PLANNING AND DESIGNING NATIONAL INFORMATION SYSTEMS

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Introduction

In many developing countries of the world there have grown up substantial structures of scientific and technological research. These patterns include many disciplines and technologies and involve a wide variety of academic, governmental and industrial research organizations, all with their special information requirements. The major importance of effective documentation and information to support research and development work within these structures is universally recognized and, over the years, complex, often highly sophisticated services and facilities to meet these needs have come into existence in virtually all significant areas of science and technology. These facilities are supplemented by various secondary information services, some of which may cover various individual sectors of the national literature and others, such as BIOSIS, the Chemical Abstracts Service, etc. which cover the international literature.

Because the scale of scientific and technological activity is so great in many developed countries each subject area has tended to become largely self-sufficient for its documentation and information needs and, over time, in many countries a substantial degree of understanding and cooperation has grown up among the various components of the network of services, libraries, etc. serving particular subject areas. In some developed countries, therefore, there may be little overall planning or coordination of services or, indeed, little specific need for it. In other countries, however, notably the USSR, there is a high degree of overall central control dictated partly by language difficulties, the need for internal self-sufficiency and other political and social considerations.

In contrast to the situation in developed countries in developing countries scientific and technological information in developing countries is a resource equally indispensable for economic and social progress, but its availability is often spread much more thinly over various agencies acting more or less independently of each other, often on a very modest scale and with little overall director or coordination. Similarly, the high cost of many secondary information services effectively places them beyond the reach of many potential users in these countries. The scale of activity in particular areas of science and technology is frequently too small to permit internal self-sufficiency for information resources

and there is commonly a correspondingly greater dependence on a very small number of non-specific central facilities, especially academic libraries.

In most developing countries today, there is a general recognition of the necessity for central coordination and improvement of their internal information resources. Such coordination offers a means of better pooling and use of available budgetary resources and of extracting maximum benefit from scarce information resources for the greatest number of users. It can also enable maximum advantage to be derived from imported information, a relatively inexpensive way of obtaining knowledge derived from what may often be extremely expensive research done elsewhere.

Various agencies have been involved in providing assistance in setting up or improving information systems in developing countries. Principal among these has been UNESCO, under which the UNISIST system has been established to provide a conceptual framework and specific recommendations for the design and development of information systems. Within this system, the establishment of a state-controlled national documentation centre acting as the main body with responsibility for coordinating national information resources into a national information system is central to the AGRIS, UNIDO, DEVSIS and INIS concepts.

It is particularly in the context of the developing countries, that this concept of the national information system has developed. At present, there are rather less than 30 formalized national information systems. Some of these are in centrally organized developed countries, but most are in developing countries and most have been set up only within the last 10 years. The concept is likely to prevail in other developing countries in which information facilities have not yet been rationalized into a coordinated system and the number of such systems is likely to increase progressively in the future.

The overall aim of a national information system is to promote the availability and flow of information of all kinds to all sectors of the community that need it. It will utilize and build on the various existing documentation and information resources of a country as a foundation and will involve the following two basic aspects:

1. The establishment of an organizational structure for centralized overall control and direction of the system.
2. The coordination, improvement and systematic development and supplementation of existing facilities and services (e.g. libraries and special information services in academic, governmental and industrial research organizations).

Centralized direction involves the creation of a national information policy with specific short- and long-term objectives for the development of the system. This policy will need to take account, firstly, of the national interests

essentially as extensions of a wider community of world systems, with the associated need for maximum compatibility among systems and cooperation at all levels.

Results of a recent UNESCO study (UNESCO, 1973) in which the organization of information centres and services in various developed and developing countries were examined, underlined the marked differences that existed among them. In 11 out of 13 developed countries, there were various degrees of governmental responsibility for overall management and coordination of information services. In many developing countries, on the other hand, there were libraries, but no documentation centres, and the emphasis was more on supplying primary publications rather than other forms of processed information. An important exception, however, was India, which had a well organized and integrated national system.

In what follows, therefore, the basic pattern of a national information system proposed assumes the UNISIST concept as its model and its context developing countries.

Planning national documentation and information systems

Initially, the national information system will embody existing library and other information stores and facilities as its basis. The essential new feature that must be added to establish a national system is:

(a) A line of administrative and budgetary control of the system system extending through a national focus to ministry or government department level.

(b) A line of executive control of the system extending up to a national documentation centre with responsibility for activating and coordinating the components of the national system.

Such a system, which may initially operate on a very small scale if the infrastructure of the system is small, can provide the necessary on-going technical basis for developing the national system in accordance with needs over time, can provide a national forum for the consideration of documentation and information needs and problems, can provide a basis for enlisting international or other aid in systems development and, finally, can effectively promote better awareness of the importance of scientific and technical information and the facilities available at all levels.

The initial step in establishing a national information system is to set up appropriate planning machinery. This might take the form of a team (preferably small) of experts in information and documentation work or with other relevant background knowledge and experience, and including one or more experts seconded by arrangement with such agencies as UNESCO, IDRC, etc. This would constitute the planning group, which would work to terms of reference and timetable set by a state-appointed committee of representatives of government and principal user groups. The planning group would make recommendations to this committee for implementation.

1. Assessment of information needs and priorities

(a) Identification of documentation and information users and user groups, with data on personnel numbers and distribution, in:

Government ministries, departments and agencies
Public utilities (transport, sanitation, water supplies, etc.)
Socio-economic services (public health, education, housing, labour, etc.)
Government research and development organizations (including agriculture, use and management of natural resources, etc.)
Industry
Universities and academic institutions

(b) Assessment of short- and long-term trends in information needs among these classes of users in terms of primary and secondary information resources, equipment, premises, etc. as indicated by state investment policy in different areas of science and technology, forward projections of research projects and activities, anticipated changes in personnel numbers, etc.

(c) Assessment of budgetary priorities for expenditure on information services among these classes of users, including ratios of expenditure on documentation and information and information services in relation to overall departmental budgets.

2. Assessment of existing information facilities and services

Including:

(a) Itemization of information stores (libraries, documentation centres, archives, etc.) and their principal users.

(b) Itemization of information centres (including industrial information or other specialized centres, referral services, etc.) and their principal users.

(c) Data on stocks of books, journals, etc. held in information stores.

(d) Data on services provided (library loans, micro- or photocopies, enquiries received, secondary information outputs etc.).

(e) Data on numbers of personnel employed in information stores and centres, with details of functions, qualifications and experience.

(f) Data on premises and specialized equipment, reprographic facilities, etc. in libraries or information centres.

(g) Details of regional or international arrangements for obtaining, providing or exchanging information.

(h) Details of printing and publishing facilities and publishers.

(i) Details of budgets for the various information facilities and services in terms of absolute figures and as proportions of R&D budgets.

(j) Data on information flow among the various information units within and outside the country.

(k) Arrangements (if any) for obtaining feedback from users on service efficiency and on services required, and the views of representative samples of users.

(l) Details of existing planning or development policies.

3. Identification of avoidable duplication among existing services.

4. Identification of gaps in existing services that need to be eliminated.

National information system components

These will vary in scale with requirements, but the basic elements of the system will include:

1. A government ministry or department responsible for overall budgetary allocation and political control of the system.

2. A national Focus. The national committee comprised of representatives of government, academic and industrial organizations, administrators, information users and producers with administrative responsibility for overall planning and coordination of the national system.

3. National Documentation Centre. The main national organization with executive responsibility, under the national Focus, for control and coordination of the national system.

4. Network of specialized documentation units and sub-centres. These may already exist, or will be created progressively as need indicates and funds permit. They may be located in university libraries, research institute libraries, etc.

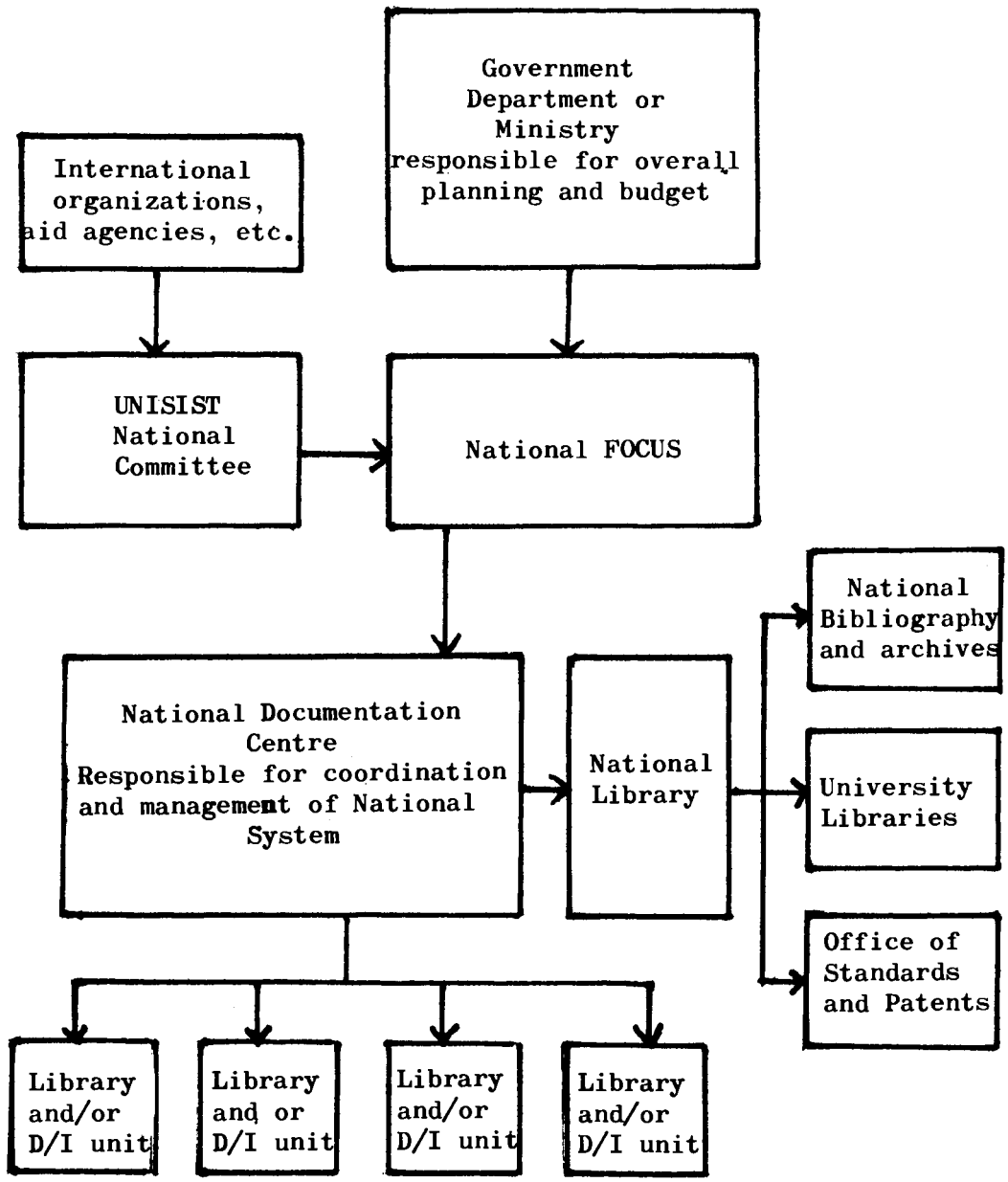
5 National copyright library

6. Network of specialized libraries. These will include libraries of research institutes, professional associations, patent and standards libraries, etc.

7. Specialized documentation centres. These may include referral or other centres engaged in document analysis.

This scheme is shown graphically overleaf.

ELEMENTS OF A NATIONAL INFORMATION SYSTEM



In this scheme, the national Focus may be associated with a UNISIST national committee, thus giving it a direct link with aid and advice from outside the country.

In planning a national system, the task of the planning group is to design a system within these components. The new elements initially to be added to what was there before will be (a) the Focus (b) the national documentation centre and (c) specific measures to coordinate the network of components. The information obtained on national information needs and facilities will provide the basis for short- and long-term design proposals, methods and systems projections and for assessing the changes in the present structure needed to achieve the agreed overall structuring, coordination links and central control in terms of finance, premises, equipment and personnel.

System design may take the form of stepwise phasing-in of different components and methods over time. The most important link in the system is the National Documentation Centre. This may be large or small, depending on the overall size of the infrastructure to be coordinated and the scope of its own information activities. Its personnel should include those with special training in information science and it will work in close association with the national Focus. The Centre may be associated with a large library, though this is not essential. If attached to a library it may itself provide information output in the form of abstracts, titles, etc., or may forward requests for information to appropriate information sub-centres.

Functions of a National Documentation Centre

Depending on its scale, the functional responsibilities of a national centre might include:

1. Implementation of policy decisions on national information services coming from the national Focus.

2. Coordinating and strengthening links among components of the national information system and monitoring system performance.

3. Acting as a referral point and coordinating link between the national system and regional and international systems.

4. Acting as the main national centre for information and consultation on the theory and practice of documentation and information. This would include responsibility for monitoring developments in methods and techniques of handling information on behalf of all units in the national system.

5. Standardizing procedures and methods for handling information within the national systems and for developing maximum compatibility with international systems.

6. Acting as a clearing house for enquiries relating to the scientific and technological literature from within and outside the country.

7. Provision of information output of various types, e.g. the national bibliography, information digests, guides to information sources, abstracts, titles, etc.

8. Coordination of input to such international information systems as AGRIS and DEVSIS.

9. Training of personnel in information work, including organization of training courses for students and practising scientists.

Within a national system, necessary information resources for research managers, policy makers and planners and which may be embodied in the national system may include:

1. A national bibliography. A list of all significant non-classified government publications and documents, both conventional and non-conventional, and all copyright literature deposited in the national library.

2. A union catalogue. A list of all serial publications taken by the various libraries within the national information system, with the location of each item.

3. An inventory of national research and development projects. Data elements for such an inventory might include:

   Project title
   Personnel
   Institutional affiliation
   Type of research (e.g. fundamental, applied, developmental)
   Start and projected end date of project
   Keywords or other description of the project for index purposes

Sources of international aid for information systems

For many years now, various international bodies have been dedicated to providing aid to developing countries to help build up their information resources. At one time the emphasis was on the transfer of information by provision of services and output from elsewhere, but is now much more on developing national information infrastructures designed to achieve as much national or regional independence and self-sufficiency in information resources as possible.

For developing countries, aid and advice from various international agencies can be crucial to the successful development of national information systems. The most important international agency is UNESCO, supported by the UNISIST programme and the creation of UNISIST National Committees within member countries to work in collaboration with national focal points. In addition to UNESCO plus the support of UNDP funds, FAO coordinates aid for agricultural information systems within the AGRIS framework, and UNIDO for industrial information systems. Various national aid organizations also exist; these are set out in Chapter 14.

Regional information systems

National systems may be associated in one or more subject sectors with regional documentation and information centres controlled by countries with common geographic, linguistic or geopolitical ties. Such jointly operated centres can enable participants to have access to equipment, translation facilities, expensive primary publications, magnetic tape services and other benefits they could not enjoy independently. National documentation centres and national information systems will need to be integrated into joint systems of this kind.

Training in information science

A national information system will depend for efficient operation on trained personnel. Information science is now a recognized discipline and many developed countries now have well established training courses within their academic structure. Developing countries have great need for cadres of trained personnel. The easiest means of developing them is to make use of training facilities provided in and in many cases funded by the developed countries or with the aid of UNDP funds or such agencies as IDRC in Canada or the British Council in the UK.

The need to ensure that the scientific or other communities in countries are adequately informed about information resources and their use must also be considered. The organization of short training courses, lectures, etc. should fall within the responsibilities of National Documentation Centres.

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