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ABSTRACT

The feasibility study forms part of a project initiated in 1969 which also includes the UNESCO Thesaurus of science and technology policies, a provisional world list of periodicals dealing with science and technology policies and some 3,000 abstracts of literature on the subject. The purpose of the feasibility study is to define the managerial, technical, legal and financial framework for a Science and Technology Policies Information Exchange System (SPINES). Included are estimates of the literature to be covered, users to be served, and costs to be met. A data table giving world estimates of science and technology policies literature is appended. (Author/PF)

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RESULTS OF THE FEASIBILITY STUDY ON THE ESTABLISHMENT OF A SCIENCE AND TECHNOLOGY POLICIES INFORMATION EXCHANGE SYSTEM ("SPINES")

SUMMARY

The Feasibility Study forms part of a project initiated in 1969 which also includes the Unesco Thesaurus of science and technology policies, a provisional world list of periodicals dealing with science and technology policies and some 3,000 abstracts of literature on the subject. The purpose of the Feasibility Study is to define the managerial, technical, legal and financial framework for a science and technology policies information exchange system ("SPINES"). The results of the Study are reported below to the General Conference pursuant to paragraph 548 of the Approved Programme and Budget for 1973-1974.

CONTENTS

I. TERMS OF REFERENCE

The last two decades have witnessed a remarkable increase in the importance attached to science and technology policies both as an aspect of government and as an academic activity. Teaching and research units in science policy are springing up in the universities and elsewhere, new or reformed national science and technology policy-making bodies are being established as part of the Member States' governmental machinery, and specialized groups, committees, etc., dealing with specific problems of science and technology policies are emerging in or in close collaboration with those States' national parliaments.

At the same time the managers and specialists working in this field are encountering a constantly increasing demand for information which, moreover, is very difficult for them to satisfy as the relevant information is spread in numerous disciplines and disseminated in a wide range of documentation, often issued by non-commercial publishers, and also because so far there are rather sharp barriers in this field between the specialists of different countries or regions. Another reason making it difficult to master the documentation relating to science and technology policies is that the field is steadily widening and the character of the information is often so technical that it is difficult to locate the expert knowledge and advice necessary for its interpretation and presentation. The problem is further complicated by the accelerating speed with which much of the information becomes obsolete.

Accordingly, the Unesco Secretariat, in implementation of resolutions 2.131, 2.12 and 2.121 adopted by the General Conference at its fifteenth, sixteenth and seventeenth sessions respectively, and of the corresponding work plans, has been undertaking a project to build an information exchange system in areas relevant to science and technology policies. This project, initiated in 1969, includes:

the latest English version of the Unesco Thesaurus of science and technology policies (see Section VI below);

a provisional world list of periodicals dealing regularly or occasionally with science and technology policies;

some 3,000 abstracts resulting from the 1972-1973 experimental indexing of literature in the area of science and technology policies (conducted with the help of specialists in Belgium, Bulgaria, France, Poland and the United Kingdom);

a Feasibility Study on the managerial, technical, legal and financial framework for the setting up of a science and technology policies information exchange system ("SPINES"), of which the results are reported below pursuant to paragraph 548 of the Approved Programme and Budget for 1973-1974.

The study and the above-mentioned publications will appear in 1974 in the Unesco series "Science Policy Studies and Documents".

The purpose of the study is to define the managerial, technical, legal and financial framework for the setting up of an international science and technology policies information exchange system ("SPINES"). Its preparation was entrusted to a group of consultants formed by: Dr. H. Coblans (United Kingdom), Chairman, formerly ASLIB (Association of Special Libraries and Information Bureaux); Mr. J. Ducrot (France), Manager, Data Processing and Information Service, Institut Textile de France; Mrs. E. Houtart (Belgium), Director, Centre de Recherche et Documentation Juridiques (CREDOC); and Mr. L. Rolling (Luxembourg), Head, Information Technology Division, European Community.

Dr. H. Coblans and Mr. L. Rolling had previously participated in the preparation of the International Nuclear Information System (INIS, IAEA, Vienna). Dr. Coblans also took part in the setting up of the Agricultural Information System (AGRIS, FAO, Rome).

II. OFFICIAL SUPPORT

(1) At its first meeting (Ulm, July 1972) the International Commission for Science Policy Studies of the International Union for the History and Philosophy of Science (IUHPS) of ICSU stated in its final report that: "The Commission expresses the opinion that the Unesco feasibility study on the establishment of a science policy information service is the most serious and useful initiative in this field and has to be supported in all possible ways".(1)

(1) Resolution A (1) on "the problem of bibliographies and retrieval services in science policy studies".

(2) At its 93rd session (Paris, 12 September - 11 October 1973) the Unesco Executive Board discussed the report of the ad hoc working group of the United Nations Advisory Committee on the Application of Science and Technology to development (UNACAST) on Unesco's science policy programme. The report contained a special section on the information exchange system in question. At the close of its discussions, the Executive Board(1) adopted a resolution in which it:

"Concurs with the conclusions reached in that report; expresses its gratification at the considerable fund of experience accumulated during the past two decades by Unesco in the science and technology policy field; and emphasizes the importance of the rôle which Unesco has played and should continue to play by itself as well as within the United Nations system, in matters relating to science and technology policies and institutions".

III. SUBJECT SCOPE

The subject scope was delimited taking into account the theory and practice of science and technology policies as developed in recent years in Unesco Member States(2) and also in agreement with the definition of the field provided by the above-mentioned International Commission for Science Policy Studies, which reads as follows:

"Science policy studies have as their focus the systematic investigation of scientific and technological activities and their function within society. In particular, they are concerned with policy-making in scientific and technological fields, and with the interrelationship between policy-making, cultural values and social goals."

This approach to the scope of the field of science and technology policies has been confirmed by the surveys and analyses made by the Unesco Secretariat for the past decade or so(3). They show that the potential users of a science and technology policies information system pertain to various spheres of activities and circles of interest (see Section V below), and that science and technology policy is like a sprawling railway station, where many disciplinary lines meet, as reflected in the following 16 areas which represent a basis for the delineation of the field:

1. Philosophy of science - theory of science
2. Systematization of science - classification of fields of science and technology
3. Ethics of science and technology - normative orientations of science and technology policies
4. History of science and technology since the nineteenth century - current trends in science and technology
5. Sociology of scientific workers
6. Creativity and psychology of scientific workers - methodology of research
7. R&D organization and management at the performer's level
8. Scientific and technological information
9. Economics of science and technology - financing of R&D
10. Development and planning of human resources for science and technology - education and training for R&D
11. Science, technology and public policy - planning, programming and budget for R&D at the national level

(1) 93 EX/Decision 4.4.2.

(2) Mention should be made here of important bibliographical sources of references such as:

"Science, Technology and Public Policy - A selected and annotated bibliography" Lynton K. Caldwell, editor - Indiana University, U.S.A. - 3 volumes (1970, 1971, 1972);

"Science Policy Bulletin" - A bibliographical bulletin issued by the Battelle Memorial Institute in Columbus, Ohio, U.S.A. from 1968 to the end of 1972;

"Science of Science Bibliography" - Dr. Káldi Pál, editor - Veszprem, Hungary (1968);

"Novaya Literatura o nauke i nauchno-issledovatel'skoi rabote za rubezhom" Fundamentalnaya biblioteka obshchestvennykh nauk, Akademija Nauk SSSR, Moscow, USSR, (monthly);

Novaya sovetskaya literatura o nauke i nauchno-issledovatel'skoi rabote v SSSR" Fundamentalnaya biblioteka obshchestvennykh nauk, Akademija Nauk SSSR, Moscow, USSR, (monthly).

(3) Cf. Science Policy Research and Teaching Units, a directory published in 1971 by Unesco in the series "Science Policy Studies and Documents" (No. 28).

12. Scientific and technological forecasting, futurology, assessment of technology
13. Transfer and implantation of technologies
14. International science and technology policies - international co-operation in science and technology
15. Legislation in science and technology
16. Science and society - public understanding of science and technology.

The corresponding documentary category codes developed in the proposed system in connexion with the above areas are given in Annex I to the present document.

IV. LITERATURE COVERAGE

The proposed system is intended to deal only with the literature referring to science and technology policies; it is not conceived in terms of a "statistical data bank".

The literature in the field may be broadly divided into:

conventional literature: this includes material available through commercial channels or government and official publishers (books, periodicals, laws and regulations, conference proceedings);

non-conventional literature: includes reports of all kinds - including research reports produced under contract - newsletters and, to a lesser extent, theses and translations. Reports and newsletters are produced mainly by government departments, academic institutes, commercial enterprises and international organizations. They are particularly relevant for science and technology policy documentation, as they contain information not usually published in the ordinary way.

The estimated world number of references per annum in the field is about 31,500 (1) (not including the literature produced by the science-based enterprises). This figure is distributed as follows according to geographical and cultural grouping, language and type of document:

(a) Estimate by region (per annum)

	Total	%
Europe	16,430	52
North America	7,250	23
Asia	2,460	8
Africa and Arab States	2,070	7
Latin America	1,270	4
International Organizations	2,000	6
	31,480	100

(b) Estimate by language

	Total	%
English	12,940	41
French	3,670	11
German	2,570	8
Russian	1,780	6
Spanish	1,630	5
Other languages	8,890	28
	31,480	99

(1) This figure is based upon Unesco Secretariat (STP) surveys (conducted in 1973) and analyses of current trends in the field. Details are given in Annex II.

(c) Estimate by form

	Total	%
Articles in periodicals	17,280	55
Non-conventional literature	5,790	18
Books	5,600	18
Laws and regulations	2,810	9
	31,480	100

Besides the number of references and the types of literature involved there is a third important parameter of the system: the depth of the coverage. Because of the very nature of the science and technology policy field itself, and due to the decentralized structure of the proposed system (see Section VII below), decisions about the depth of the coverage will mainly depend upon the national input centres. These centres will have to appreciate whether or not the content of a document is too elementary, ephemeral or without information value for inclusion in the national input to the Central Processing Group (CPG). This should be understood in the light of the fact that science and technology policy information has a high rate of evolution. On the other hand even though a document, particularly a book, a legal text, the proceedings of a conference, may not qualify as a whole, it may contain a chapter or even a section, which is in scope, and therefore should be reported. The relevant part would then be treated as an analytical entry according to standard rules of cataloguing.

V. ESTIMATE OF USERS

The following estimates of potential users of the products of the system (magnetic tapes and Bulletin of Abstracts - see Section VII) are based on analyses made by the Unesco Secretariat of current trends in the field (based among others on a survey conducted in 1972).

(a) Magnetic tapes

	Approximately
Corporate users in 132 Member States of Unesco	30 - 45
International Organization (+ 90)	10 - 15

(b) Bulletin of Abstracts SPINIA[1]

Specifically workers in science policy:

some 330 science and technology policy-making and co-ordinating bodies some 360 science and technology policy teaching/research units some 60 parliamentary groups concerned with science and technology policies some 90 international organizations concerned with science and technology policies some 2,000 science-based enterprises and financial companies	500 - 750
Other users (mainly university departments and national libraries)	2,250 - 2,500

VI. THE THESAURUS

Since "Science and Technology Policies" is a comparatively recent and expanding field, its terminology is still rather labile. Usage tends to be different in each country and even within the same culture most writers tend to use their own personal terminology. Therefore it was important to standardize the concepts so as to avoid ambiguities and poor retrieval. In addition the multilingual character of SPINES imposes the need for a thesaurus of concepts, rather than words, as a basis for co-ordinate indexing. Co-ordinate indexing insists in assigning descriptors or

(1) Acronym for Science and Technology Policies Index and Abstracts.

terms from an authority list, and their juxtaposition or co-ordination constitutes the subject characterization of the document. The Thesaurus thus becomes the standardized and comprehensive list of concept terms covering the subject field with semantical relationships. For SPINES the ultimate authority list is the ensemble of the four language versions in English (source version), French, Russian and Spanish.

The source Thesaurus was developed from a first provisional version(1) in a number of ways:

(a) it was submitted for critical examination by documentation units in Belgium, France, Poland, Spain, the U.S.A. and the USSR;

(b) at the same time (in the period 1972-1973) specialists in Belgium, Bulgaria, France, Poland and the United Kingdom were commissioned to use it for the experimental indexing of a representative sample of about 4,000 documents, including articles in periodicals, books and other types of literature(2). The Unesco Secretariat was also involved in this testing exercise. This work and subsequent consultations of experts(3) resulted in lists of additional terms proposed for inclusion in the Thesaurus;

(c) since any coherent Thesaurus must have a systematic understructure, a "hidden" classification, the proposed terms were grouped in clusters, and synonyms and polysemic terms were discarded. The specific/generic relationships were worked out by specialists in the Unesco Secretariat, assisted by consultants including Mr. B. de Padirac (France), Mr. L. Rolling (European Community) and Mrs. E. Houtart, Director of CREDOC(4). The graphic method of display by charts was adopted to establish the relational structure of the Thesaurus;

(d) the resulting version in alphabetical order shows each preferred term with its synonyms, its hierarchical and associated relationships, and includes a permuted index as well.

The complete source version in English is due for publication by Unesco in the course of 1974. The extension of the source version to French, Spanish and Russian is to be achieved during the period 1975-1976 (see in the draft 18 C/5 the work plan covered by draft resolution 2.122).

VII. GENERAL PRINCIPLES COVERING THE PROPOSED SYSTEM

The system has been conceived as a decentralized one: it would comprise a Central Processing Group (CPG) and several National (or Regional) Input Centres.

(1) The Central Processing Group (CPG) would essentially be responsible for the supervision, co-ordination and standardization of the work done by the National Input Centres, for the maintenance of the Thesaurus, and for the building and dissemination of merged tapes and printed abstracts containing the information produced by the National Input Centres.

(2) The National Input Centres would be responsible for the cataloguing, indexing and abstracting of the literature produced in their country on the basis of the Unesco Thesaurus for science and technology policies and according to the UNISIST guidelines.

(3) Copyright

Normally there is no problem of copyright for references and indexing terms. However, in the case of the abstracts to be supplied for each item the right to reproduce freely or to translate must be granted by the copyright owner.

(1) Established in 1970-1971 with the help of a team headed by Dr. J. B. Poole (Scientific Section, Research Division, House of Commons Library, U.K.).
(2) As a result of the experimental indexing some 3,000 abstracts of science and technology policies literature will be published in 1974 in the Unesco series "Science Policy Studies and Documents".
(3) Professor G. Dobrov (USSR), Mr. A.W. Heim (Federal Republic of Germany), Professor J. Ladrière (Belgium) and Professor D. Roman (U.S.A.).
(4) Acronym for Centre de documentation juridique (Bruxelles, Belgium).

Thus it is proposed that the copyright of the abstracts should be vested in the Central Processing Group. Each government, through its National Centre responsible for input, would have to make the necessary arrangements with local periodicals and other sources to ensure that the abstract supplied was not restricted by copyright. The same would apply to abstracts produced in the Centre. In effect the copyright would be ceded to the Central Processing Group which, in turn, would permit each country (one designated Centre) receiving an official copy of the full tape, to have the sole right of reproduction and repackaging, etc., in that country. However, this would not include the right to produce for sale (or free) a print-out of the tape in competition with the official Abstracts Bulletin "SPINIA" published by the Central Processing Group.

(4) Participating countries

In a first stage (1975-1979), it is expected that 8 to 10 countries will participate in the input to the system. The countries which would seem to qualify for selection are: France, German Democratic Republic, Federal Republic of Germany, Poland, Spain, United Kingdom, U.S.A., USSR, because these eight countries represent more than 60 per cent of the whole literature produced in the field. The inclusion of India and/or Japan could be envisaged if it were deemed desirable to increase the group to ten countries. The countries participating in the input would have to participate in the financing of the Central Processing Group (see Section VIII below).

(5) Countries benefiting from the system

It is envisaged that all Unesco Member States would immediately benefit from the system as soon as it becomes operational. Indeed, each country would receive, free of charge, one copy of the Bulletin of Abstracts on science and technology policies SPINIA, the publication of which is foreseen on a quarterly basis in the beginning (i.e. 1976) and later on the basis of 10 issues per annum (from 1977 onwards). Each country would also receive, free of charge and upon request, one copy of the magnetic tapes containing the abstracts.

(6) Location of the Central Processing Group

The Central Processing Group would be located in one of the Member States, to be selected in due course by the appropriate governing organ of Unesco.

(7) Rôle of the Unesco Secretariat

The Unesco Secretariat would:

(a) retain supervisory responsibility for the Thesaurus utilized in the system and for the coverage of the literature to be processed (Division of Science and Technology Policies);

(b) ensure that the UNISIST guidelines and principles were followed (Division of Scientific and Technological Documentation and Information);

(c) provide, through the Unesco Computerized Documentation Service, information services to the staff at Unesco Headquarters and in the field and to the National Commissions; to this end a copy of the tapes containing the information would be made available free of charge to the Unesco Secretariat by the Central Processing Group of the SPINES system.

VIII. FINANCIAL ASPECTS OF THE PROPOSED SYSTEM(1)

(1) Budget of the Central Processing Group (CPG)

The budget of the Central Processing Group for the period 1975-1979 has been calculated as shown in the table below (page 9) by the consultants who prepared the Feasibility Study(2).

All costs were calculated on present Western European prices (end 1973 - beginning 1974) in French francs and converted to dollars at the official United Nations rate (January 1974) of $1 = 4.6 French francs.

(1) The financing of the national input centres would be the responsibility of the Member States concerned.

(2) For more details see Science and Technology Policies Information Exchange System (SPINES) - Feasibility Study (published in 1974 in the Unesco series "Science Policy Studies and Documents").

Reference notes to the table

1. The staff would include: a director, 3 highly qualified and experienced documentalists with a university degree, 1 analyst programmer, 1 administrative technician/secretary, 2 typists, 1 operator/machinist. This is considered as being a minimum in comparison with other existing documentation groups which handle a decentralized exchange information system, i. e. a system where the collection, indexing and abstracting of the literature and its transfer to microforms are the sole responsibility of a central staff.

2. These figures have been calculated from Western European salary practices: they would have to be increased by about 25 per cent if international salary scales and personnel practices were taken as the basis of calculation.

3. It is assumed that the host country would provide the offices and furniture.

4. Administrative costs include staff travel, buying low-cost equipment, books, etc., telephone, telex; offset printing, etc.

5. Bulletin of Abstracts "SPINIA". An estimate of the profit which would result from the sale of the Bulletin has been taken into account in the figures.

SUMMARY OF THE BUDGET OF THE CENTRAL PROCESSING GROUP (1975-1979)

	Items	1975 $	1976 $	1977 $	1978 $	1979 $
1.	Staffing costs(1)	68,000(2)	140,000(2)	143,000(2)	147,000(2)	150,000(2)
2.	Offices, furniture(3)	Pro mem.	Pro mem.	Pro mem.	Pro mem.	Pro mem.
3.	Administrative costs(4)	22,500	23,500	24,500	24,500	24,500
4.	Technical operating costs	28,000	49,800	44,750	49,500	37,750
5.	Computer time	12,500	23,250	28,300	30,250	36,000
6.	Printing of the Bulletin of Abstracts "SPINIA"(5)	-	20,000	20,000	10,000	-
		131,000	256,550	260,550	261,250	248,250

(2) Possible financial sources

The budget of the Central Processing Group would be covered by financial contribution from participating countries and might be transferred to the Central Processing Group through the Unesco funds-in-trust procedures. To this effect special agreements would have to be made with (i) the host country, and (ii) the countries participating in the system.

A standard form for financing the CPG would be for the countries directly participating in SPINES to contribute pro rata to their share of the general Unesco budget. It is expected that at least part of the cost of the CPG would be carried by the host country, both in cash and kind.

Furthermore, the SPINES funds-in-trust could also be helped by voluntary contributions from other Member States. The amount of money from the Unesco Regular Programme would consist essentially of staff costs for maintaining contact with the system and the special parts (thesaurus, training) for which Unesco would retain some direct responsibility (see Sections 2.12 and 2.13 in the draft 18 C/5).

(3) Unesco budget (see draft 18 C/5, paragraphs 2073 to 2079 and paragraph 2102)

The funds foreseen in the draft 18 C/5 correspond to the rôle devolving upon Unesco, i. e. (i) setting up of the Central Processing Group (through a meeting of governmental experts and staff travel); (ii) printing of the Multilingual Thesaurus; (iii) participation in the training of the indexers (staff and consultants' travel to training workshops, organized periodically). The Unesco Secretariat would have no current documentation and information tasks, as these would be entrusted to the Central Processing Group and the National Input Centres.

IX. POSSIBLE LEGAL STRUCTURES

(1) National Centres for Input

The creation of such Centres would require a formal agreement between Unesco and the Member States (or organizations) concerned. The agreement would have to ensure that the accepted rules for input and adequate coverage were fully respected. It would imply financial guarantees for its operation and also an obligation to participate in the financing of the CPG.

The legal position of a national centre in relation to the government would depend on local circumstances. However, the government would have to accept the responsibility for making sure that the above-mentioned standards were maintained.(1)

(2) The Central Processing Group (CPG)

To ensure a stable CPG, which will function properly, the legal form would have to take the following points into account:

(a) the continuing responsibility of Unesco as concerns the objectives of the system, the quality of the indexing, the objectivity of the coverage, and the dissemination of the information;

(b) the maintenance of the rules for input and their strict enforcement by the different National Centres;

(c) the management of the Thesaurus in agreement with Unesco;

(d) the effective running of the CPG as a whole;

(e) the financial auditing;

(f) the presence of the Governing Board of the CPG, of representatives of the major national input centres.

To achieve these aims there are a number of possible legal forms described in some detail in the Feasibility Study, namely:

an autonomous organization based on a multinational agreement;

the management of the Central Processing Group by an existing non-governmental or intergovernmental organization whose statutes and bye-laws are not incompatible with the proposed SPINES system;

an international non-governmental organization incorporated under the national law of a Unesco Member State;

the creation of an entity by a Member State with the participation of Unesco;

integration within the Unesco Secretariat(2).

X. OFFERS FOR THE ESTABLISHMENT OF THE CENTRAL PROCESSING GROUP

To facilitate the final choice regarding the status and siting of the Central Processing Group, it would be advisable to call for specific offers from possible host countries and/or international organizations. The offers would be submitted for consideration by the intergovernmental meeting of experts provided for in Unesco's Draft Programme and Budget for 1975-1976(3), which is to lay down the conditions governing the establishment of the "SPINES" system.

(1) The texts of possible legal agreements between Unesco and a Member State for the creation of (i) the National Centre for Input and (ii) the Central Processing Group, are appended to the Feasibility Study (see footnote (2) on page 8).

(2) If the Central Processing Group were to be integrated in the Secretariat of Unesco, the budget of the CPG would have to be increased by $19,000 in 1975 and $34,450 in 1976.

(3) Cf. document 18 C/5, paragraph 2076.

These offers would have to:

(1) satisfy all the conditions governing the operation of the system, as laid down in the Feasibility Study, and be based on the model agreement between Unesco and the government of the host country, which is proposed in Annex F of the Study;

(2) contain specific proposals concerning:

(a) the arrangements to be made for the accommodation of the Central Processing Group;

(b) the status of the Central Processing Group;

(c) the financing of the Central Processing Group.

The decision as to which of the offers should be chosen would take account of the criteria listed below in order of priority:

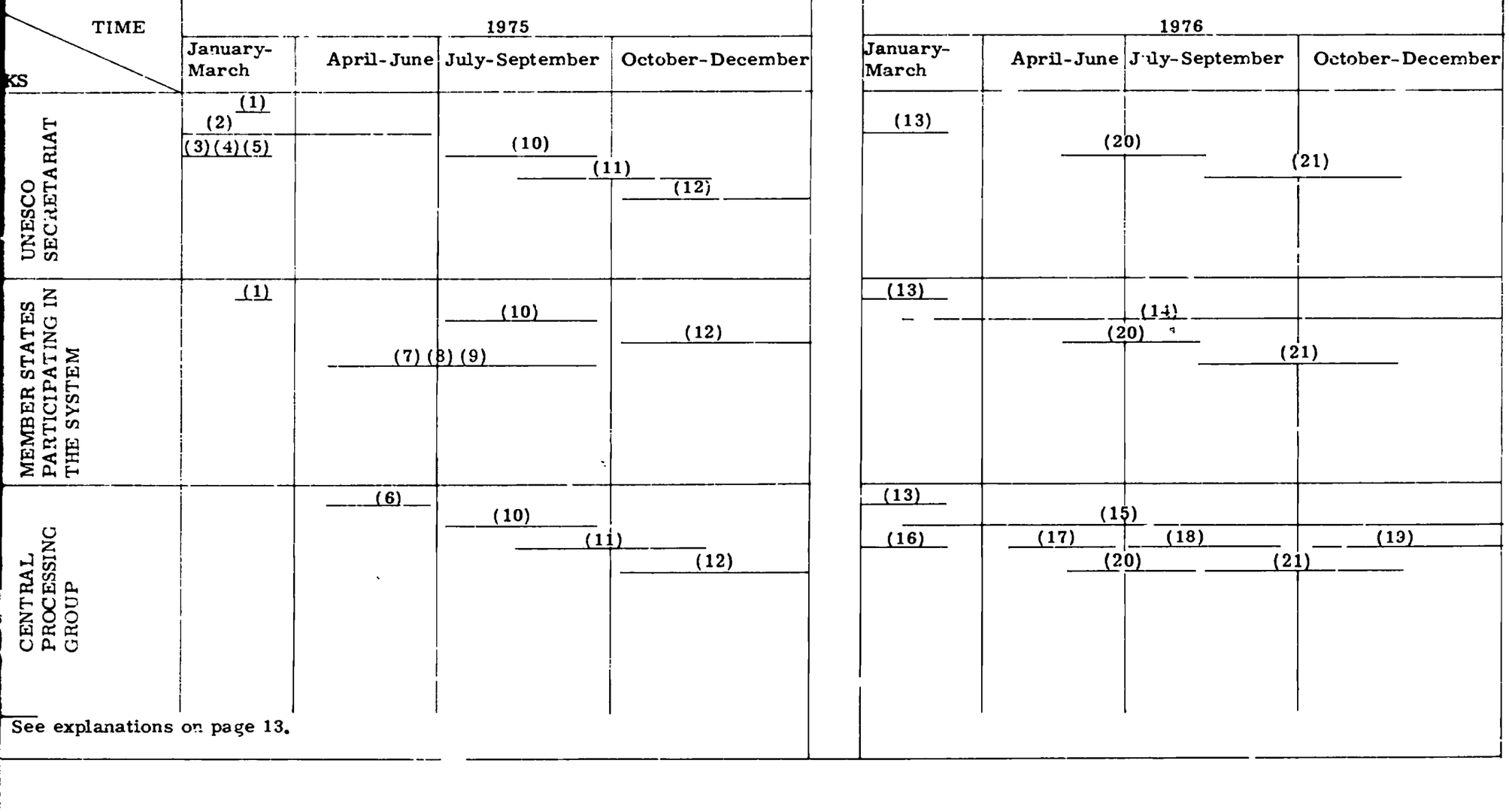
1. Does the offer guarantee the Central Processing Group a status ensuring its independence and permitting of effective international co-operation?

2. Does the offer guarantee the Central Processing Group access to the most modern data-processing techniques and the services of a sufficiently numerous and qualified staff?

3. Does the offer guarantee the Central Processing Group the financial support necessary for its efficient operation?

4. If the answer to each of the above questions is in the affirmative, does the offer seem to be the best from the financial point of view?

XI. SUMMARY TIME SCHEDULE FOR THE INSTALLATION OF THE PROPOSED SYSTEM (PERIOD 1975-1976)(1)



See explanations on page 13.

Reference notes to the summary time schedule

(1) Meeting of governmental experts from countries participating in the input of the system, convened with a view to decide about the modalities of the installation of the Central Processing Group (see draft 18 C/5, paragraph 2076).

(2) Collection of voluntary financial contributions for the establishment of the Central Processing Group.

(3) Contacts for the extension of the Unesco English (source) version to French.

(4) Idem for the extension of the Thesaurus to Russian.

(5) Idem for the extension of the Thesaurus to Spanish.

(6) Installation of the Central Processing Group; hiring of its personnel.

(7), (8), (9) Extension of the Thesaurus to French, Russian and Spanish.

(10) Contacts with the countries participating in the input of the system for: (i) literature coverage and (ii) setting up of national input centres.

(11) Listing and printing of the multilingual Thesaurus.

(12) First workshop for the training of the indexers.

(13) Second workshop for the training of the indexers.

(14) Cataloguing, indexing and abstracting of science and technology policies literature produced in the countries where national input centres exist.

(15) Cataloguing, indexing and abstracting of science and technology policies produced by international organizations.

(16), (17), (18), (19) Listing and printing of the 1976 quarterly issues of the Bulletin of Abstracts "SPINIA".

(20), (21) Third and fourth workshop for the training of the indexers.

ANNEX I

DOCUMENTARY CATEGORY CODES

A. FOUNDATIONS OF SCIENCE

A 10 THEORY OF SCIENCE
A 20 SYSTEMATIZATION OF SCIENCE
A 30 ETHICS OF SCIENCE AND TECHNOLOGY
A 40 HISTORY OF SCIENCE AND TECHNOLOGY SINCE THE NINETEENTH CENTURY
A 50 SOCIOLOGY OF SCIENTIFIC WORKERS
A 60 CREATIVITY AND PSYCHOLOGY OF SCIENTIFIC WORKERS

B. SCIENCE AND TECHNOLOGY RESOURCES

B 10 ORGANIZATION AND MANAGEMENT OF R&D
B 20 R&D EQUIPMENT
B 30 SCIENTIFIC AND TECHNOLOGICAL INFORMATION
B 40 ECONOMICS OF SCIENCE AND TECHNOLOGY - FINANCING OF R&D
B 50 HUMAN RESOURCES FOR SCIENCE AND TECHNOLOGY

C. SCIENCE AND TECHNOLOGY POLICIES

C 10 NATIONAL SCIENCE AND TECHNOLOGY POLICIES
C 20 FORECASTING AND ASSESSMENT OF SCIENCE AND TECHNOLOGY
C 30 TRANSFER AND IMPLANTATION OF TECHNOLOGIES
C 40 INTERNATIONAL SCIENCE AND TECHNOLOGY CO-OPERATION
C 50 LEGISLATION IN SCIENCE AND TECHNOLOGY
C 60 SCIENCE AND SOCIETY

D. PLANNING OF SECTORIAL R&D POLICIES

D 10 SECTORIAL R&D POLICIES
D 20 AGRICULTURAL R&D POLICIES
D 30 MEDICAL R&D POLICIES
D 40 TECHNOLOGICAL R&D POLICIES
D 50 ENVIRONMENTAL R&D POLICIES
D 60 SPACE R&D POLICIES
D 70 DEFENCE R&D POLICIES
D 80 SOCIO - ECONOMIC AND CULTURAL R&D POLICIES
D 90 OTHER

ANNEX II

WORLD ESTIMATES OF SCIENCE AND TECHNOLOGY POLICIES LITERATURE

Regions (countries) \ Type of literature	Legal documents	Books	Unpublished documents	Articles	Total
Europe					
1 France*	80	224	150	1,995	2,449
2 Germany (Democratic Rep. of)*	40	51	165	660	916
3 Germany (Federal Rep. of)*	80	403	195	570	1,248
4 Poland*	40	104	225	390	759
5 Spain*	20	198	150	165	533
6 USSR*	250	355	315	360	1,780
7 United Kingdom*	80	334	375	1,860	2,649
Total 1-7	590	2,169	1,575	6,000	10,334
Total Europe	1,370	3,295	2,910	8,850	16,425
North America					
Canada	80	42	165	360	647
8 United States of America*	250	806	930	4,620	6,606
Total North America	330	848	1,095	4,980	7,253
Total 1-8	840	2,975	2,505	10,620	16,940
Africa and Arab States	500	62(a)	90	1,420	2,072
Asia					
India	40	136	30	360	566
Japan	40	310	30	90	470
Total Asia	300	703(b)	115	1,340	2,458
Latin America					
Brazil	40	64	30	40	174
Mexico	40	44	5	100	189
Total Latin America	310	191(c)	75	690	1,266
WORLD TOTAL	2,810	5,099	4,285	17,280	29,474
International Organizations (+ 100)	-	500	1,500	-	2,000
Science based enterprises (+ 1,000)	-	-	2,000	-	2,000
GRAND WORLD TOTAL	2,810	5,599	7,785	17,280	33,474

(a) 21 countries from 50.
(b) 17 countries from 23.
(c) 14 countries from 25.

* Countries that might be selected to participate in the input of SPINES during its first stage of operation.