which are overlooked by the participating industries.

6.10. The third restriction is that, while remaining discrete activities, research and its utilization must evidently maintain close links. Research must be more concerned with utilization and promotion of exploitation right from the stage of planning its activities (paragraph 3.8), and must also be sure to maintain continuity between research and utilization, in particular making every effort to convey all useful information to the departments which are responsible for utilizing the research results (paragraphs 3.6, 3.7, 5.14 and 5.15). Conversely, the utilization and promotion departments should be able to turn to the research departments and obtain any help from them they need, without hindrance and on commercial terms, if necessary (paragraph 3.44 to 3.48).

Promotion of exploitation: a cost-effective or publicly financed activity?

6.11. Why should cost-effectiveness not be pursued in all cases where it is possible? In every area in which a commercial-type undertaking can balance its budget by selling its services to researchers or to industry, there is no reason why this should not be allowed, or encouraged. Furthermore, there is no longer a monopoly on the promotion of exploitation in any of the countries which the Court has visited.

6.12. It is nevertheless a fact that the area of promotion and transfer of technology can never be entirely cost-effective, and therefore cannot be handed over completely to the commercial sector. In certain high-risk sectors, few enterprises are prepared to accept the financial losses associated with possible failure, or to wait for the often very long periods — ten, fifteen or even twenty years — before an innovation can produce profits. Moreover, innovations do not always end up in the market place, in environmental matters for example. These non-profitable sectors may, however, be vital for our collective technological future.

6.13. Nevertheless, public innovation and promotion departments which are destined to operate permanently at a loss cannot use this as a pretext for neglecting the financial return on their operations. This will always be a prime test of efficiency, and its pursuit an incentive to promoters. The co-existence within a single organization of profitable and non-profitable or grant-aided activities is not inconceivable. Is it not the case that the whole reform under way at the JRC at present is based on the idea that, alongside administrative research programmes which are entirely financed by public funds, a profit-making sector of activities on behalf of third parties is to be developed which will ultimately represent a considerable part of the whole activity?

A set of specialized administrative departments or an autonomous integrated agency?

Integration

6.14. Integration must be ensured, in the first place, within the Directorate which is responsible for the utilization of research results. Duplication of effort is to be avoided (paragraph 5.28), whichever services can be organized as common to all should be (points 5.26 to 5.28), and the departments which are required to cooperate should be brought closer together in the organization chart (paragraphs 5.29 and 5.30).

6.15. The departments must be integrated further for the sake of more integrated activity. Rather than a set of one-off measures, the promotion of exploitation should be seen as playing a role of overall mediation between economy and research (paragraph 3.53). The staff who are to promote exploitation of research should bring a wide range of training and experience to their task (paragraph 3.35).

6.16. Fundamentally, technology transfer and the promotion of research results pursue the same aims and are of like nature. They only differ by virtue of the origin of the information with which they are concerned (paragraph 5.51). In most of the national innovation centres, there is very little concern to distinguish, among the available technologies, between those which arise from research and those which do not. At the Commission, the separation is total. What is more, the aim of innovation is pursued in a multitude of dispersed initiatives. Some amalgamation, entailing greater integration of technology transfer activities around a more powerful, rationalized axis would, by a process of synergy, produce a multiplier effect (paragraphs 5.51, 5.53, 5.56 and 5.58).

6.17. Of course, this integration will inevitably entail limits. In certain cases, innovative work reveals so many affinities with a particular common policy that it has to remain linked to it, rather than to the future inter-sectoral pole of innovation. Thus, the wish to promote economic and social convergence and consistency would justify a programme such as 'Stride' (see paragraph 5.54) remaining linked to regional development policy. In fact, within the innovation pole, this wish for balanced spatial development would incur a heavy risk of being swallowed up and forgotten in the interests of the Community's global technological ambitions. In the context of such a solution, however, at the very least close cooperation would have to be instituted between the departments which are responsible for the two common policies in question. As a programme in favour of the regional development of research, 'Stride' has to operate through close cooperation between the ERDF and the Community's research and innovation departments.

6.18. Having stated these reserves, the Court can see the advantages of an effort to integrate within a single consistent whole all measures which derive from innovation and technology transfer, whether, like those of the 'Value' progamme, those measures have their origins in research results or whether, like the 'Sprint' programme (paragraph 5.53), they are based on available technologies in general. The administrative separation between the information technology networks of research and its utilization (sub-programme II of 'Value' and 'Cordis') and the networks *in general* of innovation *in general* (Sprint programme) is artificial. How can it be acceptable for the staff working on the 'Sprint' programme and those of the 'Value' programme to maintain so few practical dealings when they come under the same adminstrative management? Ought questions not also to be asked concerning the pronounced affinities to be observed between certain promotion measures carried on by industrial concerns and SMEs in particular (paragraph 5.54), or indeed the demonstration projects (paragraph 5.52) and other pilot projects, with technology transfer in general? It would be unwise to propose precise boundaries from the outset. There is a need for analysis and reflection on the part of the Commission in order to determine the contours of the 'Community innovation pole'.

Flexibility and autonomy of management

6.19. Autonomy of management is a general characteristic of the research promotion structures which were visited in the Member States. Whether companies, associations or public establishments, these are bodies with a legal identity and financial autonomy. The essential reason for some autonomy of management is the promotional nature of their activities and the dynamism that is called for in the pursuit of these activities. A style of management closer to the private model affords considerably greater flexibility for the internal structuring of departments and for the allocation of staff and financial resources to the various areas of activity. This flexibility is indispensable if the intention is for the promotion of research results not to be content to work down from research towards industry but, as the Court has suggested, also to work up from the needs of industry towards research and to be able to adjust to the changing needs of industry itself.

The resources to match the responsibilities

6.20. If an integrated body is also to be autonomous (to a point which of course remains to be defined), that presupposes, finally, consistency between the responsibilities assigned to the body and the resources, particularly budgetary resources, which are meant to allow it to carry out these responsibilities (paragraph 5.57). For a given operation to be co-financed by a series of different departments runs counter to the principle of financial autonomy and single management and does not make for

either consistency or dynamism in action. The financial power to publish, which is currently dispersed among the research departments, Directorate XIII-C, the General Secretariat of the Commission and the Publications Office, must be concentrated in one place again (paragraphs 5.31 to 5.40), and the financial power for exploiting research, which is currently split between Directorate XIII-C and the JCR, must be similarly refocussed (paragraphs 5.41 to 5.45). Splitting the budget into too many headings and articles, and thus making the compulsory allocation of resources excessively specific, entails a similar disadvantage (paragraphs 5.20 to 5.22), even when these various budget headings are managed by the same department. Unity, autonomy and consistency are some key words which should serve to make the Community departments which are responsible for promoting innovation more productive.

Application of a healthy principle of decentralization to innovation

6.21. In a decentralized system, responsibilities that can be discharged at local level or by subordinate authorities are left to them and the central level retains only those which it alone can effectively assume. This principle, which is currently applied in the Member States should also be common at Community level, particularly in matters of innovation and technology transfer.

No duplication of Member States' action

6.22. Some of the suggestions in this report may appear difficult to implement if implementation is attempted without taking account of the complementarity between action by the Member States and Community action. Certain practices which are valid for 'heavy-duty' promotion bodies, like those which exist in most of the Member States, could obviously not be transposed to a structure with scant resources like Directorate XIII-C. How, for example, can an idea like the 'inventions exchange' put into practice by certain national bodies be made viable in Directorate XIII-C, which deals with a reduced number of dossiers? The answer can only be that it is impossible if Directorate XIII-C obstinately works alone on its own dossiers, but such an idea can be envisaged if XIII-C draws on the logistical might of the national exploitation bodies. The networks exist, even in the 'Value' programme: Directorate XIII-C should therefore play a part in the transnational networks which it itself recommends! The Eurotech club, cited in paragraph 3.53, constitutes the beginnings of a possible step in this direction. Likewise, instead of the Commission itself creating its own national levels of operation, it should draw on those of the Member States. Such a development can of course only be gradual and should be negotiated with the Member States.

No duplication of enterprises' action

6.23. There is no point in going in for administrative exploitation when the enterprises themselves do it effectively. The Court has suggested, in paragraphs 2.25 to 2.29 and 6.9, that, for certain types of research, industry is the best natural agent for promoting the exploitation of research results. Whenever this approach is possible and its effectiveness is confirmed, it should be given preference over action sponsored by the government or Commission

The irreducible core of government-led or Commission-led promotion of exploitation at Comunity level

6.24. While limited by the application of a healthy principle of decentralization, a vast area for action by the Community in matters of exploitation of research results will remain, for a variety of reasons, chief among which are the following:

a) The transnational nature of innovation

Over and above the action of the Member States, the Community will still have to play a part in promoting the transnational character of innovation, both by making innovations which, for reasons of cost or scale, cannot be tackled at the Member State level and by ensuring that innovations arising in a single Member State, which might otherwise remain hidden there, are extended to the whole Community;

b) The intersectoral nature of innovation

In those programmes where there is a high degree of participation by industry, such as ESPRIT or RACE, the approach taken to exploitation, attractive as it is, is is first and foremost sectoral. It is 'tied' to a particular scientific domain. Yet real technological progress often assumes the interaction of techniques which are to all appearances alien to each other. A multidisciplinary promotion team should be the point where disparate techniques meet and are harnessed together on one project;

c) Taking social aims into account: convergence and promotion of SMEs.

The programme-based approach to exploitation which, as noted, has been very positive in programmes with heavy industrial involvement (see paragraphs 2.25 to 2.29), does not necessarily guarantee that account will be taken of the aims of convergence, social development, job creation on a wide territorial basis

and systematic promotion of small and medium-sized enterprises. It will therefore remain for one department which maintains a global approach to the promotion of exploitation to make particularly sure that these qualitative but essential aims of the Community are translated into reality.

Strategy to be promoted in a context of limited resources

6.25. A team with few staff and limited financial means is not doomed to ineffectuality, but it has to adjust its strategy to its situation. Since it cannot throw itself into the execution of major operations autonomously, it must see its rôle as being the catalyst which sets in motion those structures which do have powerful logistical means and greater financial resources at their disposal.

6.26. This strategy must be developed, where the Community's departments and structures are concerned, by promoting better coordination of all the programmes and departments which are working in one way or another towards innovation (paragraphs 5.51 to 5.58). It must also be developed in respect of those structures — public administrations, enterprises and professional organizations — which pursue the same ends in the national context. Where these extra-community structures are concerned, their assistance will be called on and cooperation proposed (paragraph 3.53).

This report was adopted by the Court of Auditors in Luxembourg at the Court meeting of 7 March 1991.

For the Court of Auditors p.p.
Aldo ANGIOI
President

André Middelhoek, Member of the Court

THE COMMISSION'S REPLIES

1. INTRODUCTION

In implementing the research and technological development programmes, the Community has set itself the objective of strengthening the scientific and technological basis of European industry and encouraging it to become more competitive at international level, in accordance with Article 130f of the Treaty.

Optimum utilization of the results produced by these programmes is of major importance in this respect since it is the integration and widespread and effective adoption of new products, processes or services which help improve the competitiveness of European industry.

In view of the subject chosen and its contents, the report submitted by the Court of Auditors is therefore of great value and the Commission wishes to thank the Court for its contribution to this major question.

However, the Commission finds it appropriate, in a general first section of its replies, to clarify various points concerning the establishment of measures to utilize research results, their specific features and the objectives pursued. The second section contains the Commission's detailed replies.

General considerations concerning measures to utilize research results

Background

The dissemination, protection and exploitation of research results has gradually developed out of the utilization of the results of JRC research work conducted under the Euratom Treaty. Practices justified by this field of research, such as the issue of non-exclusive licences, have thus been introduced.

These initial practices inspired the approach subsequently adopted when the measures to utilize research results, relying on extremely modest manpower and financial resources and without any other legal base, were gradually extended to some shared-cost research sectors.

The VALUE programme on the dissemination and utilization of the results of specific programmes under the framework programme was not approved until June 1989 and it is therefore important to point out that most of the Court's analysis of measures to utilize research results predates its implementation.

The complexity and specific nature of exploitation

The analytical section of the special report on the processing of cases of exploitation also prompts the Commission to make a number of general comments on the specific features of these activities:

— The activities are complex since they require use of multidisciplinary powers.

— Exploitation of research results is a long process; although there are considerable variations between sectors of activity, it is estimated that on average five to seven years elapse between obtaining a result and placing a product on the market; with hindsight, this may explain certain errors of judgment on potential markets.

— The risks of failure are great, especially if research is mainly prior to marketing as is often the case, since Community RTD programmes are precompetitive in nature.

— The departments of DG XIII-C do not intervene at the competitive stage and the success of a product on the market depends at least as much on commercial strategy adopted as on the technical qualities of the product. However, this is the sole responsibility of the firm concerned and cannot be otherwise.

Field of application and integration of measures to utilize research findings

The Commission fully shares the Court's opinion that measures to utilize research results are primarily the responsibility of the firms themselves.

However, as the Court states, centralized activities for the dissemination and exploitation of these results is also necessary in order to promote the utilization of information derived from specific programmes.

These activities must include in particular:

— the definition of the Commission's strategy in these fields and the internal and external coordination of these activities;

— multidisciplinary assistance to ensure that good results are not underutilized;

— a number of limited pilot measures to promote the exploitation of results using an approach that looks both 'upstream' and 'downstream', as the Court desires;

— monitoring of all publishing activities and the issue of publications, particularly summary reports and works of an interdisciplinary nature;

— establishment of a modern infrastructure for the dissemination of results, using information technology (data bases and associated electronic services);

— monitoring of the protection of the results of Community research and the protection of the results of direct research.

The Commission agrees with the Court about the need to involve the competent bodies in the Member States. It is therefore planning to select a number of bodies, in collaboration with the national authorities, to serve as relay centres for the dissemination and exploitation of results.

A further advantage of this approach is that it will allow better integration of the results of national and Community research.

2. LIMITED IMPACT OF MEASURES TO UTILIZE RESEARCH RESULTS

Publications

The number of scientific and technical publications

2.4. Because of the variety of research activities, originating departments must enjoy some independence as regards publishing decisions. However, the Commission tries to play a central coordinating role designed to achieve overall consistency and to include all these works in its annual publications programme.

Dissemination policy

2.5. A look at the titles published reveals that most of them are so technical that sales are targeted on only a very limited number of specialists who are difficult to reach through normal marketing channels. This prompted the Publications Office to propose to the Commission a system of publication on request for this type of document; apart from the listing in the catalogue, this will require a financial outlay only if a copy is requested and a payment can therefore be expected (see attached document: Annex to the Commission's publications programme for 1991 — General principles governing the Commission's publishing activities). [1]

2.6 and 2.8. These publications are very specialized and interest only a very narrow target audience which is normally already provided with free copies. However, DG XIII has undertaken an additional promotion campaign. The establishment of a network of relay centres in the Member States for the dissemination and exploitation of results should also make it easier to gauge potential demand.

2.7. The Commission considers that the Publications Office's sales record cannot be compared with that of private publishers. As the Court indicates, some of the works produced by DG XIII are published privately and others are produced and distributed by the Publications Office. Private publishers are of course interested only in that part of the programme for which there is a good prospect of sales while the Publications Office has been given the role of a public service responsible for marketing the commercially less attractive items on the programme.

Patents

2.9 – 2.16. The reduction in the number of inventions patented is due not to the stagnation of the JRC's inventive creativity but to the reorganization of its activities in recent years on the basis of a Council decision supported by Parliament. This is a natural consequence of the JRC's switch to prenormative or regulatory research, in particular as regards safety and the environment. The same

[1] SEC(90) 2473, 13.12.1990.

thing applies to other public-sector research sectors with a role comparable to that of the JRC.

Promotion of exploitation

Few productive files

2.17 – 2.18. The utilization of results is mainly the responsibility of the firms and laboratories which conducted the research; the purpose of the exploitation department is to help those contractors who would not manage to exploit their results themselves without the Commission's assistance.

The situation has changed since the VALUE programme was introduced and in 1990 some fifty files were opened for the exploitation of research results, an increase of 117 % over the figure mentioned by the Court for 1988.

2.20 – 2.23. According to specialist publications, the rate of failure in exploitation operations is relatively high. It is estimated that, out of every thousand projects examined, 120 will lead to the issue of a licence and between ten and thirty to the marketing of a new product.

Very low level of royalties

2.24. The royalties charged by the Commission are low since the research results obtained are precompetitive in nature and require considerable further investment by licence-holders.

3. THE SEARCH FOR CAUSES: 1. DELIBERATE ACTION OR PASSIVE PROCEDURES

Shortcomings prior to the involvement of Directorate XIII-C

3.2. To assess the utilization of the results of Community research, it is important to take account of its diversity and the various methods of exploitation.

Some RTD programmes are close to fundamental research or basic technological research; others, while still precompetitive, have a more distinct industrial purpose. The nature of their impact and the methods of dissemination and exploitation must therefore be adapted along with the division of responsibilities between DG XII and DG XIII, based on two principles: the principle of horizontality for dissemination and exploitation at central level and the principle of internal dovetailing to avoid any duplication of effort. There must also be effective collaboration between the specific programmes and the central level of dissemination and exploitation — measures have been adopted to this effect since the introduction of the VALUE programme.

The forty or so evaluation reports already available on the specific programmes also show that the positive impact of these programmes on improving the effectiveness and quality of the Community's scientific and technical potential is also achieved through the development of cross-frontier cooperation, the establishment of RTD networks, the organization of conferences and seminars, the mobility of scientists, the elimination of the duplication of effort and the search for synergy at Community level. For example, a recent Irish report on the impact of the BRITE programme on national research policy revealed that this programme provided the best response to the needs of small firms.

Dissemination of information

3.5. The Court's comments do not mention the vast quantity of scientific articles published directly by the laboratories taking part in the programmes; this is of prime importance to the scientific community. DG XII also carefully monitors publications which reflect the value and usefulness of a programme. For example, the annual and final reports of the biotechnology programmes (BEP, BAP and, shortly, BRIDGE) are sent regularly to DG XIII-C and provide an overview of all the results and statistics on connected publications (number of articles per sector, scientific reviews concerned, international nature of the articles, etc.).

Promotion of exploitation

3.6. Relations between DG XII and Directorate XIII-C are guided by the principle of internal dovetailing and the

procedures for cooperation between the VALUE programme and the other programmes take into account the specific features of each of these programmes. One example is a common BRITE-VALUE study now in progress to identify and evaluate the potential for utilizing the results of 77 BRITE projects.

3.7. An internal DG XII instruction has produced an improvement in the situation described in the Court's draft report and has harmonized the practices of the various scientific programmes administered by this Directorate-General.

3.9. In 1990, for the first time, Directorate XIII-C published a notice in the *Official Journal of the European Communities* concerning exploitation of the results of specific programmes. In response to this notice, it received sixty or so proposals from contractors who had taken part in Community RTD programmes relating to the exploitation of the results obtained. The departments administering the specific programmes which produced the results to be exploited were associated by Directorate XIII-C in the procedure for evaluating the proposals received.

Since the VALUE programme extended exploitation activities to new sectors such as biotechnology, BRITE, etc., there has also been increased cooperation between DG XII and Directorate XIII-C to identify and evaluate results (see reply to paragraph 3.6).

Limited dynamism of the patents and publications department

3.10. The extension of measures concerning patents to shared-cost research raises problems of business ethics since the results are normally the property of the contractor.

3.11. See replies to paragraphs 3.5 and 3.55.

3.12 – 3.15. The CORDIS information service containing the EABS data base is at the development stage. It is now accessible to the public in an experimental form via the ECHO host. The introduction of new technologies such as CD-ROM is also being considered in order to modernize the dissemination of information.

An electronic Community information service comprising CORDIS will be introduced as part of a centralized measure under the third framework programme.

Promotion of exploitation — a one-way process

3.16. The promotion of exploitation should indeed be a two-way process. In implementing VALUE, DG XIII-C is endeavouring to refine and extend its downstream activities. At the same time, it has commissioned studies which will make it possible to allow for the requirements of productive activities by setting up a network of relay centres comprising the bodies responsible for dissemination and exploitation in the various Member States.

This network should make it easier to match supply to demand in the technological sector.

Preponderance of staff in the least dynamic departments

3.17. The limited resources allocated to measures to utilize research results are due to the context in which these measures were devised and established (see Section 1).

To some extent, implementation of the VALUE programme has remedied the inadequacy of the resources observed by the Court.

The centralized action provided for by the third framework programme (1990 to 1994) will be given 1 % of the resources allocated to the specific programmes.

Sometimes passive attitude of the promotion of exploitation department

Time lags

3.18 – 3.19. The limited resources available to the promotion of exploitation department and the absence of a sound legal base (before the Single Act) did not allow the unit to monitor results systematically and finance large-scale projects within a limited period of time.

This was the situation in the case mentioned at 3.19, where the delays noted were largely due to the inadequacy of financial resources.

3.22. As the Court states, recent developments suggest that this project could be given fresh impetus, illustrating the complicated processes involved in the exploitation of results.

Prevention of litigation

3.24. The Commission will examine the possibility of revising certain clauses in contracts. In the case mentioned, it decided not to start costly legal proceedings because of the legal uncertainty concerning reciprocal rights and the low level of royalties involved.

3.27. The terms of reference for the studies are determined in accordance with the Commission's requirements, but it is logical that account should also be taken of the demands of the licence-holders, who are its partners, and, during the negotiations, of the opinions of the experts who will be responsible for conducting them.

Verification of the recovery of sums due and debt monitoring

3.29 – 3.30. In taking action, the Commission took account of the small amounts involved and the cost-benefit aspects of such operations.

3.31. The Commission will examine the possibility of including an additional clause relating to interest on late payment.

Priority given to technical rather than commercial aspects

A technical rather than a commercial standpoint

3.35 – 3.36. Of the two persons recruited for the exploitation of results under the VALUE programme, one had an economics qualification and the other was a scientist with experience of launching new products in the pharmaceuticals industry.

Shortcomings of market surveys

3.37 – 3.38. The exploitation of research results is estimated to take an average of five to seven years and market surveys must therefore anticipate 'future markets'. Hence the major risk of errors of judgment. European market surveys are expensive and sometimes, in view of the appropriations available, have to be restricted to a survey of the dominant market, with the results being extrapolated to the other markets.

3.41 – 3.43. The difficulties encountered in the case described by the Court were caused by changes in the licence-holder's strategy; this is directly linked to his commercial requirements, which only he can assess (see reply to previous point).

As regards the accusation of 'fragmented administration' made by the Court, measures have been taken to rationalize the procedure for exploiting JRC research results; in particular, an 'exploitation' liaison officer has been appointed in each institute of the JRC to improve relations with DG XIII-C.

Research not sufficiently geared to the needs of exploitation

Research workers' lack of time

3.45 – 3.46. The reasons for the cases outlined by the Court were the continuing rationalization of the JRC and the measures subsequently taken to ensure staff mobility. As a result, support for inventions could no longer be included systematically in the specific programmes.

Promotion of the exploitation of research step-by-step

3.49. Like the Court, the Commission considers that the step-by-step or result-by-result approach is not sufficient. The following measures were adopted in the course of 1990:

— publication of a notice in the Official Journal;

— evaluation of the industrial and commercial potential of a significant section of the results (e.g. joint study with BRITE of 77 results);

— gradual establishment of a network of contacts with other Community operations (SPRINT, small firms, Eurotech Capital, etc.).

Licences non-exclusive in legal terms, exclusive in practice

3.50 – 3.52. The report mentions the issue of licences which are non-exclusive in legal terms but exclusive in practice, the inadequacy of various clauses in the contract and the low level of royalties.

'There is no clear solution to the problem', the Court states and urges the Commission to pay greater attention to the legal aspects and that of effectiveness. The Commission accepts this recommendation.

The Commission will also endeavour to revise certain clauses in contracts which the Court considers to be inadequate or a breeding ground for dispute.

The royalties charged by the Commission are low, since the research results exploited are precompetitive in nature and require considerable investment by the licence-holder over a number of years, with a significant risk of failure (see reply to paragraph 2.24).

The Commission also plans in future to vary the levels of royalties charged for licensing contracts in line with the results expected (potential market) and the time estimated to achieve them.

A few suggestions

3.53. The Commission shares the Court's opinion on the need to make use of the competent bodies in the Member States. In liaison with the national authorities, it is therefore planning to select a number of bodies as relay centres for the dissemination and exploitation of results. This solution appears more suitable than use of the Eurotech club, which has different objectives.

Furthermore, the VALUE programme makes use of a network of consultants and advisers selected after a tendering procedure.

Inadequate assessment of the impact of measures

Failure to assess the impact of publications

3.55. Figures are available for the receipts from sales of DG XIII publications (total sales revenue) and the figures for each title may also be obtained on request from the Publications Office.

Improvements are now being made to obtain systematic and more accurate indicators (see reply to paragraph 3.5).

Failure to break down revenue and expenditure by project or operation

3.56. The computerized system for the management and monitoring of files now being introduced should provide more detailed information on management in future.

4. THE SEARCH FOR CAUSES: 2. MEANS DISPROPORTIONATE TO REQUIREMENTS

The operational consequences of the lack of resources

4.12 – 4.15. The resources available to DG XIII-C did not allow it to monitor all the specific programmes. It also lacked a sound legal base to do this systematically before the adoption of the Single Act (Article 130g (c)) (see Section 1 and the reply to paragraph 3.17).

Appreciable progress has been made since the introduction of the VALUE programme:

— Documents are now channelled from DG XII to DG XIII-C and arrangements for monitoring and circulating documents have been introduced within DG XIII-C.

— Liaison officers have been appointed in each JRC institute for the promotion of exploitation.

— Regular working relations have been established between DG XIII-C and most of the specific programmes, especially those programmes mentioned by the Court in paragraph 4.13.

4.18. The 1990 figures show that shared-cost research is now the dominant sector of activity. In 1990 only 13 % of the files opened were still accounted for by the JRC. This drop in relative terms is the result of an increase in the total number of files opened.

5. THE SEARCH FOR CAUSES: 3. EXTENSIVE DISPERSION OF THE ACTIVITIES OF UTILIZATION OF RESEARCH RESULTS AND OF TECHNOLOGY TRANSFER

Dispersion of the responsible departments

Dissemination of results

5.1 – 5.10. The Commission does not consider the dispersion of publishing activities to be that alarming. The underlying principle is that of internal dovetailing, which guarantees a certain degree of autonomy to the specific programmes. This principle is found in the third framework programme (1990 to 1994), which provides that results should be disseminated both by the specific programmes and centrally by DG XIII-C.

'Unofficial' publications

5.6 – 5.7. See reply to points 2.4. 2.5 and 3.5.

The new approaches to the dissemination of research results

5.8 – 5.10. DG XIII-C has recently been reorganized. One of the changes involved the creation of a unit for the dissemination of scientific and technical knowledge, which handles all dissemination activities irrespective of whether they take place via computer networks (in particular CORDIS) or by other means (publications, conferences, etc.).

The promotion of the exploitation of results

Directorate XIII-C and departments which manage indirect action programmes

5.13 – 5.15. Considerable progress has been made since the Court's audit (see reply to paragraphs 4.12 to 4.15).

Programmes entailing a large degree of industrial participation and traditional programmes

5.16 – 5.18. It is only recently that Directorate XIII-C has been able to concern itself with certain programmes since it did not have the powers to do so before the VALUE programme was adopted (see also reply to paragraphs 4.12 to 4.15).

Share of responsibility for the framework programme

Duplication of activity for the utilization of results in the framework programme

5.20. Article 7 of the proposal for a Council Decision on the dissemination and exploitation of knowledge resulting from the specific programmes of research and technological development of the Community, drawn up by the Commission and submitted to the Council in accordance with the procedure described in Article 130q (2) of the Treaty, proposes rules for the dissemination of information and states that the Commission should lay down the arrangements for implementing these rules.

Limited organic links between departments

Common sources of information

5.26 – 5.27. A computerized system has been introduced for the monitoring of files. This system covers information concerning contracts, results and the possible dissemination or exploitation of these results.

5.28. The appointment of liaison officers for the exploitation (and protection) of results in the JRC institutes should remedy the situation described by the Court.

Need to locate departments by related activities

5.29. An innovation and technology transfer unit separate from the patents departments was set up during the latest reorganization of DG XIII-C to remedy the situation described by the Court (see also the reply to paragraphs 5.8 to 5.10).

Dissociation between duties and resources

Splitting up publication appropriations between several departments

Originating DGs and the Secretariat-General

5.32. The Commission would point out that, prompted by Financial Control, it has decided to propose to the budgetary authority a transfer of appropriations from the headings in question to a heading which will cover expenditure on the priority publications programme for 1991 and that it is planning to enter a specific heading in the 1992 budget for financing priority publications.

It would also draw attention to the fact that there have been no restrictions on publications concerning the utilization of research results.

Originating DGs and the Publications Office

5.35 – 5.40. The Court suggests that the Office for Official Publications of the European Communities has financial powers enabling it to determine, by simple administrative decision, the allocation of the resources entered in Article 342 of the Commission budget.

The Commission would point out that the appropriations allocated to the Publications Office are administrative appropriations and thus intended for specific purposes. The Publications Office's budget is therefore to be allocated to a range of well-defined activities common to all the institutions.

In particular, these activities involve:

— the production and distribution of the *Official Journal of the European Communities*;

— production of the publications in the institutions' programmes;

— management of printing contracts on behalf of the institutions;

— sale and distribution of Community publications, including production of catalogues and sales promotion.

The Publications Office thus undertakes any work of this type which is requested of it.

The distribution of resources between authorizing departments observed in the Publications Office's analytical accounts is not the result of choices made by the Office but simply reflects the authorizing departments' activities. The Publications Office is merely providing information about a workload over which it has no control.

To cope with these tasks, the budgetary authority has so far allocated the Publications Office sufficient budgetary funds. It is true that the Publications Office has a small integrated printing shop but the main purpose of this is to be able to publish urgent issues of the Official Journal in the event of serious problems in the private sector and thus to ensure that the Communities' legislative process is not brought to a complete halt.

In normal circumstances this plant is used to produce other publications. In 1989 the workshop was allocated funds totalling ECU 3 370 771, i.e. 11.1 % of the total budget of ECU 30 239 400.

Priority is given to printing documents falling within the Publications Office's remit, in particular catalogues and advertising material. The remaining capacity available has traditionally been divided fairly between the institutions under the control of the Management Committee of the Publications Office and in accordance with the rules in force.

Directorate XIII-C appropriations and JRC appropriations for support for the Commission's departments

5.41 – 5.45. As regards the general question of application of the supplier-customer principle to JRC support activities for Commission departments, the Commission would refer to its replies to the Court's comments in the 1989 annual report (Chapter 9 — JRC, paragraphs 9.23 to 9.25) which clearly set out the constraints imposed on the Commission by the Financial Regulation and the financial perspective for 1988-92.

These replies also cover the specific question of ensuring competition raised by the Court in paragraph 5.42.

As regards the JRC's specific support for DG XIII, it is evident that, for reasons of efficiency and the transfer of know-how, it would be difficult to make use of organizations other than the JRC for exploiting its own inventions.

It should be noted that the exploitation measures carried out for DG XIII represent only some 6 % of the total workload accomplished by the JRC for supporting other DGs.

As was already the case with various other Directorates-General, a multiannual agreement was recently signed between DG XIII and the JRC on the utilization of research results.

Its application will be described in greater detail in the annual work programmes, the monitoring meetings and the annual reports and meetings with staff representatives.

Appropriations of Directorate XIII-C and ECSC measures

5.46. Article 20 of the Merger Treaty referred to by the Court states that the administrative expenditure of the ECSC is to be entered in the general budget together with the administrative expenditure of the other institutions. As a result, a number of items of expenditure which were described as administrative at the time were eliminated from the ECSC budget and entered in the general budget. This includes the expenditure referred to by the Court. ECSC expenditure is clearly involved and this Treaty must continue to be referred to in the remarks on the budget.

5.49. The Court's findings are correct. DG XIII-C will specify the exact budgetary source for each publication so that the Publications Office can correctly allocate the revenue for re-use.

Multiplicity of related activities which are managed separately

The demonstration projects of DG XI and XVII

5.52. The activities of DG XIII-C and DGs XI and XVII are complementary and do not overlap. There is also active cooperation between DG XIII-C and DG XVII concerning the dissemination, exploitation and reciprocal promotion of the results obtained.

The Sprint programme

Innovation and different common policies

Conclusion

5.53 – 5.56. It is difficult to integrate these various activities which have different legal bases and purposes. However, collaboration between these activities is encouraged within the Commission and several common initiatives are now being prepared.

5.57. See reply to paragraphs 5.35 to 5.40.

ANNEX

The Commission's publications programme for 1991

General principles governing the Commission's publishing activities

I. *The imperatives*

A. The Commission's decision of 31 October 1989 laid down a number of principles which are to govern its publishing activities, including:

— judicious investment of available resources (matching the means employed to the objectives pursued);

— reflection of the Commission's main concerns (concept of a priority programme);

— due consideration for the diversity of in the various cultural areas;

— a professional commercial approach to the design, presentation and distribution of publications;

— subsidiarity and partnership;

— strict programming of production, notably as regards time for translation.

B. The present approach makes it possible to meet these requirements. The choice of the material for publication, its structure, presentation and distribution, reflect needs identified by soundings of public opinion and publishing experience in the various cultural areas on which Community publications are targeted. Surveys have been conducted via distribution outlets, circulation figures have been analysed and cooperation with private-sector publishers has been established, providing a clearer picture of the true situation in the various cultural and linguistic areas and making for the optimum choice of subject matter, design, format, presentation and marketing methods.

C. Three operations are thus progressing in tandem:

1. Precise formulation of the priority programme for 1991

This entails:

— a judicious choice of subject matter;

— an accurate choice of target readership,

— selecting appropriate titles;

— selecting appropriate media;

— appropriate presentation;

— optimum distribution;

— sustained promotion;

— close cooperation with private publishers.

2. Scrutiny of each title to establish:

— whether it merits publication;

— whether it needs to be published in a particular form;

— whether it needs to be published via particular media;

— whether a different decision should be taken on one or more of the above points.

II. Forms of production

The proposed production range comprises:

1. Official publications

As a rule, official publications appear in printed form and in predetermined numbers in all the official languages of the Community. They are the responsibility of the originating institution and their presentation reflects that institution's image. Because of the substantial investment required, they are used only for high-quality subject matter and have a sufficiently wide readership to offset production costs to a reasonable extent.

Official publications take the form of *periodicals* or *monographs*.

Once the basic print-run is exhausted, and unless the authorizing department has given explicit instructions to the contrary, the Publications Office may arrange additional print-runs to meet existing demand; this is financed by an overall provisional budget.

Modern publishing equipment will be used to hold down production costs while satisfying minimum technical and cultural requirements.

2. Published documents

2.1. The published document is the appropriate vehicle for any form of information which an institution considers it should make available to the public without taking responsibility for the content (a request from a Director-General is sufficient to ensure publication).

Generally speaking, published documents are reproduced as such in the language versions available. The necessary biographical references are supplied.

Published documents are listed in the monthly and annual catalogues in the same way under the same headings as official publications. As far as the external user is concerned, they are indistinguishable from official publications, except that a statement appears in the catalogue and on the cover to the effect that the Commission accepts no responsibility for the content.

In the first instance published documents have a limited print-run. The Publications Office may print additional numbers to meet specific demand. Published documents are sold at cost price and must be self-financing.

Here again, certain savings will be made by using modern publishing equipment.

2.2. Published documents may also derive from an original kept in the archives (paper, microfiche, electronic or optical archives). Although, as far as the external user is concerned, these are indistinguishable from official publications, the difference is considerable as far as the production departments are concerned since published documents, as listed in the catalogues, exist only in the form of an original from which the Publications Office makes copies on request. This means that the number of copies printed never exceeds that requested by a known customer and there is no need for storage or for any investment unless a substantial demand has been identified.

Because of their simple method of production and straightforward presentation, published documents are an appropriate vehicle for material aimed at a readership which is restricted or impossible to assess in advance. There is no need to estimate print-runs, no need to store copies, and no need to incur expenditure unless demand means that revenue will be at least equivalent to outlay.

This form of 'publication on request' is particularly indicated for the mass of technical reports on ECSC and Euratom matters, published by DGs V, XII and XIII.

2.3. Mention should also be made in this context of the *'document delivery'* service, i.e. the distribution of data from archived documentary sources (paper, microfiche, electronic or optical archives). The documents delivered in this case are extracts rather than entire publications (e.g. a directive published in an OJ, a section of a handbook, a chapter of a study, statistical data, etc.).

Archived material can be accessed through data bases which can be consulted via public or private data-communication services (e.g. videotex) linked to an electronic system for entering commands and arrangements whereby the information requested can be rapidly made available through the appropriate channel (mail, fax, computer network).

Considerable work will be done on indexing archived documents, since optimum exploitation can only be ensured if there is ease of access and if pertinent replies are available to those consulting data bases. All this will depend on the quality of indexing.

2.4. *Electronic transfer* is used for information held in an electronic memory bank which can be accessed from a computer terminal. Having located the desired information by means of a search facility, the user can either obtain the data immediately on his own terminal or can use the 'document delivery' facility to order a printed version from the relevant memory bank and have it forwarded by mail or by fax. Well-known examples of such systems include the CRONOS (statistics), TED (public contracts) and INFO92 (single market) data bases. This form of electronic transfer is to be extended to handbooks, topical information and publications which are frequently updated; access should be available through both the traditional computer networks and networks open to the general public (videotex).

3. Reference works

Reference works also have a place in the priority programme. The content of these publications has been established under Commission supervision but they may be printed and distributed, on financial terms to be specified, by private publishing houses (subsidiarity). They will not be published by the Commission itself unless private publishers have failed to show any interest in a particular language version. The purpose of such reference works is to fuel discussions on topics with a bearing on European integration, to publicize certain key ideas and, possibly, to create a media event. They will be written by well-known authors and promoted by well-established advertising agencies.

It is in the interests of the Commission, working with private publishers, that the presentation of reference works should be comparable to that of competing works on the same market and that they should be distributed and advertised through channels which offer substantial sales opportunities.