DEVELOPMENT SCIENCE INFORMATION SYSTEM (DEVSIS)

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0. Introduction

In March this year, a Study Team consisting of some half a dozen persons began work at the ILO, Geneva, on a feasibility study for a global information system for the socio-economic development field. The system is called Development Science Information System (DEVSIS). The Study Team was assisted, from time to time, by specialists on specific aspects of the design of the system. The first version of the complete report of the team has just been released. It will be discussed at the DEVSIS Steering Committee meeting in Paris, 4-5 Dec 1975 and at an evaluatory meeting in West Berlin, 8-12 Dec 1975. The work of the Study Team and the thinking and actions preceding it can be viewed as an exercise in systems design and planning.

The major parameters generally considered in a system design are:

1. Establishing need for the proposed system
2. Overall scope of the system to meet the identified needs.
3. Analytical study of the system components
4. Organizational aspects
5. Environmental aspects
6. Economics of the system
7. Developmental programme
8. Steps for implementation of recommendations and plans

1. Establishing Need For A System

One may encounter a specific problem and then begin to search for a solution to it. On the other hand, there may be only a vague general notion of existence of the problem as experienced by persons involved in the field concerned. For instance, in the information field, experience may indicate that a certain community of users is not getting adequate access to the information they need. One might then investigate, say through surveys, identify the specific information needs and the inadequacies of existing systems to meet the needs. This could lead to improvements in existing systems, and their utilisation, or the designing of new systems adequate to meet felt needs, such an exercise of a detailed survey of needs, inadequacy of existing systems,
etc, as a preliminary to making a proposal for a system of global dimensions could be too costly and time-consuming, if practicable at all. However, it is useful to examine the expression of experiences and the premises that have been formulated over the years, orienting the thinking and actions of peoples, institutions and organizations to develop a global information system for the socio-economic field.

11 Premises

1. Peace and prosperity in the world requires the creation of a new economic and social order - something different from the present order marked by dichotomies, distinctions, and discriminations, of haves and havenots, rich and poor, advantaged and disadvantaged, privileged and underprivileged, developed and under-developed.

2. The creation of this new economic and social order depends on cooperative and collaborative action among nations, institutions and social groups of all kinds, so as to bring about the appropriate economic and social changes, reducing the gaps between cultures, between nations and between social groups.

3. Knowledge is the principal instrument of socio-economic change, and the sharing of knowledge (intellectual resources) could be an effective means of reducing and bridging the gaps in and between societies.

4. The capability for knowledge transfer and information handling is both the potential for change as well as the indicator of achievement in material wealth.

5. Modern transport and communication systems have shrunk distance and time such that actions and happenings at one point have their impact, echo, and reverberations across space and through time. Therefore, one needs a broad perspective transcending the local context, to the national and international context.

Based on these premises, there is a growing recognition of the need to create the systems, the institutions, and the instruments which would help the movement towards this new economic and social order given the environmental context just mentioned. Information systems constitute one such instrument.

The preliminary recommendations of the Study Team contains three brief notes based on the postulates that DEVSIS is justified on the grounds of

- international equity, that the system will permit the sharing of information on socio-economic fields in a way that will permit a more equitable distribution of organized human knowledge;

- immediate international needs, that there is a general recognition of the imperative for a new international economic and social order to cope with long-term and recurring development crises that have global impact.

12 Reports Of the Sixties

The recognition of the need for global intersectoral, interdisciplinary development information systems and programmes is not new. We are familiar with the Lester Pearson report [8], which placed general emphasis on information and techno-
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ology transfer to the developing countries. The Graham Jones report [6] which is something of a continuation of the Pearson report, says:

"Successful industrialization requires the provision of a whole range of supporting services to augment the technical and managerial competencies of individual enterprises. The services include technical information and library services; surveys of industrialization possibilities; technological, social, and economic feasibility studies; investment project studies; preproject planning; applied scientific research and pilot plan development; market research; layout, organization and productivity improvements; standards and specifications; testing laboratories and quality control; equipment services; technical trouble shooting; technical management consulting; and extension services."

Several pages of the report are devoted to technology transfer to developing countries.

The series of conferences on the application of science and technology for development in Asia [1], Africa, and Latin America, also emphasised the sharing of knowledge between nations. Sir Robert Jackson's study of the capacity of the United Nations [5] identified the need for the establishment of an information system for UN's own development activities as a priority need. The report points out: "The present UN structure for development cooperation contains three levels of activity: (i) the development level... (ii) the executive level... (iii) the field level.... All three levels play significant roles in economic and social development... each substantive unit of the UN and some the Specialized Agencies plans and conducts its own programmes without significant references to the programmes of others". Following the report, the UN set up the Inter-Organisation Board for Information Systems. The setting up of a computer-based Current Register of Development Activities (CORE), is in progress.

The international symposium held in Berlin in November 1969, which was sponsored by the German Foundation for Developing Countries, made a strong recommendation for the establishment of development information clearing houses.

The comments and recommendations of the influential Conference Board, contained in its publication "Information technology: Some initial implications for decision makers" (1972), have now become common knowledge.

More recently, the Club of Rome, in its second report pointed out:

"All contemporary experience points to the reality of an emerging world system in the widest sense which demands that all actions on major issues anywhere in the world be taken in a global context and with full consideration of multidisciplinary aspects. Moreover, due to the extended dynamics of the world system and the magnitude of current and future change, such actions have to be anticipatory so that adequate remedies can become operational before the crises evolve to their full scope and force. If actions are to be anticipatory and effective, they must be based on a supply of information which is as complete and accurate as it can be made to be".
Current Realities

If there had been, over the past decade, the recognition by influential bodies, particularly international and intergovernmental organizations, of the need for development information system of international dimensions, why then action to establish such a global system was not initiated until 1974? Of course, there have been in operation a few international abstracting and indexing services in the economic and social science fields; more recently computer readable data bases have also become available in these areas. Most of these are discipline oriented, not mission-oriented: they are inadequate in coverage and scope with respect to development information; and most of them are not based on the concept of global participation of countries.

The DEVSIS feasibility report describes several surveys which indicate that little is known about development literature produced in developing countries, or about the 'grey literature' (government documents, reports, memoranda etc) produced anywhere. A fairly high proportion of the development literature produced in developed countries is abstracted and indexed many times over, both by secondary services and by individual organisations. This is an unsatisfactory situation leading to wastage of resources on the one hand, and the persons concerned with development planning and policy making having no reliable access to the information which is of interest and value to them most, on the other.

Until recently, there has been little experience and very few models of global information systems in which there was voluntary international cooperative participation in the design, operation and utilization of an information network. The International Nuclear Information Systems (INIS, 1966-1970) is the first example of decentralized input--centralised processing--decentralized product utilization. Then came AGRIS (1971-75). And now DEVSIS. In the meanwhile, through the programmes and projects of UNISIST (Unesco-ICSU programme for a World Science Information System) experience has also been gained in systems interconnection, compatibility, and convertibility.

The successful operation of these cooperative international information systems has demonstrated that the application of the "territorial" formula ensures the sharing of responsibilities and costs among nations on an equitable basis. This helps to eliminate duplication and to increase comprehensiveness of coverage of relevant literature. Countries have a national interest in bringing their own literature under bibliographical control; and once this is done, to submit information about that literature to a Central Unit for processing and distribution adds only an incremental cost which governments are increasingly willing to pay in order to regularly obtain information from other organizations and other countries. Thus, the experience of INIS and AGRIS is indicative of the feasibility of developing a mechanism for meeting the identified user needs which has not been achieved with the existing systems.

14 Genesis Of The Devisis Proposal

14.1 International Priorities

One might also ask why the sequence INIS, AGRIS, DEVSIS in the chronology of development of global information systems. International initiatives depend on international priorities. INIS came first perhaps because the superpowers were
looking for ways in which they could cooperate in the nuclear field and build up the trust and confidence that could lead to an eventual detente. AGRIS came next because of the importance of food to all mankind. Ultimately such decisions are taken by governments. Perhaps, governments will be moved to action by the concern over the protection of the environment or by the energy crisis. However, there is a strong plea that the next global information system should respond directly to the needs of the large international community of persons who are concerned with economic and social development, in planning and operating programmes, in evaluation and in research.

Proposal For A Development Information System

A plea and a proposal for a development information system are contained in a paper entitled "DEVSIJ: A development science information system" by John E Woolston (Director, Information Sciences, IDRC, Ottawa), distributed in January 1974. He proposed that "an effort should be made to build a cooperative information system with decentralized input/output making use of the organizational and technical experience of INIS and AGRIS and founded on the principles of UNISIST". He also proposed a schedule of action and indicated the role of the International Development Research Centre (Canada) in the programme [9].

The proposal received encouraging response from different groups, and an international conference was convened in Ottawa in June 1974 to discuss the project. General recommendations about various aspects of the system and the formation of a Steering Committee and a Feasibility Study team were made.

The Steering Committee at its first meeting on 16-18 October 1974 in Paris, adopted the following Statement of General Purpose and Objectives of DEVSIJ:

"In the overall interest of providing equal access to information, the general purpose and objectives of DEVSIJ should be:

1 (a) To improve access to economic and social development information to individuals and institutions, particularly in developing countries, and especially to those involved in the formulation and implementation of development activities in governments and intergovernmental organizations.

(b) To foster the building and utilization of national and international resources needed to meet this goal.

(c) To improve coordination between the existing development information, including library facilities.

2 Within the overall concept of evolving a future oriented programme for economic and social development information of broad scope, an international development information system (DEVSIJ) should be prepared, which would:

(a) Provide information services to users working in the development field at the national and international governmental and non-governmental levels (including the academic community) in developing and developed countries;
(b) Be responsive to the expressed needs of its users, and, following reviews and evaluation, to adjust to effective needs within a constantly evolving world context;

(c) Be responsive to appropriate technological advances in communications and to interconnection with other related systems, and thus contribute to meeting the priority information needs for the establishment of a new international economic and social order (General Assembly Resolution 3201 S (VI)).

3 DEVSIS should cover both published literature and unpublished documents and data. The system should be based on the concept of decentralized input, centralized merging, and decentralized output services; it should thereby help contribute to the development of adequate information infrastructure and resources at the national level.

4 DEVSIS should be managed within the United Nations System.

5 DEVSIS should be open to the participation of interested Member States, as well as of intergovernmental and non-governmental bodies concerned with problems of development.

6 DEVSIS should be developed within the conceptual framework of the UNISIST programme; its design should take into account the experience of other operational and experimental information, including library systems.

7 All countries should be encouraged to give consideration to development information as an important component in the formulation of both their national development policies and their national information policies.

Under the guidance of the Steering Committee a Study Team was set up which is responsible for developing the system design for DEVSIS. The team would also identify existing relevant activities and resources in both developing and developed countries; define technical aspects of the system, such as, scope, coverage, required outputs, input and processing procedures, etc; and examine the financial and legal requirements of DEVSIS and recommend alternative options for implementation.

In the first phase of its work the Study Team was made up mainly of individuals who have had direct or indirect experience with policy making, planning, and research; the members came from different countries and cultures. The preliminary recommendations regarding the categories of users, the scope, and organization of DEVSIS are briefly mentioned below.

2 Scope Of The System

21 Responding to the Needs of Policy-Makers: Planners and Researchers

211 Potential Users

The Study Team has tried to take into account the needs of

(a) Policy makers with respect to socio-economic development at
governmental and non-governmental levels, nationally and internationally;

(b) Planners - strategic, tactical, operational - of socio-economic development projects and programmes, including formulation of social and economic indicators, forecasting; and pre-investment studies at various levels; techno-economic and social surveys, including the scanning of the socio-economic and socio-political environment; and assessment and performance evaluation of projects and programmes;

(c) Researchers and teachers of socio-economic development subjects and those involved in management of research projects and programmes;

(d) Financiers who provide resources and technical co-operation for development projects and programmes. Likewise those who provide consultancy and advisory services; and

(e) Personnel concerned with information analysis and products thereof and those who provide support service to the categories of users mentioned above.

212 Information Needs

The Study Team consensus is that these groups feel the following needs:

(1) To better understand the present status and trends in the economies and societies for which they are taking decision and making plans, and the implication of these trends for the future;

(2) To have access to information on programmes and projects closely related - in content and intent - to those on which they are working, in order to have the possibility of benefitting from the experience of others; in their country or elsewhere, and to effect coordination of efforts;

(3) To receive digested background information on major trends in development philosophy and experience, probably in the form of short, readable monographs (supported, where appropriate by synoptic tables, graphs and charts); and

(4) To know where to go to get specialized information, data and statistics when particular needs arise.

22 Inferences

Following a detailed discussion of these priority needs, the DEVSIS Study Team has drawn a number of conclusions.

221 Organisation to capture unpublished information

The first conclusion that may be drawn for the statement of priorities is that DEVSIS must place a special emphasis on the capture of unpublished information.
Further projections (item 1) and programme and project reports (item 2) often now exist only in the internal files of ministries, banks and other institutions. This has implication for the organisation of DEVSIS which must be able to demonstrate that an institution that participates by making its own unpublished information available will enjoy compensating benefits by having access to the contributions of other institutions.

222 Access to full texts

The second conclusion is that DEVSIS must contain a well organised sub-system for providing rapid access to the full texts of the documents that it records. Since unpublished documents are not available in libraries around the world, all such documents reported to DEVSIS must be copied on microfilms or microfiches and sets of these placed at all major output stations in the DEVSIS network.

223 Indexing abstracting and data extraction

The third conclusion that can be drawn is that entries in the DEVSIS file, especially those relating to pre-investment (including feasibility) studies and project reports, should be indexed in depth and, as far as possible, should be abstracted in such a way that key data are immediately available from the computer record.

224 Methods of economic analysis and models

The fourth conclusion is that there is a high-priority interest in the methods and models used for calculating the effects of development actions (and of any changes in the parameters used), and for predicting trends in various sectors and sub-sectors of global, regional and national economies. DEVSIS should be particularly hospitable to information about such methods and models and about the computer programmes that are available for carrying out the calculations. Such records should necessarily include a notation of the source and availability (and, where appropriate, the cost) of obtaining the documents or programmes.

225 Information analysis services

Future predictions (whether quantitative, as in tables or graphs, showing supply/demand relationships, or qualitative as in assessments of the changing content of educational programmes) and digests (which again may be either quantitative or qualitative) imply the investment of intellectual resources on a large scale. The professional staff (and, hence, the cost) is far greater than that needed for a basic DEVSIS service. The fifth conclusion is, however, that DEVSIS should aim -- as soon as possible -- to build a service for digesting material of various forms such as

- information digests
- statistics
- forecasts.

Meanwhile, DEVSIS can, from its first days, provide referral to the organisations that offer services in these areas.

226 Links to other systems

And the sixth conclusion is that DEVSIS itself cannot meet all the priority needs, but, where it does not, it should provide a means of access to other sources of information...
The seventh conclusion is that the DEVSIS programme must involve a strong component to foster the building of the necessary national information policies and national information infrastructures to support the users, to exploit the services that DEVSIS will provide, to identify the gaps in available information, and to motivate authorities to fill these gaps [7].

23 Categories of information material

The following categories of information material are proposed by the Study Team as candidates for admission to the DEVSIS data base:

1 Basic Economic and Social Information and Data

1.1 Basic information and data: international and national levels.

Statistical and other factual information and data relating to economic and social conditions and phenomena (such as, resources, production, consumption, distribution, trade, and other transactions) as applied to the entire world, to regions of the world, or to particular whole countries.

1.2 Basic information and data: sub-national levels.

Same as for 1.1 but as applied to particular localities and to sub-areas within a country.

1.3 Information on existing social and economic situations: international and national levels.

Descriptive accounts and studies on the economic, social, political, and legislative structures and of the causes for underdevelopment and of factors favouring development, as applied to the entire world, to regions of the world, and to particular whole countries.

1.4 Information on existing social and economic situations: sub-national levels.

Same as for 1.3, but as applied to particular localities and sub-areas within a country.

1.5 Forecasts on trends: international and national levels.

Papers on trends in economic, techno-economic and social conditions extrapolated into the future, as applied to the entire world, to regions of the world, and in particular whole countries.

1.6 Forecasts on trends: sub-national levels.

Same as for 1.5, but as applied to particular localities and sub-regions within a country.
2 Theories Models and Methodologies

2.1 Models, Methodologies, Tools, and Techniques of study.

Papers on socio-economic models, econometric models, development indicators, methodologies, tools, and techniques (including computer programs) helpful in forecasting, planning, and other development studies, and evaluations of these.

2.2 Theoretical studies: international and national levels.

Theoretical and similar studies and evaluation of such studies on economic and social development and development policy formulations as applied to the entire world, to regions of the world, and to particular whole countries.

2.3 Theoretical studies: sub-national levels.

Same as for 2.1 but as applied to particular localities and sub-regions within a country.

3 Development Policy, Plans and Strategies

3.1 Statements of development policy

Documents issued by international, regional, national and local authorities and organizations, banks, funding and investment agencies, and political parties, defining or explaining their policies in relation to the pursuit of development goals.

3.2 Plans

Official plan documents, descriptive accounts of plans and statements issued by international, regional, national, and local authorities and organizations, banks, funding and investment agencies and political parties, detailing their development plans, programmes, resources allocations, budgets, time target, etc.

3.3 Reviews and evaluations of development programmes

Official and non-official commentaries, reviews and evaluations of the policies, plans, and programmes (For individual projects sec 3.5).

4 Studies on and for Development Tactics

4.1 Pre-investment studies and their evaluation

Pre-investment studies (including feasibility studies and market survey) and their evaluations, for specific development projects.

4.2 Tools for pre-investment studies

Papers on econometric models and techniques (including computer programs) useful for the elaboration and evaluation of pre-investment studies (including feasibility studies).
4.3 Development resources (general)

Studies on the availability of resources for development at global, regional, national, and local levels.

4.4 Development resources (specific)

Studies identifying particular development resources, and guides and directories for such resources information.

4.5 Operational experience (general)

General reviews and evaluatory papers on experiences in implementing development projects and programmes, including managerial, financial, legislative and administrative aspects. Aspects of coordination of development activities; institutional arrangements and cooperation.

4.6 Operational experience (particular projects)

Descriptions and progress reports of particular development projects and programmes; reviews and evaluatory reports of experiences in particular projects, including managerial, financial, legislative, administrative, coordination and control experiences.

5 Studies on Consequences of Development Efforts and Activities

5.1 Economic impact: international and national levels

Analytical studies and interpretations of the economic impact of development policies, programmes, and projects, at the international, regional, and national levels.

5.2 Economic impact: sub-national levels

Analytical studies and interpretations of the economic impact of development policies, programmes, and projects, at local level and at the level of sub-areas within a country.

5.3 Social impact: international and national levels

Analytical studies and interpretations of the social impact (including political and cultural) of development policies, programmes, and projects, at the international, regional, and national levels.

5.4 Social impact: sub-national levels

Analytical studies and interpretations of the social impact (including political and cultural) of development policies, programmes, and projects at the local level and at the level of sub-areas within a country.

5.5 Evaluations

Evaluatory reports of the results and achievements of specific development strategies, programmes, and projects.
Exclusions: Information qualifying for admission to DEVSIS under any of the categories mentioned above would, nevertheless, be excluded if it

either (a) is trivial or redundant;

or (b) contains exclusively technical information, even when such technical information has been collected for, or is a result of, particular development programmes or projects.

The admission of sectoral information (as opposed to non-sectoral or cross-sectoral information) may be limited to that defined as directly pertinent to the DEVSIS mission. The Study Team has drawn up a table of proposed limitations in regard to sectoral information for each category listed above.

The categories of information to be admitted and excluded from DEVSIS are now being checked with actual documents with a view to understand the problems of identification, and improve the definitions, categorization, etc.

24 Devisis Files

Information pertaining to development is found in many sectors and the existing information services covering some of the sectors may overlap with DEVSIS. Where this is identified, the recommendation is for close cooperation with those systems — if they are internationally based and providing comprehensive coverage — in order to draw clearer boundary lines between those systems and DEVSIS.

Need has also been felt to make a distinction between information generated in response to development mission, and the more aggregated information from other sectors which is also used by the decision maker. The Study Team has recommended that DEVSIS contain, to begin with, two data bases (File 1 and File 2). These files would form the basis for the major printed products of the system, namely, Devindex and Devprofile. The two files are made up respectively as follows:

(1) File 1 —A comprehensive file with bibliographic references, abstracts and extracted key data, which would include references to such materials as computer programs, feasibility studies, project evaluation reports, market studies, etc. The file should be an integrated file, but it should involve multiparameter indexing to permit effective retrieval of specific information; for example, by type of information, by form of presentation, by subject, by sector, by geographical region, etc. The scope criteria is intended to ensure that, as far as possible, this integrated file would reflect the priority needs that have been outlined. The scope criteria would apply to all types of information entered into this file. — (FILE 1)

(2) File 2 — A data file on specialized sources and services available in the world dealing with topics relevant to socio-economic development. This file would be constructed to facilitate referral of enquiries to appropriate other sources and services.

25 Language

Estimate of the quantity of literature produced and used in the developing world — Asia, Africa, Latin America — indicates that the major languages which DEVSIS will
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have to handle are: English, Spanish, French, and Arabic. To begin with, DEVSIS would be hospitable to English, Spanish and French. In due course, capability for computer processing of Arabic characters would be developed.

26 Products/Services

The principal outputs are expected to be available on magnetic tape as well as in printed form: Devindex, the main bibliography of current development literature, with indexes; and the file on magnetic tape. It is recognised that users in developing countries often face difficulties in having access to documents. The Central Unit will, therefore, maintain a microfiche back-up file for all documents and reports not restricted by copyright law, and copies of documents can be obtained from this file. Participating centres can use DEVSIS output (on magnetic tape, printed form, and on microfiche) to produce specialized products and services for their own user communities. For example, bibliographies on specific subjects, SDI service, area bibliography, etc.

3 Analytical Study of System Components

The technical aspects of the data base, of the information processing, and of the output have been considered in some depth and detail by the Study Team. Experience gained with other global systems and the specialised characteristics of DEVSIS have been taken into account. Giving details of the recommendations here would amount to reproducing a good part of the feasibility study report! I shall only mention the titles of the chapters in the report which deal with the technical aspects.

Section B: Technical Aspects: The Bibliographic File (File One)
Chapter 11: The DEVSIS record
  12: Parameters for indexing and retrieval
  13: The Creation of the File
  14: Outputs from the DEVSIS Central Unit
  15: Full-text service from the DEVSIS Central Unit
  16: Outputs from participating centres
  17: The DEVSIS Network

Section C: Technical Aspects: The Referral File (File Two)
Chapter 18: A centralized operation
  19: Content and format of the referral file

4 Organizational Aspects

The institutional framework of DEVSIS should be established to ensure the participation of:
- the producers of the information that will be sought for the DEVSIS data base;
- the major users of the information that will be provided from the DEVSIS data base.
The institutions likely to be involved include international and regional organisations concerned with development, national governments, banks and other organisations financing development investments, public and private foundations, and research institutions.

We need also to envisage the possibility that DEVSIS may be financed by a consortium of organisations, and that the organisations providing resources — financial or otherwise — will seek a voice in the governing of the system.

The question then is — how can all these institutions best be brought together in one network?

There is clearly a need for the kind of mechanisms that only the United Nations system can provide, particularly:

- mechanisms for communicating with government and enlisting the participation of governments;
- mechanisms for providing long-term financing according to a formula of fair distribution of costs to governments;
- mechanisms for enlisting the necessary political and public interest, for example, by resolutions of the Economic and Social Council and the General Assembly of the UN;
- mechanisms for associating DEVSIS with other major international information programmes.

One of the working groups at the Third Session of the DEVSIS Steering Committee in July last, considered global organisation and financing of the System. While accepting that it would be premature to specify a long-term solution for the management of DEVSIS, the Working Group noted the desirability of eventually incorporating DEVSIS within the regular programme and budget of an appropriate agency; given the present structures, the most interesting candidates would be:

(a) an agency with broad responsibilities for economic and social development. At present this could be the UN Department of Economic and Social Affairs (ESA), or the UNDP. If the report of the Group of 25 is implemented, it could be the proposed UN Development Authority (UNDA).

(b) an agency with broad responsibilities for information programmes. At present this would be Unesco with particular reference to its UNISIST activities which are now being expanded into the economic and social sciences.

(c) an agency with the appropriate personnel and equipment resources acting on behalf of the UN system as a whole. At present this could be, for example, the ILO making use of the facilities of ICC.

(d) an inter-agency body with general responsibilities for information systems; at present this would be the IOB, but it is put at the end of this list because such a solution would be placing the activity at one step more removed from direct control by Member States.
The Working Group noted that there was interest in the secretariates of ESA, Unesco and ILO for possible future responsibilities for DEVSIS.

For the policy-making body, the Study Team recommends the creation of a Governing Board with broad representation, including sponsoring agencies as well as representation, on the basis of geographic regions, of participants providing input to the system as well as users.

The DEVSIS concept necessarily involves the production of a central file. It may be produced by merging any number of regional or national inputs, but there must be a central operations unit to handle the physical production of the comprehensive file. Technical skills and a computer capability must be available at the central operations unit. An arrangement like that of AGRIS may be possible — with the secretariat and management functions carried on in one organisation and the computer processing in another.

In reviewing the management functions of the Central Secretariat, particular emphasis is placed on providing support to the technical and financial advisory bodies, on network support and on cooperation with other international information systems.

5 Environmental Aspects: Supporting Programmes

In order to ensure smooth technical functioning of the system various standards, manuals, guidelines, authority lists, indexing, vocabulary control tools, etc are essential. The existing tools, particularly the ISO, and UNISIST formulations and used in other international information systems have been taken into account. Wherever found necessary, programmes and projects for development of new tools or for improving existing ones have been suggested and/or initiated.

The role of participating national centres and guidelines for selecting such centres have been outlined. The programmatic role of regional centres with respect to areas where national information infrastructures are yet to develop has been identified. Recognizing the need to keep abreast of developments in information processing and computing technology especially in regard to input devices and small scale computers, the DEVSIS would make available to the national centres a body of knowledge and advice developed centrally and regionally when making decisions about choice of computer hardware and software.

6 Economics of the System

Based on past experiences of operating global information systems of a pattern similar to the one proposed for DEVSIS, estimates of staff required to perform the various tasks and some of the cost elements are given in the sections dealing with technical aspects of the system. When DEVSIS goes into operation, may be three years from now, more experience would have gained with the interim organizational model (See Sec 7), the number of likely participating centres would be known more accurately, and information on the extent of usefulness, efficiency and economy of input and processing devices, such as the OCR equipment now being experimented with, would be available. There may also be other information technology developments which may prove useful to incorporate in DEVSIS. Some of these features would necessitate revision of the cost of operating the system. Here, we are considering mainly the cost of
operating the Central Unit, the Central Secretariat and the services they provide. It will be remembered that the cost of making inputs to the system would be shared by the participating centres in different countries. The report indicates only the facilities required for national and regional centres, because the cost and the staff will vary with the volume of material to be processed, the facility and equipment already available and the size and interests of the user community.

7 Development Programme and Implementation Schedule

The ultimate objective is to get DEVSIS incorporated into the programme and budget of a UN organization. (The location of the Central Unit in a developing country is not also ruled out). But considering the nature of the cycle of movement of proposals, such as that of DEVSIS in UN bodies, and the budgeting process, it may be three to six years before DEVSIS becomes fully operational as an integral programme of the UN system. For the interim period, an organisational model which would locate DEVSIS Central Unit within a UN organization and also provide useful experience and opportunity to study a little more realistically the implementation of the various suggestions and recommendations, and user reactions, three options have been considered: The UN Department of Economic and Social Affairs (using the computer facilities and technical resources of IAEA), Unesco (using its own computer facility or that of ICC in Geneva), or the International Labour Organization (using the computer facility of ICC).

The cost of the three-year programme may come to $1.6 to $2.0 millions depending upon which components of the system are put into operation first, and the rate of development of the system. The rate of development would be influenced by the number of national participating centres involved during the three-year period. The financial estimate includes support for planning national participation.

Several alternative sources for the extra-budgetary finance of the interim operation have been considered: e.g. UNDP support for a global project, funding through a trust or a consortium established by several interested organizations, or a combination of these.

The jobs to be done during the period to enable the start of regular production cycles are defined and the staff required to these jobs is also identified. The phasing of these jobs in various combinations to provide a number of operational options, at different costs, during the interim period, is delineated.

8 Conclusion

The objectives of DEVSIS are broad and laudable in that the achievement of the objectives would help the establishment of the new economic and social order. Right from the beginning the system has placed emphasis on service to developing countries, and on effective national and regional participation, particularly of the developing world, in the development and operation of the system. DEVSIS would also collaborate with other international bodies such as UNESCO and regional institutions in building up strong national information infrastructure which, in turn, would contribute to an efficient and effective operation and utilization of DEVSIS in the long run. The standards and guidelines for information handling and systems interconnection developed under UNISIST auspices would be utilized in DEVSIS.
### Comparison of some Features of INIS, AGRIS, and DEVSIS

<table>
<thead>
<tr>
<th>Feature</th>
<th>INIS (1971- )</th>
<th>AGRIS (1975- )</th>
<th>DEVSIS (proposed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>of subjects covered</td>
<td>Nuclear science, and technology—hard sciences; interdisciplinary, but fairly well defined</td>
<td>Agriculture and allied fields—interdisciplinary, but less well defined than nuclear science and technology</td>
<td>Economic and social development—a large part soft science; cross-sectoral, and more interdisciplinary and less well defined than agriculture</td>
</tr>
<tr>
<td>Orientation</td>
<td>Serves predominantly research workers, engineers and technologists</td>
<td>Serves predominantly research workers, teachers, and to some extent, agricultural development planners, governments</td>
<td>To serve predominantly policymakers, planners, financiers, researchers, and information analysts concerned with socio-economic development at all levels, particularly in developing countries.</td>
</tr>
<tr>
<td>Types of documents covered</td>
<td>Books, articles, reports, theses, etc, mostly produced by research workers, engineers and technologists</td>
<td>Similar to that of INIS</td>
<td>In addition to books, articles, theses, etc greater emphasis placed on capturing the unpublished literature, such as project reports, pre-investment reports, administrative reports, etc.</td>
</tr>
<tr>
<td>Major part of the input from</td>
<td>A few developed countries</td>
<td>About 60 per cent from developed countries; about 40 per cent from developing countries at present</td>
<td>Mainly from developing countries; specified type of information from developed countries</td>
</tr>
<tr>
<td>Language</td>
<td>Predominantly English as the carrier language. French and Russian versions of INIS thesaurus produced</td>
<td>Predominantly English as the carrier language. Problems of using other languages may arise in due course</td>
<td>English, French, and Spanish proposed as carrier language to begin with; Arabic may be next in line.</td>
</tr>
<tr>
<td>Terminology of the field</td>
<td>Fairly well defined technical terminology</td>
<td>Less rigorous than for nuclear science</td>
<td>Much less exact than in nuclear science and agriculture. Often difficult to find one-to-one equivalents for terms in different languages. Words often carry connotation which reflect the predominant social philosophy of the society in which they are used.</td>
</tr>
<tr>
<td>Universality of concepts/ideas</td>
<td>Concepts are fairly universal</td>
<td>Less universality of concepts than in nuclear science</td>
<td>Much less universality; the economic, cultural, and demographic environment affects the universality of ideas.</td>
</tr>
<tr>
<td>Output products and services</td>
<td>Mainly list of references (Atomindex); microfiche doc back-up</td>
<td>Level 1: List of references (Agrindex)</td>
<td>List of references with abstract and reference service, initially (Devindex). Listings for a region may be provided. Digests, compilation, information analysis, and synthesis, forecasts, etc, in due course. Microfiche document back up.</td>
</tr>
<tr>
<td>Database (computer files)</td>
<td>Mainly citations; inclusion of abstracts under consideration</td>
<td>Level 2: Specialised subject services: abstracts, digests, etc. (proposed)</td>
<td>To include abstracts for the documents in the computer file. A computer-readable inventory or information sources in the field, including computer software packages availability information.</td>
</tr>
<tr>
<td>Input communicating medium</td>
<td>Magnetic tape, paper tape, worksheet</td>
<td>Magnetic tape, paper tape, worksheet</td>
<td>(To be decided)</td>
</tr>
<tr>
<td>Number of items processed per year</td>
<td>About 70,000</td>
<td>About 250,000 ultimately</td>
<td>100,000-200,000 (?)</td>
</tr>
<tr>
<td>Number of input centres</td>
<td>About 40 at present</td>
<td>Mainly CAB, CAIN, a few regional centres and national centres at present</td>
<td>May be over 100.</td>
</tr>
<tr>
<td></td>
<td>Dispersal of information generating centres</td>
<td>Organization</td>
<td>Cooperating/cosponsoring bodies</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>13</td>
<td>In each country concentrated in a few centres</td>
<td>Decentralized input-centralised processing and decentralised input use</td>
<td>IAEA, governments</td>
</tr>
<tr>
<td>14</td>
<td>In each country dispersed in several institutions and projects</td>
<td>Similar to that of INIS</td>
<td>FAO, governments, regional centres</td>
</tr>
<tr>
<td>15</td>
<td>In each country, dispersed in a large number of institutions and projects</td>
<td>Similar to that of INIS. Strong emphasis of participation of regional centres.</td>
<td>A UN body, governments, intergovernmental organization, financing institutions (?)</td>
</tr>
</tbody>
</table>
References


2. DEVSIS, STUDY TEAM. Working papers. 1975 (restricted distribution).


7. JONES (G). Role of science and technology in developing countries. 1971. P 122-123.

8. NEELAMEGHAN (A). Discussion paper [Role and impact of regional development information system] for the DEVSIS Steering Committee, Session 2, Paris 28-29 April 1975.
