GREY LITERATURE AND THE DEVSIS-BOTSWANA PROJECT : THE CASE OF THE NATIONAL INSTITUTE OF DEVELOPMENT RESEARCH AND DOCUMENTATION.

Introduction

All over the world, practitioners and teachers in the field of information, have written a great deal about this baffling 'creature' we call 'grey literature.' The literature provides us with a suitable definition of grey literature, as being "the material which is not available through normal book selling channels. As well as being the subject of haphazard or specialised distribution arrangements. It also has a number of other distinguishing characteristics - small print runs, variable standards of editing and production, poor publicity, poor bibliographic control ... and poor availability in libraries. It has another characteristics; namely that it contains information likely to be of use to a considerable number of people. It is a costly public asset going largely to waste."[1]

These documents, which include feasibility studies, survey results, consultancy reports, project documents, evaluation reports, minutes of meetings, conference papers and research findings do contain information which is vital in a nation's socio-economic planning and development.

Generally in Africa, the fact that several documents are not published can be attributed largely to the state of the publishing industry, which is still in its infancy. It is found that with the exception of South Africa, Zimbabwe, Kenya and Nigeria, there are very few large publishing companies in the continent. The publishing industry is still at the rudimentary stage, and it has not attained the level of sophistication which is exhibited in the developed world. Again, many of the publishing companies are not well organised to facilitate easy procurement of manuscripts. Therefore, authors who submit their manuscript for publication, often have to adhere to unnecessary and excessive formalities and even the terms offered to them are unattractive and unacceptable. It can be argued however, that African publishers also do face problems which impede the development of the industry. Very often, they do not have adequate capital to finance their businesses and they encounter difficulties in obtaining import licences for the importation of essential inputs, such as paper and machinery. The picture painted here, dismal though it may seem, makes the acquisition of documents in Africa generally, extremely difficult and frustrating.[2]

However, all these problems mentioned above, do not as pointed out, "negate their value as sources of useful information. On the contrary, studies have shown that a high proportion of unpublished reports are used in both basic and applied research. The mere fact that some materials have been published does not necessarily mean that they are more important than the

unpublished. They provide current and timely information in the sense that they are normally issued in the same year or month following the inception of the work reported.[3]

Indeed, the importance of grey literature has necessitated the various efforts being made by information handlers to have it bibliographically controlled to ensure its being effectively disseminated. This realisation, encouraged the National Institute of Development Research and Documentation of the University of Botswana, to establish within its framework an information system known as DEVSIS-Botswana, which is the main thrust of this paper.

The History of the National Institute of Development Research and Documentation (NIR)

The National Institute of Development Research and Documentation (NIR) was established in 1975 as a documentation centre at the University of Botswana. It developed into a full research Institute three years later. The Institute's objectives are three-fold and these are:

1. to promote, co-ordinate and conduct research on issues of socio-economic, environmental and cultural development affecting Botswana;

2. to develop the national research capacity within Botswana; and

3. to document, publish and disseminate the results of such research.

In order to accomplish these objectives, the Institute has been actively engaged in launching various research projects, organising seminars and conferences, mounting short training programmes and workshops with a view to increasing the research capacity of Botswana.

The Institute's research activities are focused on the major theme of rural development with special reference to :

1. Agriculture
2. Education
3. Environment
4. Health and Nutrition and
5. Gender issues.

In the field of documentation, the Institute's Documentation Unit is playing a leading role in providing information services to the researchers of the Institute and the University, and to other scholars both within and outside Botswana. It collects, processes, and stores information, mainly unpublished, about the

socio-economic development of Botswana, and disseminates it to public institutions, private organisations and interested individuals. It needs mentioning, that the Institute is part of a number of national and international networks which link together major research and documentation institutes dealing with problems of development.

Therefore, in attempt to improve the collection and dissemination of development literature on Botswana especially, the Institute initiated the Devsis-Botswana project.

The DEVSIS concept

The Development Sciences Information System (DEVSIS) is a concept that dates back to the mid - 70's when various international agencies, including the International Development Research Centre (IDRC) came together to sponsor the establishment of a system that would help meet the information needs of planners and decision-makers responsible for economic and social development.

The concept was, never, however implemented as a global one that it had been envisaged to be. Instead, a number of national and regional development information systems evolved out of the programme.

DEVSIS-Botswana is one example of the national information systems. At the regional level, and of immediate relevance to DEVSIS-Botswana, is the Pan African Development Information System (PADIS), created under the aegis of the United Nations Economic Commission for Africa (ECA) in Addis Ababa, Ethiopia. PADIS is a development information system for Africa which was established to serve as a conduit for information and data for development, centred around national, sub-regional and regional networks, to which all ECA member states would voluntarily contribute information management experiences. The establishment of PADIS therefore necessitated the setting-up of national networks of which DEVSIS-Botswana is one.[1]

The Origin of DEVSIS-Botswana

In 1981/82, Botswana and the other members of the Southern African Coordinating Conference (SADCC), now called the Southern African Development Community (SADC), recognised the importance of information as a vital resource for achieving economic and social goals.

They decided to establish a regional development information network to further the strategic economic objectives of SADCC, to be called the Southern African Documentation and Information

System (SADIS). It was to put in place an organizational and technical structure at the regional and national levels that will aim at facilitating the sharing of information within and outside the region.

There was no doubt that the success of SADIS would depend on the extent to which each member state was able to develop the necessary infrastructure to facilitate its own national planning requirements as well as its full participation in the regional system. It happened that Botswana was the first country to take the necessary steps towards the establishment of a national infrastructure through the initiative of the National Institute of Development Research and Documentation. A project proposal was approved by the Ministry of Finance and Development Planning and submitted to the International Development Research Council (IDRC), which agreed to fund the project.

Objectives of the Project

The project agreement was signed in 1984 and it was to enable the Institute to organise the national economic and social development information in support of the planning process in Botswana, particularly with reference to the priority for development in the communal areas and to strengthen Botswana's capacity to participate in the regional PADIS network and in the proposed SADIS programme.

The specific objectives were:

1. to collect, organise and disseminate Botswana's national information and documentation related to its economic and social development;

2. to participate in the regional PADIS network and more specifically in the PADIS - DEV programme;

3. to train the Institute's staff in the organisation and operation of a specialised documentation centre ; and

4. to determine the computer equipment, staff and training that will be needed in order for the Institute to carry out its mandate as the primary national focal point for all information and documentation in the country and to prepare for it to participate in regional networks such as SADIS and PADIS.

Implementation of the DEVSIS-Botswana Project

a) The manual processes

In order for NIR to participate in the PADIS system as a national focal point, the PADIS methodologies of processing documents had to be adopted. This involved the use of a special cataloguing, indexing and abstracting worksheet designed by PADIS. It also involved the use of the OECD Macrothesaurus for indexing. NIR had hitherto used a system designed in-house. Each document could have any number of keywords. Normally, as well as producing two or more cards if the number of authors warranted, the practice was also to produce as many cards as there were keywords. A lot of time was spent producing these cards. There was neither time nor sufficient staff to carry this out. Backlog and space were key problems.

Staff at NIR were trained locally to use PADIS methodologies, with one member of staff being trained in Addis Ababa. After this training, NIR began processing and sending their worksheets to PADIS for inclusion in the PADIS-DEV database - which is a bibliographic reference database for economic, technological and social development information on Africa. This was done whilst at the same time maintaining the original NIR mode of processing documents. Two systems were actually being used side by side resulting in a lot of time being wasted, and ultimately, it was decided to use only the PADIS methodologies.

b) Computerisation

As noted, one of the objectives of the DEVSIS-Botswana project was to determine the computer equipment, staff and training needs for NIR to become an effective focal point for all information and documentation centres in the country and to prepare for it to participate in regional networks such as SADIS or PADIS. Having done that, the system would then be computerised to ensure that all the information collected was well organised and accessible.

The project proposal spelt out the type of national network that would be established as a result of the project. The network would be a fairly elaborate (in those days) affair. NIR as the national focal point, would be responsible for setting up and maintaining the national database. Other participants, such as government departments and libraries and information centres would contribute to the database and would have access to this database through terminals located at their offices.

Further to that, NIR was to be linked via satellite to the PADIS-DEV databases in Addis Ababa, so that PADIS would have access to data about Botswana, and Botswana would also have access to information about other parts of Africa.

Even though at the beginning, it appeared as if either PADIS or the IDRC was going to fund the computer equipment, it became clear during the first year that this was not to be the case. However, the provision made by IDRC within the project was to

train a database manager and to fund a consultancy that would look at the computer needs of the project.

Therefore, in 1986, an IDRC funded consultant was sent to NIR to determine the computer hardware and software needs of the project. Although this consultancy did not produce the expected results, it still was of benefit to the Institute since it provided technical advice in the management of a specialised documentation centre. The question of what software and hardware to use still remained unanswered.

The situation was further complicated by the fact that an IBM microcomputer had been acquired, and so any software identified had to run on that computer. As you all know, it is easier to identify software and then find hardware for it.

The microcomputer was the very first computer the Institute ever had. The major problem for the Documentation Unit was what software to use for its purposes, other than the generic software - wordprocessing, etc. that were available. At that time it was difficult to identify software that would be appropriate for a database as there was no information available about information storage and retrieval software. The initial idea in the project proposal had been to use MINISIS, a software used by IDRC and PADIS themselves. The only problem though was that the software could only run on a Hewlett Packard minicomputer, but the Institute had no funds to purchase a computer of that capacity.

A decision was made however to go ahead and use the computer and the DBASE III software that was available. Using DBASE was seen as a way of gaining experience in the use of a database management software which would stand us in good stead when we identified the appropriate software. Whilst DBASE could be used to provide a listing of the holdings of the Documentation Unit, it was found to be lacking in preparing indexes from a field that had more than one value. For example, every document at NIR is assigned a number of keywords which are used in retrieval. These keywords could be as many as twenty in number. DBASE could only index using the first keyword. The alternative was to define as many as twenty fields and to create an index from every one of those fields. It was decided not to use the software for the catalog but for other functions such as creating mailing lists and for developing a circulation system. The exercise was indeed important, since it prepared the staff for the real task that was to follow.

By 1986, the Unesco package CDS/ISIS which is an information storage and retrieval software for use by non-profit making institutions, had been identified and it was recommended for use since it was in a sense, similar to MINISIS. Computerisation at NIR then began in earnest in 1987. The first step taken was to ensure that the internal worksheet used for processing NIR documents was adapted to that used for PADIS methodologies. Prior to that, there was duplication in that the Unit was using two worksheets for each document. One worksheet was to be sent to

PADIS and the other was for internal purposes. The bibliographic information sent to PADIS was to be included in that Centre's database.

In 1987 NIR began to build its own database, issues of DEVINDEX-Botswana, which is an index to literature on economic and social development in Botswana, using the information available in the Institute's library, were produced. The first three issues of DEVINDEX-Botswana were to be produced by PADIS, until computerisation had taken off ground at NIR.[5] In the end, however, PADIS and IDRC produced the first issue, and the rest were produced by NIR itself, using its computerised database.

Achievements

1. NIR staff were trained in the use of methodologies which would allow them to co-operate with other institutions in the region.

2. Indeed, the Institute's staff were trained in the organisation and operation of a specialised documentation centre.

3. As a result of the project a member of staff was sponsored for a Masters degree in Information Studies. She was able on her return, to start the computerisation aspect of the project. Other staff members also benefitted in that they were also exposed to the use of computers for documentation work.

4. A bibliographic database was built from 1987 which heralded a new and better method of storing and retrieving information. The card catalog is still available for use in retrieving materials processed before the period of computerisation.

5. After the production of the first DEVINDEX-Botswana by PADIS and IDRC, the NIR was able to take over the production using the computerised records. This endeavour is still continuing, and to date 5 issues have been produced.

6. The project had an impact on the rest of the Institute, in that it was the first attempt at computerisation, and it encouraged other Units to use computers too. Computers are now part and parcel of the work being done in the Institute.

7. Due to the successful implementation and organisation of the project coupled with the wealth of experience gained, requests are being received from both within and outside the country for the training of other librarians and documentalists.

8. There is no doubt that, DEVSIS-Botswana project being the first of its kind in the Southern African region has made its fair contribution towards the bibliographic control of economic and social development information in the region as a whole. Presently, the library has over 12,000 grey literature in its database.

Lessons to be learnt

1. The idea of collecting, organising and disseminating information focusing on communal areas was not met. It was not possible to make the trips to the communal areas as had been envisaged at the start of the project. Even locally, in Gaborone very little was collected. The concentration was mainly on NIR holdings. Also the project never developed to a stage where there was an active network within the country with NIR as the focal point. The problem was two-fold:

Firstly, there were manpower constraints - additional personnel that should have been hired were not. The problem was that the Institute had to rely on a centralised facility for recruiting staff. In other words, the University Administration handled the matter, and this exercise was beset by delays.

Secondly the project was largely seen as an NIR project. The envisaged computer network failed partly because of this and also because the plans made at that time were rather elaborate and no thought had been given to funding. Despite the last point, the project could still have involved the other players in the country through their contributing to the database, but that issue was never addressed, probably because getting the project off the ground itself at NIR was quite an involving task.

2. The project memorandum distributed at the beginning of the project was probably discussed and accepted by the heads of the various government ministries and departments that were consulted, but the word was not sufficiently passed on to the potential participants until a seminar was organised at the end of the project, so that information about it could be disseminated and DEVSIS-Botswana made a national, on-going collaborative activity.

3. In so far as the computerisation was concerned, one is of the feeling that it could have been better handled. Instead of frantically hunting for software, the staff should have considered first what they wanted from a computerised system and planned their database accordingly. This exercise was never done, and instead CDS/ISIS was used to merely transfer what had been done manually into computing. As the database was being developed the staff realised certain aspects that they could have done differently, if a requirement exercise had been carried out prior to computerisation.

4. Another major exercise to have been accomplished was to prune down the PADIS worksheet and to decide on fields that were more relevant to the services to be rendered. The day to day

management of the database and production of the Devindex-Botswana on a regular basis could have also been mapped out and agreed upon, and manuals could have been developed detailing how the system works.

5. The whole process was in itself a learning exercise. A lot still had to be learnt about the software. At the time, no-one else in the country was using CDS/ISIS and we had to work ourselves out of problem areas.

6. There was also a shortage of staff to do the data entry and other related functions, thus, there was always a back-log of documents to be processed.

7. As noted, during the life of the project, the members of staff were unable to make trips to the districts in order to acquire the relevant documents and this had direct implications on the aim to gauge the volume of socio-economic development information being generated in Botswana.

Conclusion

During the implementation of the DEVSIS-Botswana project, it was not possible to collect all the socio-economic documents being generated on or about Botswana each year. Thus, only an information system for the field of socio-economic development was established on the basis of the already existing information from within the Institute's information database. However, there is a wealth of information produced within the various government's agencies, development agencies, national societies, research institutions, district administration offices, libraries/information centres and individual subject specialists. It is envisaged that the establishment of a national information network through which all these sources of development information could be identified and linked together will go a long way towards the achievement of a bibliographic control of economic and social development literature in Botswana specifically, and the Southern African region as a whole.

The basis for a national network has been established, and thus the next step is to take this idea further. Of particular interest is that the initial ideal of the project proposal of computer networking can still be achieved. The FIDO system for data communication is one that can and has been used throughout Africa. Participating centres would only require a computer, a modem, a direct telephone line and the FIDO software in order to connect to the NIR database. This would make it possible for them to input their records into the database and to search for information from the same database.

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SPANISH CONTRIBUTION TO THE SIGLE SYSTEM

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The *Centre for Scientific Information and Documentation* (CINDOC), from the *Spanish Council for Scientific Research* (CSIC), is the main document supplier in Spain both by the amount of fulfilled requests, and by the number of users of its services. The CINDOC always showed a deep interest in overcoming the problems commonly associated with documents' acquisition in general, and specially the so-called grey literature. A direct consequence of this interest was the great deal of attention put over the SIGLE program from its very beginnings. Finally, in 1990 the CINDOC joined the EAGLE association as the Spanish National Member.

Even before joining SIGLE, the CINDOC had started some contacts with the objective of simplifying as much as possible the retrieval of Spanish grey literature. In this framework a joint strategy was developed together with the *Interministerial Commission of Science and Technology* (CICYT). This body provides funding for the organization of scientific meetings, congresses, symposia, etc. Applicants must of course fulfil some prerequisites and agree to a number of conditions defined in a yearly call published in the Spanish Official Bulletin. One of those requirements states that at least two copies of the final proceedings must be sent to the CICYT as soon as they get published. The aforementioned joint strategy between CINDOC and CICYT included an compromise in virtue of which the CINDOC will take over these copies for their inclusion in the SIGLE database. This set of documents has became one of the most important sources of grey literature used by the CINDOC to provide input in the SIGLE database.

Some arrangements are still to be closed which will greatly improve the effectiveness in locating and compiling the spanish grey literature in the most comprehensive basis, but important agreements have been made. Of special interest are those made with spanish universities for the obtention of Ph. dissertations and theses, but some other organizations have also been contacted.

In addition to giving up the proceedings from officially sponsored meetings and conferences, the CICYT also granted to the CINDOC the required economic aid to get the operative methodology working, and to back the journeys for the executive and technical committee meetings.

An introductory analysis of the spanish grey literature revealed it as both abundant and diverse in origin, with documents produced by a number of different institutions, most of them of governmental nature.

Most of the identified organizations were initially contacted, but currently only a couple of them were at the time predisposed to submitting documents to the CINDOC in a regular basis for its introduction in the SIGLE database.

With the aim on improving this situation an informative conference was organized by the CINDOC with the cooperation of the Spanish Society for Scientific Documentation (SEDIC), in April 1992, which also served for the introduction of the CD-ROM of the SIGLE database. This meeting reached a great deal of success, and ultimately was the base for some of the most solid agreements between CINDOC and other institutions concerning grey literature.

Up to late April 1993 a total of 993 documents were processed in the CINDOC, generating a total of 1090 SIGLE records, which are the subject of analysis in this communication. Aspects examined include document type, language of publication, subject classification, institutional origin and date of publication.

I-Document Type:

CINDOC records imputed to SIGLE can be classified according to the type of document that generated it (as defined by the SIGLE cataloguing rules). Their quantitative distribution is reflected in Table 1.

Table 1
Distribution by document type

Document Type	No.	%
Serials	157	14,4
Conference Proceedings	344	31,5
Theses	256	23,5
Technical Reports	148	13,6
Bibliographies	6	0,6
Translations	4	0,4
Standards	3	0,3
Other	172	15,8
Total	1.090	100,00

As can be clearly seen, the greater share of the documents belongs to the *Conference Proceedings* category; this is a consequence of the aforementioned agreement between the CINDOC and the CICYT. After *Proceedings* come the *Degree Theses*, *Serials*, and *Technical Reports* groups. There is also a small percentage of records which belongs to the *Bibliographies*, *Translations*, and *Standards* categories. Finally, a significant percentage (rounding the 16 %) of documents do not fit in the document's typification given in the SIGLE cataloguing rules (i.e. working papers). Those documents has been included in the *Other Types* class.

II-Language of publication:

Grey Literature produced in Spain is published in a several languages. The distribution of the documents by language of publication, is reflected in Table 2:

Table 2
Distribution by Language of Publication

Language	No.	%
Spanish	671	55,2
Catalonian	18	
Galician	8	2,2
Basque[1]	1	
English	296	24,4
French	42	3,5
German	7	
Italian	7	
Portuguese	3	1,5
Arab[2]	1	
No language indicated	157	13,2

As could be expected, most of the documents are published in *spanish*, with a very small percentage of documents written in the other official languages of Spain (*catalonian*, *galician*, and *basque*)[3]. Second place in number of documents is for *english*, representing a near 25% of the documents, followed far behind by *french*, with a fairly smaller percentage (around 3,5%). A small set of documents (less than a 2%) are published in other languages (*german*, *italian*, *portuguese*, and *arab*).

Looking close to Table 2 it can be noted that the total number of documents is far higher than the 1090 referred at the beginning of this communication. The reason is that a high percentage of the document selected for inclusion in the SIGLE database are published in two or more languages. From those documents in which a language is indicated, 54 are published in two different languages, 18 in three, 9 in four, and there is even a single document published in 5 different languages.

II-Distribution by Subject:

When considering the subjects classification of the documents processed by CINDOC for inclusion in the SIGLE database, the distribution is as shown in Table 3.

[1] The document included in the table was a degree theses, and had extensive abstracts both in english and spanish. All the footnotes and charts were also written in spanish.

[2] This single document was published in both Arab and Spanish.

[3] These documents usually have abstracts in spanish and/or english.

Table 3
Distribution by Subjects (attending to the SIGLE classification)

Classification	Subject	No.
01	Aeronautics	1
02	Agriculture & Veterinary	50
03	Environmental Pollution	9
05	Humanities and Social Sciences	459
06	Biology and Medicine	272
07	Chemistry	68
08	Earth and Atmosphere Sciences	55
09	Electric and Electronic Eng.	26
10	Energy	3
11	Material Science	9
12	Mathematics	226
13	Mechanical, Industrial and Civil Eng.	9
14	Methods and Equipment	15
17	Navigation, Communication, Detection...	2
20	Physics	27

Can be observed that the largest subject category (in number of documents) is 05 (*Humanities, Psychology and Social Sciences*). This can be broken down in *social sciences* (311 documents including 120 documents from *sociology*), and *economy* (103 documents). The *humanities* are comprised by *history* (40 documents) and *literature* (38).

The second larger group by subject category is the 06 (*biology and biomedicine*), being the greatest portion from *clinical medicine* (86 documents), followed by *biochemistry* (41), and *zoology* (35). Third comes *mathematics*, with 226 records.

If we collect these categories in larger groups, we will find the results showed in Graphic 1.

As Graphic 1 shows, most documents deal with *experimental sciences*, followed by *social sciences* and *biomedicine*. If we consider the "dual" distribution between *sciences* and *humanities-social sciences*, the 62,7% of the spanish documents deal with *sciences* (*hard, experimental and technological*), and only the 37,3% are from *social sciences/humanities*.

Graphic 1 also shows frequency of each of these wider groups in the whole of the SIGLE database. Is worth to note that the distribution of spanish records and that of whole database display some significant deviations:

-Spanish input shows a higher percentage of records in the *Social Sciences* and *Biology/Medicine* category than the whole SIGLE database, while the percentage of records classified as *Technology* are significantly smaller.

-The proportion of records included in the *Sciences* classification is exactly the same in both the spanish input and the complete SIGLE database.

IV-Date of publication:

Table 4 shows the distribution of the documents processed by CINDOC attending to the date of publication:

Table 4
Distribution by Date of Publication

Date of Publication	No.	%	
1978	2	0,2	
1980	4	0,4	
1982	1	0,1	
1984	1	0,1	
1985	1	0,1	12%
1987	3	0,3	
1988	17	1.6	
1989	100	9,2	
1990	169	15,5	
1991	369	33,8	
1992	242	22,2	
1993	23	2,1	
No date expressed*	158	14,5	

As might be expected, most documents date from the 1991-1992 period, and just a straight 12% comes from dates earlier then 1991, with the oldest document being from 1978. A small set of documents dates from 1993, but the number of records from this period is growing very fast.

V-Institutional Origin:

Corporate authors and organizations in which the personal authors develop their professional activity are quite diverse in the documents processed by the CINDOC. Table 5 shows the distribution of those organizations, arranged in wider categories.

As shown, the most important contributor (in the amount of documents supplied to SIGLE) is *University*. In this category are grouped a total of 37 spanish universities, plus a foreign one, generating a total of 558 documents. The single university which has supplied a greatest number of documents is the *Universidad de Santiago de Compostela*, with 73 records, close followed by the *Universidad de Oviedo* (71). The *Universidad Carlos III de Madrid* (61), and the Universities of *Cantabria* (46) and *Valladolid* (38) are far below. Finally, six universities are represented with just one record.

It could be worth to mention that none of the Centres represented with 35 or more records are counted between spanish most prominent Universities.

*This figure reflects the series records, which do not display date of publication as a individual field.

This fact is related to the disposition of the different centres to donate their documents, specially the *degree theses*. Is a common occurrence that these "small" universities are often more available than the bigger ones in the moment of supplying copies of those documents they have generated.

Table 5
Institutional Distribution

Corporate Entry	Amount of Documents	%
Universities	558	44,4
Official Research Centres	143	11,4
Scientific and Professional Assoc.	149	11,9
Governmental Organizations[5]	110	8,8
Private Business[6]	12	0,9
International and Foreign Bodies	15	1,2
No corporate entry included	269	21,4

In a second place by the number of records generated, are the *scientific and professional associations* with a total of 149 records. The single body of this group which has supplied a greater number of documents is the *Basque Association of Sociologists* (*Asociación Vasca de Sociólogos*), along with the *Federation of Sociologists Associations* (*Federación de Asociaciones de Sociólogos*) which are responsible of 26 records.

The third place is taken by the *Official research centres* category, with a total of 143 documents. The single body which has provided the greatest number of documents is the *Valencian Institute of Economic Research* (*IVIM*) with 56 documents. There are also 41 records from documents produced by research centres from the *CSIC*.

Fourth place is the *governmental organizations* category. In this single classification are grouped all those organizations which depend from any of the levels of the Spanish Administration; Central Government, Autonomous Administrations and Local Administration. The corporate body which has provided the greatest share of documents from this category is the *Town Council from Alcobendas*, with 64 documents. This figures can be surprisingly high bearing in mind that we are not speaking of a major city (Alcobendas is a satellite village from Madrid). Anyway, the Town Council has a notable Department of Sociological and Urban Research, and conducts a series of surveys not only in Alcobendas, but also in the whole of the Madrid Autonomous Community.

[5] Included in this category are bodies from the three levels of the spanish administration (i.e. national, autonomic and local).

[6] Also have been included in this category some government and joint bodies.

Collaboration between the Alcobendas' Town Council Documentation Service and CINDOC started after the meeting organized in 1992 to present the SIGLE service to official bodies from the different spanish administration levels, and has steady continued from then on.

An additional point to consider is the greater number of documents coming from departments and agencies from the Local and Autonomous Administrations (79) than from organisms and departments of the Central Administration (31).

Finally, there are 15 documents coming from international organizations or foreign institutions, and 12 more coming from industrial companies.

The following statements summarise the final conclusions:

a) Spanish input to the SIGLE database is highly diverse when considering the types of document imputed.

b) As expected, most documents are published in spanish, but there is also a straight 30% of the documents published in other languages.

c) Distribution by subject is similar to that of the whole SIGLE database, with slightly higher figures from the *biology and biomedicine* and *social sciences* fields, and a significantly lower input from the *technological* fields.

d) Most of the documents are dated from the 1991 to 1992 period, with isolated exceptions, and the oldest document dating from 1978. About this point, is worth to remember that effective incorporation of Spain to the SIGLE system took place in 1992.

e) Universities and research centres are responsible of more than a 50% of the documents imputed, with a minimal contribution from the private sector.

Graphic 1
Coverage by Subject in the Spanish Input

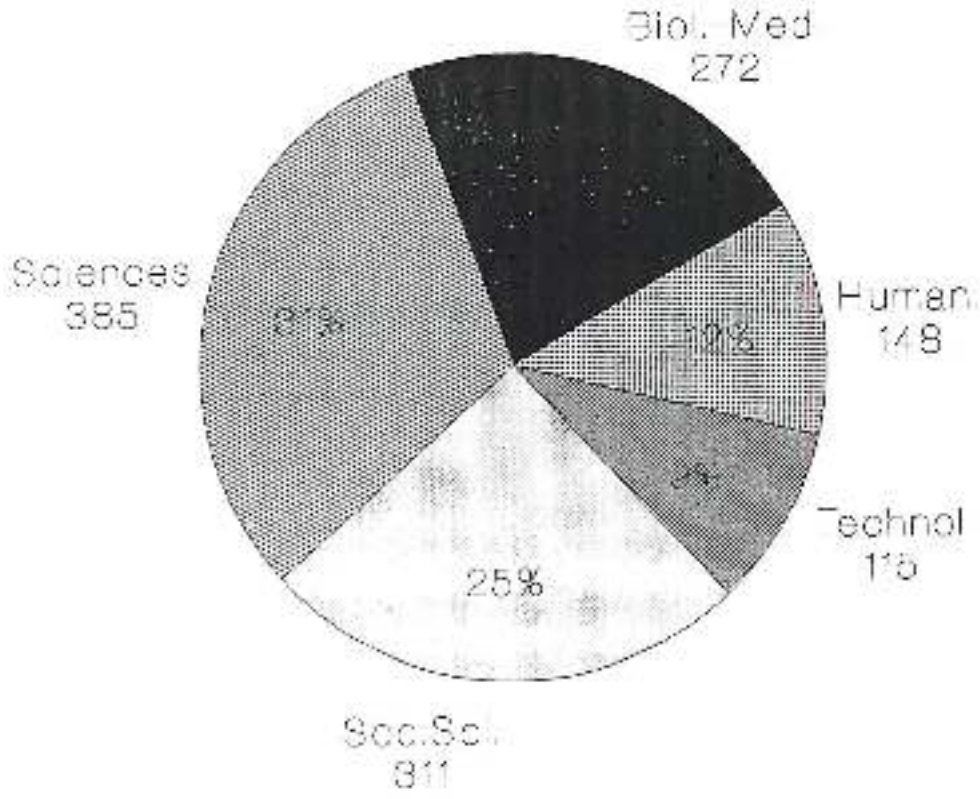
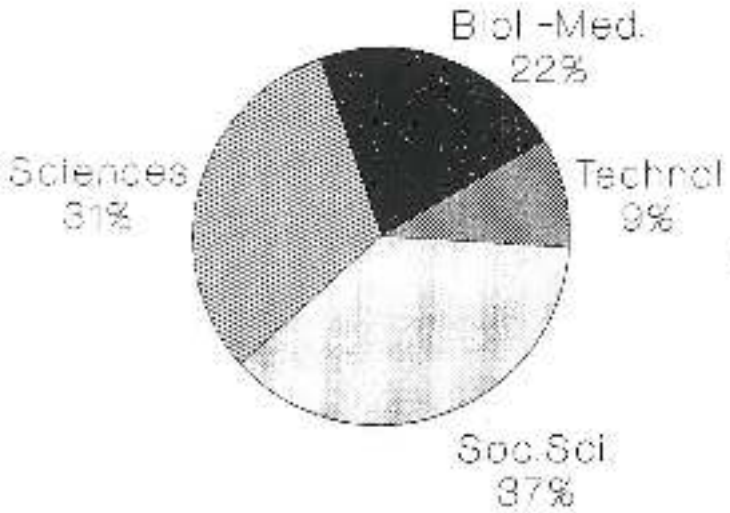
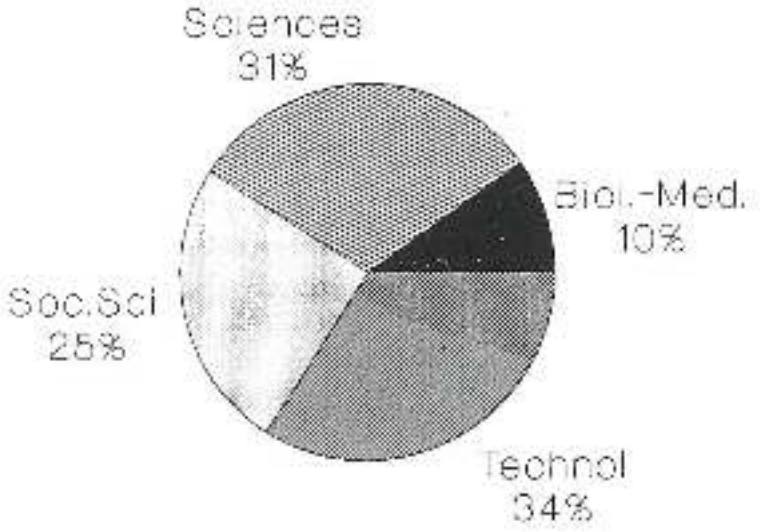


Table 2
Coverage by Subject



Spanish Records



Whole Database

Concept of joining SIGLE by Hungarian libraries

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Abstract

Hungarian libraries with stocks of different types of grey literature make efforts for joining SIGLE. Through this database Hungarian documents as doctoral dissertations (theses) and other non-traditional -so-called grey - documents would become internationally and widely known.

Theses defended at the Hungarian Academy of Sciences, a collection in the Library of the Hungarian Academy of Sciences would be one part of the Hungarian database. The major part would constitute of the doctoral dissertations accepted at the Hungarian technical universities (Budapest, Miskolc, Veszprém), at the University of Economics (Budapest), perhaps later could be incorporated dissertations from the collections of other universities too.

The Hungarian regulations for obtaining a doctors degree in various technical and economical branches at the universities - similar to the Ph.D. - prescribe to present the dissertations only in three copies as a manuscript, not photocopied or published, either in microform nor printed.

There are no national bibliographies of dissertations, only some universities list their own dissertations periodically. Therefore the availability of these documents is limited and so they can be considered as grey literature.

The project to join SIGLE contains the work to archieve a database, i.e. cataloguing, subject classification and English title translations of all items of dissertations in the collections in the format of the SIGLE system.

To enable this work we hope to get help from a project of the European Commission or of the PHARE program.

1. INTRODUCTION

1.1 Obtaining the doctors degree and presenting a doctoral dissertation (thesis)

In different countries there are different regulations for obtaining a doctors degree. After finished studies and passed examinations doctoral dissertations (theses) are to be prepared, presented and defended according to the prescriptions of the universities. After conferred the degree of doctor on somebody, the person is authorized to use the doctors degree, which is also marked differently with abbreviations, i.e. Ph.D., Dr.phil., Dr.-Ing., Dr.rer.nat., Dr.oec. etc.; in Hungarian: Dr. (for all kinds of branches of sciences).

The Hungarian technical and other universities got back in 1957 the right of awarding titles of doctors degrees. According to Hungarian regulations these university doctoral dissertations are to be presented in 3 copies from which one copy is to be kept in the library of the university.

I have to mention that in Hungary not only the universities have the right to qualify scientific research with a degree. The Hungarian Academy of Sciences awards for dissertations submitted to its Qualifications Committee the degree of Candidate or Doctor of Technical (Economical, Agricultural etc.) Sciences (CSc, DSc) - in the Hungarian scientific qualifications system for a higher degree than the university degree - which dissertations are also prepared as manuscripts as the university doctoral dissertations.

1.2 The dissertation as a type of document

Dissertations are considered also in foreign practice as

- grey or
- semi-published or
- not-published

literature although students have to present them in the form of

- microfiche or
- photocopy (xerocopy);

at several universities in 100 copies.

The form of a dissertation can be

- a book (photo-, xerocopied or printed) or
- a manuscript (typed) or
- a microfiche or
- a floppy disk (in the future).

Some of these forms are non-conventional, i.e. they belong to the category of grey literature. But all of these types have one thing common: they are monographs, i.e. a solution and report of one scientific problem.

Because of the different prescriptions concerning the number of copies, these documents are through commercial channels - bookshops - not available only those which are edited by a publisher or appear as a booklet of a series or report of an institute or of the department or faculty of the university.

1.3 Acquisition

The acquisition of dissertations is not an easy task for librarians. They are

a./ *not available:*
in bookshops except if the text of a dissertation is
presented in a published form as a book or a report,

b./ *available:*

ba./ the university library gets one obligatory copy from the Rectors
office or from the faculty deans free of charge,

bb./ the university library - if it has an adequate number of copies -
distributes them among other libraries
- in exchange or
- as a gift.

In Hungary dissertations are to be collected in the university libraries, as I mentioned, as obligatory copies. So another university library can not get the dissertation if it would be of interest because of its subject. Also the Széchényi National Library doesnt get a copy of it because it is a manuscript.

The dissertations from universities abroad can be acquired from those university libraries mostly in the frame of international exchange which have copies for distributing.

Research institutes which are in connection with university libraries have also the opportunity to get them in exchange if they want to collect some of definite subjects - but only from universities abroad.

2. COLLECTIONS OF HUNGARIAN LIBRARIES

In Hungary - due to the type of dissertations mentioned above - dissertations are kept in special collections or as a separate part of the manuscript collection.

2.1 The Library of the Hungarian Academy of Sciences

The Librarys Manuscript Collection contains in its stock the dissertations submitted to the Academy. This collection has the only complete series of dissertations ever obtained for the degree of CSc and DSc, appoximately 16 000 volumes.

2.2 University libraries

2.21 The Hungarian technical university libraries

The following technical university libraries are building up their collections since 1958:

a. Technical University Budapest
   Library and Information Centre
b. University of Miskolc
   Central Library
c. University of Veszprém
   Central Library
d. University for Forestry and Wood Industry,
   Sopron, Central Library

In all of these libraries dissertations are collected due to the subjects of their technical faculties. In the last 2-3 years there were new faculties established, i.e. economy, languages, law, humanities therefore the future will bring other than technical dissertations too to their collection.

The technical university dissertations collections have an amount approximately:

a. 4300 volumes
b. 750
c. 750
d. 350

2.22 Other university libraries

The Central Library of the Budapest University of Economic Sciences has a big collection, appr. 8000 volumes.

The Central Library of the University of Veterinary Science, Budapest has only some hundreds of dissertations, about 800 volumes.

The three traditional Hungarian universities have also their central libraries which collect the dissertations of the humanities and sciences:

a. Budapest : Eötvös Loránd University
   /the predecessor Pázmány Péter University was founded in 1635/ /appr. 3500 vols./
b. Debrecen : Kossuth Lajos University
   /appr. 1850 vols./
c. Szeged : József Attila University
   /appr. 2450 vols./

3. AVAILABILITY

The holdings of the university libraries are available
- in the reading rooms /not circulated because of their one-copy-status as manuscript/
- titles are to be sought for in the conventional catalogues or
- in the own database on-line catalogue /if it exists/

The dissertations are not processed in the Hungarian National Bibliography nor exists a union dissertation bibliography as the German "Jahresverzeichnis der deutschen Hochschulschriften" etc.

Certain university libraries publish annually, bi-annually or five-years-lists of dissertations:

TU Budapest	:	"Guide to theses accepted by Hungarian technical universities for doctors' degrees" which contains annually the dissertations of the technical universities Budapest, Miskolc and Veszprém.
UF Sopron	:	"Dissertations, reports, diploma works..."
UE Budapest	:	"Doctoral dissertations, diploma works"

All of these lists are very important tools for information but they have all the same disadvantage: they are never up-to-date. Most of them appear only in the second or third year /or later/ after the universities had accepted the dissertations.

4. CONCEPT OF JOINING SIGLE BY HUNGARIAN LIBRARIES

4.1 Subject of the program

Hungarian libraries having in their stocks a collection of doctoral dissertations realized the necessity of joining the world-wide known database SIGLE for making the data of Hungarian dissertations available for researchers in foreign countries.

For this reason the Budapest University Association - a cooperation between the universities in Budapest mentioned before, except Eötvös Loránd University - has entered for a financial assistance in the frame of the PHARE program with the following subject:

> Cooperation of the associated universities for establishing in Hungarian and in English a database of data of doctoral dissertations accepted by Hungarian universities; for passing the records at

the disposal of the international database SIGLE and for providing on-line and on CD-ROM the international data of dissertations.

4.2 Main objectives

The main objectives of the draft are the following:

- to provide the users in Hungary and abroad with the results of researches published in doctoral
- to promote cooperation in research,
- to promote the mutual use of information on the contents of the dissertations,
- to participate in the SIGLE international database which would include Hungarian research information in its Europe-wide coverage,
- to allow Hungarys admission in EAGLE with Technical University Budapest Library and Information Centre as national centre.

4.3 Immediate objectives

The immediate objective is to provide international access to the bibliographic data and English (translated) titles of the Hungarian dissertations by

- processing relevant information in a unified computerized system,
- providing access to the database through a network,
- managing the union catalogue of Hungarian doctoral dissertations processed separately by the universities,
- transferring the records of the unified database to SIGLE,
- promoting the on-line use of SIGLE database and subscription to SIGLE CD-ROM,
- ensuring the availability of the Hungarian titles -up to now presented only in form of lists - in English in the database for use by researchers abroad and through this promoting access to Hungarian research results,
- reduction and/or elimination of differences in this respect between Hungarian and foreign universities,
- establishing the computerized system, necessary for accessing information both on Hungarian and foreign dissertations, in particular the SIGLE database,

- the TUB Library and Information Centre as SIGLE-Centre of Hungary should be provided with appropriate personal and technical means for the coordination of the database processing work of the members of the Association and for transfering the data to SIGLE,

- preparing with DTP technique (Desk Top Publishing) periodically a publication on the Hungarian dissertations, making use of the database, including abstracts in Hungarian.

4.4 Some considerations

For the university staff, researchers and students is important in order to increase the efficiency of their work to have access to the relevant and valuable grey literature in their fields of activity.

The preservation of one copy of doctoral dissertations is obligatory, this task has been entrusted to the university libraries.

The development of the dissertation collections is about 180-200 titles/year/ university (at the University of Veterinary Science the half). The university is obliged to offer 1 copy to the university library, therefore the acquisition is free of charge. But cataloguing, computerized processing, translation of titles etc. are very expensive.

The development of the technical background is indispensable to the fulfilment of the project. ETHERNET, INTERNET, X.25., the fiber-optic network provide for the conditions of information exchange and search but a number of workstations are needed for librarians (cataloguing etc.) and for end-users.

5. CONDITIONS

5.1 Institutional background regarding libraries

The universities taking part in the cooperation have a central library and a library network each consisting of departmental, institutional, faculty libraries. The computer technology available allows the search in the databases. The coordinated development is indispensable in the field of establishing the dissertations workstations and the on-line and CD-ROM retrieval facilities.

5.2 **Dissertation collections (holdings from 1980, volumes to calculate with, records for SIGLE till 1980 backwards)**

- Technical University Budapest	3500	volumes (appr.)
- Budapest Univ. of Economic Sc.	2400	"
- Univ. of Veterinary Science	800	"
- Univ. Miskolc, Veszprém, Sopron	800	"
- Univ. Budapest, Debrecen, Szeged	3200	"
- Hungarian Academy of Sciences	7500	"

Accession/year

- Technical University Budapest	100-150	volumes
- Budapest Univ. of Economic Sciences	100-150	"
- Univ. of Veterinary Science	100-120	"
- Univ. Miskolc, Veszprém, Sopron	30- 50	"
- Univ. Budapest, Debrecen, Szeged	150-200	"
- Hungarian Academy of Sciences	400-500	"

5.3 **Computer equipment**

The cooperating libraries established a good foundation for the application of the computer technology in library and information work. The resources of the Budapest University Association available or ordered by the end of 1992 were the following:

- Technical University Budapest:
  a VAX 6410 mainframe and a microVAX computer with ALEPH integrated library software and micro-CDS-ISIS for the processing of textual information, local ETHERNET network linked to X.25 and INTERNET.

- Budapest University of Economic Sciences:
  a VAX 6410 mainframe and a microVAX computer with HUNGALIS integrated library software, local ETHERNET network linked to X.25 and INTERNET.

6. THE RECOMMENDED PROGRAM

The project to join SIGLE contains the work to achieve a database, i.e. cataloguing, subject classification and English title translations of all items of dissertations in the collections in the format of the SIGLE system.

The program contains the following:

- computer processing: acquisition, bibliographic description (cataloguing), classification, definition of keywords, title translation into English; shortening and stylistic corrections of the Hungarian abstract; from these records the retrospectiv and continuous achievement of the own database,

- sending of the own databases records through the TUB Library and Information Centre to SIGLE,
- providing the end-users with the on-line services of the Hungarian databases and the SIGLE database,
- subscription to the SICLE CD-ROM and providing access for the users,
- participation in the general assembly of the EAGLE member countries and in SICLE conferences as a new member of EAGLE.

7. PERIODS OF THE PROJECT

Our draft - which contains all the need of financial and personal assistance for the first period of work, i.e. processing the collections of the members of the Budapest University Association - was presented to the PHARE Committee, last month.

As second phase of the project it can be taken into consideration the financial assistance for achieving the database at the Library of the Hungarian Academy of Sciences, later at other university libraries.

The project has planned for the first three years a big amount of expenditures for manpower and hardware. We hope to get help from the PHARE program to enable the work for making Hungarian doctoral dissertations internationally and widely known and to make the use of the SIGLE database possible for Hungarian end-users.

For this reason we hope to get membership in EAGLE and promise that the Library and Information Centre of the Technical University Budapest will provide for the cooperation between Hungary and EAGLE as the National Centre for SIGLE in Hungary.

THE ACQUISITION OF GREY LITERATURE IN DEVELOPING COUNTRIES

INTRODUCTION

Before any attempt is made to discuss the procurement of grey literature in developing countries, it is proper that we endeavour to find out much about this literature. Just as there appears to be a lack of general understanding on what comprises the grey literature in the developed states, (1), (2) the same problem persists among professionals in the third world. Kibirige (3) considers this literature like Bloomfield, (4) as ephemera contrary to the view held by Line (5) who views grey literature as a totally different category of literature divorced from the ephemera. Ephemera according to Line constitutes that kind of literature that has no scholarly or research value. Such literature may comprise publishers' catalogues, publicity brochures, leaflets, etc. A number of writers in this part of the world rarely use the term "grey literature". This collection generally comprises cyclostyled materials produced by government ministries and departments, research institutions, conferences, etc. The difference in the definition of grey literature among professionals in this region does inevitably affect its procurement.

Grey literature in the third world is produced for a specific purpose. In this regard, only limited copies are made to be distributed to specific people. In the case of annual reports for instance, the materials may be confined to decision and policy makers in the government machinery. The producers rarely think of commercializing the literature. Furthermore, such

literature may be restricted from public consumption. Some organizations may produce limited copies on account of financial and other economic constraints.

A number of institutions are involved in the production of grey literature. Among them are government printers. Government printers are state owned concerns specially established to produce all sorts of grey literature for government ministries and departments varying from open to classified literature. Although limited titles may be available for sale, the majority are not sold. Research institutions within the public sector too, produce enormous literature pertaining to the many research programmes conducted in their area of speciality. While part of this collection may appear in the scientific and research journals in and outside the states, a great portion will remain unpublished and therefore unaccessible to the majority of the researchers. Universities, too, are involved in one kind of research or another. Both academic staff and postgraduate students write theses and dissertations as part of their research programmes. Much of this literature is deposited in University Libraries and has recently become an excellent research resource. Learned societies and institutions also produce considerable volume of grey literature. Disciplines such as agriculture, medicine, law, library, engineering, veterinary, geology, architecture, etc have set up full fledged professional associations in their respective countries. The associations organize annual conferences, seminars, etc in which highly researched papers are produced. While a few of these may later

appear in form of proceedings, the majority are bound to disappear with the conference(6). In addition, a number of business concerns in the private sector conduct or commission researches in areas of their interest resulting in the production of exceedingly valuable reports. Unfortunately such reports are never disclosed to the public for fear of passing such information to potential rivals.

Procurement of Grey Literature

Acquisition of grey literature is carried out through a number of methods. Purchase is one such method. Since this collection is never stocked in bookshops, the best approach is to procure the materials direct from the producers. This means that the acquisition librarian must have a thorough knowledge of the producers. Since the majority of producers do not compile any bibliographies, the librarian must establish intimate relationship with them so that he is constantly alerted whenever a new title is produced. Acquisition trips may be the most ideal form of purchase of grey literature within states. Inter-state trips may not be feasible as few libraries can afford financing such ventures. However this method is practicable for libraries in developed states where funds are generously available. Both Frankfurt University Library and Frankfurt Main Municipal Library are known to apply this method to acquire materials produced in Africa with great success (7). Some Libraries opt to use acquisition agents. This arrangement requires each Library to appoint an agent in each state to collect and assemble all materials produced in a particular country. Such arrangement

requires the agent to have a thorough understanding of the type of materials sought by libraries in that country. Again, very few libraries in the third world opt for this arrangement on account of limited budgets and scarcity of foreign currency. It is however an ideal method for libraries in the developed states. It is less expensive compared to acquisition trips. Libraries in the US opt for this method.

Another possible option is exchange. This method is popular in both developed and developing countries. All what the acquisition librarian needs to do is to establish exchange agreements with libraries where the materials are sought. The arrangement may involve exchanging materials with libraries owned by the producing institution such as special or university libraries or, teaming up with a library in each country that has the financial and professional ability to acquire the materials produced in that country. The former method is popular in this region as the exchange library generally does not pay for the materials produced by the parent institution. To the contrary, such a practice is encouraged by the parent organization for the purpose of acquiring publications that are generally hard to come by way of purchase. The second option may hit a snag as it requires substantial financial investment on the part of a third world library (8). The exchange arrangement is extremely appropriate in this region where on account of financial constraints, libraries are not financially able to acquire materials from outside. The only important requirement is that the parent institution must have materials to offer in exchange.

Donation constitutes another acquisition option although it has its own ups and downs. Since grey literature is not produced specifically for sale, some producers do not mind donating copies to libraries particularly those frequented by their staff. All acquisition librarians need to do is to contact the producing institution from time to time to ascertain whether there are any new materials for donation. Donations are effective only where the recipient library and the donors are in the same state. Inter-state arrangements are less popular on account of lack of patriotism.

Acquisition problems

Grey literature unlike the conventional literature poses serious procurement problems. One problem pertains to the limited imprints that characterise this literature. Materials such as annual reports, research reports, technical reports produced by government and quasi-government institutions are usually produced in limited numbers. Since such materials are destined for limited circulation, producers do not see the rationale of making extra copies for university libraries, national bibliographic agencies or even endeavouring to reserve a few for sale.

Grey literature is characterised by total lack of publicity. An enormous amount of grey literature produced in the third world is never publicized in publications such as trade bulletins, specialist journals or local abstracting and indexing journals. Government press which produces a considerable portion of government publications in any one country rarely produce

catalogues of their materials. In Kenya for instance, the last time such a catalogue was produced was in 1977. In the absence of this vital information, the existence of such vital research materials is not known to the majority of potential users leave alone acquisition librarians.

The acquisition of grey literature in the third world is further compounded by the absence or ineffective bibliographic control programmes. Few states in this region have national bibliographic agencies. For those that do, their bibliographic control activities are far below expectations. Scarcity of funds and skilled manpower have seriously hampered acquisition and documentation programmes to the extent that the national bibliographies are not only demanding in terms of comprehensiveness, but have tended to play a greater role as retrospective rather than current bibliographies. Both Tanzania and Kenya which have endeavoured to publish the national bibliography, have so far managed to cover only upto mid 1980s. Lack or ineffective national bibliographies greatly affects any serious acquisition programmes as national bibliographies by virtue of their comprehensive coverage are considered a vital bibliographic tool for the acquisition of non-published literature.

The nature of the publishing industry too, has affected comprehensive collection of the literature. The industry in this region favours the publication and distribution of school books. Educational books are in greater demand compared to say, research

materials. This trend has encouraged book traders to invest heavily in school books. They consider non-published materials risky enterprises.

As regard materials emanating from other states in the region, their acquisition poses acute problems. Among them is the problem of tracing small private publishers particularly in Africa. The majority of these publishers do not highlight their addresses on the titles. As a result, tracing them can be a nightmare. This is so in instances where the materials are cyclostyled. Where attempts are made to trace them, they rarely respond to any trade inquiries.

Although exchange proves an ideal method of procuring non-published literature in the region, it has its own drawbacks. As stated, the programme requires an exchange library to have regular publications to act as the basis for exchange. Unfortunately, fewer institutions can sustain regular publication of their titles. For those institutions opting to purchase local materials to be used as exchange titles, such arrangements must be assured of substantial financial backing from the funders to save them from imminent collapse. Furthermore, the success of any exchange programme greatly depends on the commitment of the two bilateral exchange partners.

Proposed solutions

The best way to tackle the acquisition of grey literature in developing countries is to approach the issue from the national

point of view. Regional approach would not solve any problem as regional bodies have hardly any enforcement powers on national organizations or governments.

The establishment of a national policy on grey literature

The most practical approach is the establishment of a clear government policy on grey literature by national governments. Such a policy is no doubt bound to compel producers to deposit copies of their work with gazetted repository institutions.

In fairly large states with substantial numbers of producers, it may be advisable to appoint more than one institution as repository centres while smaller states with less vigorous publishing programmes, one institution may suffice. In Kenya for instance, the government through a major government policy has appointed the Kenya National Archives and Documentation Service as a legal depository centre for materials emanating from government ministries and departments as well as parastatal organizations (9). Until this major decision was made, government publications were never deposited with any bibliographic agency as the Legal Deposit Act of Kenya exempts the government and its parastatal organizations from compulsory deposition of their literature.

Setting up or revitalising national bibliographic agencies

A number of states in the third world do not have national bibliographic agencies. In their absence, vast amount of the national literature output largely goes down to waste. In some

states, leading libraries such as university and public libraries have been appointed to act as national repositories. While these libraries have endeavoured to meet the objective, their performance have greatly been affected by lack of financial support from national governments. As a result, such libraries have not been able to secure sufficient funding and staffing resources to enable them to acquire, process and publicize much of this literature.

For the few states that boast of national libraries, their contributions are far below expectations. Funding again has been responsible for their undoing. It is therefore important that national governments endeavour to establish national bibliographic agencies where they have not been set up and avail them the necessary financial and legal support to enable them to acquire and access all the literature produced in the country including non-conventional literature. Where such agencies exist, all effort should be made by national governments to provide them adequate funding to enable them realize their statutory obligations.

The establishment of national documentation centres

The setting up of national documentation centres will no doubt go along way to contain all unpublished literature produced in a state. The national centres would endeavour to acquire, organize and disseminate information contained in among others, the grey literature which as already stated, takes a big chunk of national literature output. In Tanzania, the Tanzania Library

Service (TLS), has set up the Tanzania National Documentation Centre (TANDOC) to acquire and document both published and unpublished literature produced in the country (ID). As part of its current awareness programme, TANDOC produces abstracts and indexing journals highlighting materials acquired during a specific period.

In Uganda, the Institute of Public Administration (IPA) in Kampala officially acts as a national documentation centre for Uganda and performs similar functions as TANDOC. Unfortunately, only a few states in the third world have any significant national documentation centres. It is therefore important that such institutions be created to supplement the work of national bibliographic agencies to enable the state to maintain a complete mastery of the national imprint.

The establishment of documentation centres in sectoral areas

While a proposal has already been made for the setting up of national documentation centres in the region, it is impossible for one national documentation centre in a state to acquire all the literature produced in one country. It is therefore felt that the establishment of national documentation centres in specialized fields such as agriculture, science and technology, medicine, social sciences, humanities, etc., will no doubt go along way to contain practically all the grey literature produced in a country. In Kenya, the establishment of specialized institutions such as the Kenya Agricultural Documentation Centre (KADOC) in agriculture; and the Kenya National Scientific

Information and Documentation Centre (KENSIDOC) in the area of science and technology is hoped to eventually document all the literature produced in the two disciplines. The creation of the Southern African Documentation and Information System (SADIS) hopes to document all literature produced in the member states of the Southern African Development Co-ordination Conference (SADCC) in the area of development information.

While the above proposals may sound appropriate, their implementation will very much depend on the enthusiasm governments in the third world attach to information. In states where information development is considered for all intents and purposes a luxury investment, such proposals will remain long distant dreams particularly at this time when states in Africa for instance, are pre-occupied fighting internal unrest, famine, diseases, ignorance and scarcity of shelter.

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EFFORTS TOWARDS THE BIBLIOGRAPHIC CONTROL OF GREY LITERATURE IN GHANA

First International Conference on Grey Literature

RAI Congress Centre
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by

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S U M M A R Y

Until very recently, little attention had been paid to grey literature (GL) in most developing countries including Ghana. Increasingly, however, GL is gaining importance all over the world and developing countries are also beginning to recognize their importance. The many varied features and sometimes unique characteristics of GL have rendered them rather problematic, even though some of the features favour the not very rich countries which cannot afford to procure all the material they require from foreign sources. Efforts in Ghana to effect national bibliographic control started very well but in the last two decades or so the situation has declined rather sharply. Attempts at complementing these efforts soon started with the establishment of the Central Reference and Research Library of the Council for Scientific and Industrial Research (CSIR). These have gained increasing support and some advancement has been made although there remains room for improvement, especially with regard to the identification and acquisition of GL. In handling GL in developing countries, the assertion is made that there need not be any sharp distinction between conventional and non-conventional literature since their total imprints are generally small, especially with regard to conventional literature, and also because the non-conventional type of GL tend to contain information that cannot be obtained from anywhere else. It is therefore recommended that developing country library and information centres should have a more global perception of information sources and adopt the strategy of networking and resource-sharing in solving their problems.

Introduction

The phenomenon of grey literature (GL) is a relatively recent one which has continued to attract attention during the last thirty years or so. In developing countries like Ghana, grey literature is also beginning to attract the concern of national libraries and national bibliographic centres where such centres exist. This is particularly the case in the developed countries where in the United States Library of Congress for example, there is an almost aggressive policy of collecting grey literature from developing countries. In Africa for example there is a centre in Nairobi, Kenya purposely set up to see to collect indigenous literature from the eastern, central and southern African countries. Similar concern exists in many European countries like Sweden and the Netherlands. This interest in African literature has arisen from the increasing interest in African studies which prevails in many universities and in their research programmes.

Until recently, the unique features and other characteristics of grey literature were hardly noticed. However, as a result of the increasing realisation of their importance, especially with regard to the value of information they often contain, grey literature have become a recognisable literature type which requires special treatment.

Features

Some of the main characteristics of grey literature have been identified to include the following:

- they tend to have rather specialised subject content or concentrate on subjects of only local interest;
- their specialised subject content or parochial limitation often renders them unattractive for publication in conventional forms;
- they therefore tend to be issued in rather limited editions or small print runs. This often results in their being issued in mimeograph;

- their non-conventional formats result in non-uniform or variable standards of editing and production;
- their non-uniform standards and unattractive forms make effective pricing, cost recovery and marketing difficult;
- the difficulty in pricing often results in their being distributed at no cost, an obvious advantage to poorly funded libraries in most developing countries;
- the limited editions also result in poor availability, limited accessibility, poor distribution, poor publicity and ultimately, poor bibliographic control;
- one issue raised by their poor bibliographic control is that of their failure to provide bibliographic details like the imprint (place, publisher and year of publication), or the International Standard Book Number (ISBN);
- also because of their poor bibliographic control their output is difficult to estimate since they can emerge from the least expected sources, both institutional and individual, and are issued and distributed in a rather haphazard manner;
- their bibliographic control defies the concept of Universal Bibliographic Control (UBC) and consequently they make the idea of Universal Availability of Publications (UAP) seem an elusive mirage;
- the question of non-uniform standards of production raises issues like the size, usually only a few pages, which makes them liable to be viewed as trivia;
- if they get issued in non-paper media like microfilm or electronic media, they raise even more complex issues of compatibility, and they require special equipment to make them useable. The very fundamental issue as to whether they could or should be acceptable in manuscript form would require addressing;
- the advent of desktop publishing (dtp) has also boosted the ease and rate of production of grey literature and has helped in improving the quality of production;
- the various features which make them unattractive and complex to control and the relatively little value placed on them by libraries contribute to the difficulties associated with their identification, collection and use.

Some Pertinent Issues

The above features of grey literature which are by no means exhaustive create a situation of ambivalence, which developing countries could exploit to considerable advantage. It is ironical that even though libraries in developing countries lack foreign currency to procure the foreign literature which may not bear direct relevance to their local situations, they tend rather to look down on their own local grey literature which they can usually obtain free of charge. This attitude of libraries in developing countries may be attributed to a variety of causes.

One of these causes has been attributed to what has been termed the "made in there" syndrome, one of the typical vestiges of the colonial legacy, whereby practically everything produced locally is considered inferior in comparison to the imported type. Admittedly, books produced in the developed countries have a high standard of production, are more acceptable internationally and also command greater authority eventhough they are a great deal more expensive.

Aside from the subjective causes, there are also the clearly demonstrable negative features of grey literature generally, as already identified above. There is the general line of thinking that it is the unattractiveness, limited runs, poor and non-uniform standards of production, poor editing, small size, poor distribution and accessibility that make local grey literature tend to be undervalued by librarians in developing countries. Here also it must be admitted that even if they were attractively produced, some grey literature, for the reasons already given, do not create a strong enough attraction anyway.

Another cause of the lukewarm attitude of libraries in developing countries towards grey literature arises from the fact that most librarians tend to concentrate on books and journals and fail to have a broad perspective of other information resources. This arises from the traditional book oriented attitude of many librarians in developing countries.

Arising from the physical features and even the specialised content of grey literature, libraries in developing countries, because of their limited personnel in terms of both quantity and in cataloguing skills, as well as the general lack of expertise in handling such special material, the subject content of which may not be adequately catered for in the various classification schedules, or the cataloguing of which makes greater demands on the cataloguer, librarians are often not very keen to handle such material.

The flimsy or physical characteristics of grey literature also demand special storage equipment and facilities like pamphlet boxes or filing cabinets which are an additional drain on the limited financial resources of libraries in developing countries.

These libraries also have to contend with the issue of conservation arising from the poor durability of most grey literature which are often produced on poor quality paper, in mimeograph, and in simple binding using metal staple pins.

An important contributory factor to the indifferent attitude of libraries of developing countries to grey literature arises from their generally weak publishing and book development industries. There is ample documentation in Ghana of reasons for the weak book production and publishing industry. Chief among these are the poor infrastructure, weak financial base and lack of adequate incentives for authors and writers leading to poor output.

The weak infrastructure for a thriving book industry also partly contributes to the proliferation of grey literature in many developing countries. In Ghana it has been attributed partly to the spate of local workshops, seminars and conferences by the many emerging professional associations and societies, and the lack of resources and facilities to publish their proceedings. It is also attributable to the development of modern information technologies like dtp which facilitate production of grey literature.

From the Ghanaian experience and future plans, the approach of pooling resources and sharing the workload is recommended as one of the feasible means of bringing about effective bibliographic control of grey literature. Financial and other resources are getting more scarce and donor agencies are likely to support relatively less expensive but impact making projects. The Ghastinet Project is one such which could do with some outside assistance or collaborative effort with other outside agencies. We are ready to welcome any interested agency to talk with us to achieve our objective.

Finally, it is noted that this is the very first international conference ever to discuss the issue of grey literature and that both the developed and developing partners are mutual beneficiaries of the deliberations of this conference. It is therefore recommended that the conference should pay special attention to problems of the developing countries because of their peculiar situation and the potential contribution they can make to the development and growth of grey literature. In doing so it is recommended that the idea of further developing some already existing systems to serve as possible models which could be adapted if necessary, to suit other countries be given very serious consideration.

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Grey Literature in Russia: Acquisition, Access, Perspectives.

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Abstract

Publishing of grey literature in the countries of the former USSR has reduced to that of 1930 and libraries acquisitions decreased accordingly. To compensate the decrease our Library has established direct contacts with major institutes and organizations. Subject scope of grey literature has been transferred from fundamental science to practice. To facilitate access to the collections of grey literature Russian National Public Library for Science and Technology has been maintaining the Union Catalog, a bilingual database and has been developing telecommunication access. As a perspective we envisage the possibility of creating a full-text depository of grey literature stored on CD-ROMs, conversion of printed collections of the Library and development of retrieval and delivery system.

ACQUISITION

"But there are many pressures to publish quantity, fewer pressures to publish quality". [1, p.25]

We would rather prefer to view the bright future of grey literature development from a hill top of the actual 1993 achievements of the kind. Unfortunately the viewpoint of Russian librarians is from the tunnel. The collapse ("perestroika" as it used to be called) of the economy and state management system, which has begun in the late eighties as a result of Michael Gorbachev's political reforms, is still going on. Therefore, on completion of a new series of political transformations in October 1993, Russia is still unable to get out of the economic crisis. And since there exists a close connection between the welfare of the country and the status of its libraries, the majority of libraries today are in a very complicated situation. The mentality of the people and its representatives in the Parliament is falling behind the changes in the state system: libraries are still the last of priorities as they used to be.

This somewhat pessimistic beginning may be illustrated by the situation in publishing. Fig. 1 presents the issuing of non-periodic publications (books, booklets) in Russia [4]. Having reached the level of 50 000 titles a year in the late 1950s - early 1960s, the country (it was precisely the country, since the publishing was performed and supported by the state) kept it stable till the second half of the 1980s. And then - the dramatic fall, the end of which we have not reached yet. It should be mentioned that this drop is a structural one: publishing of political literature reduced by 10 times, while the volume of reference publications remained at the same level. Publishing of children's literature and fiction increased in 1992 thanks to the new private publishing houses, but the dynamics of publishing books and booklets on science and technology (Fig. 2) fits in with the general situation.

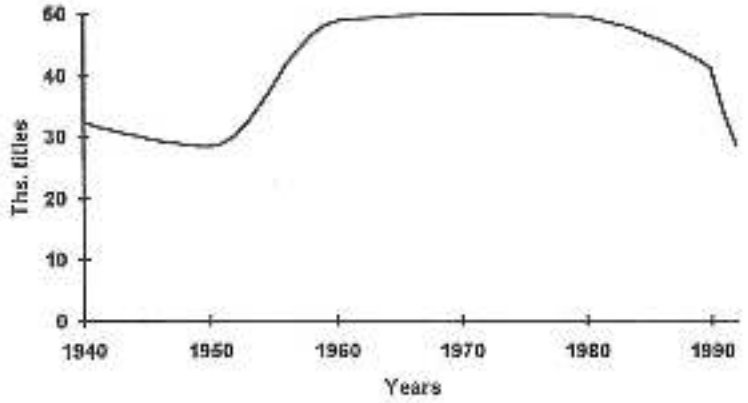

Fig. 1. Publishing of books and booklets in Russia, thousand titles

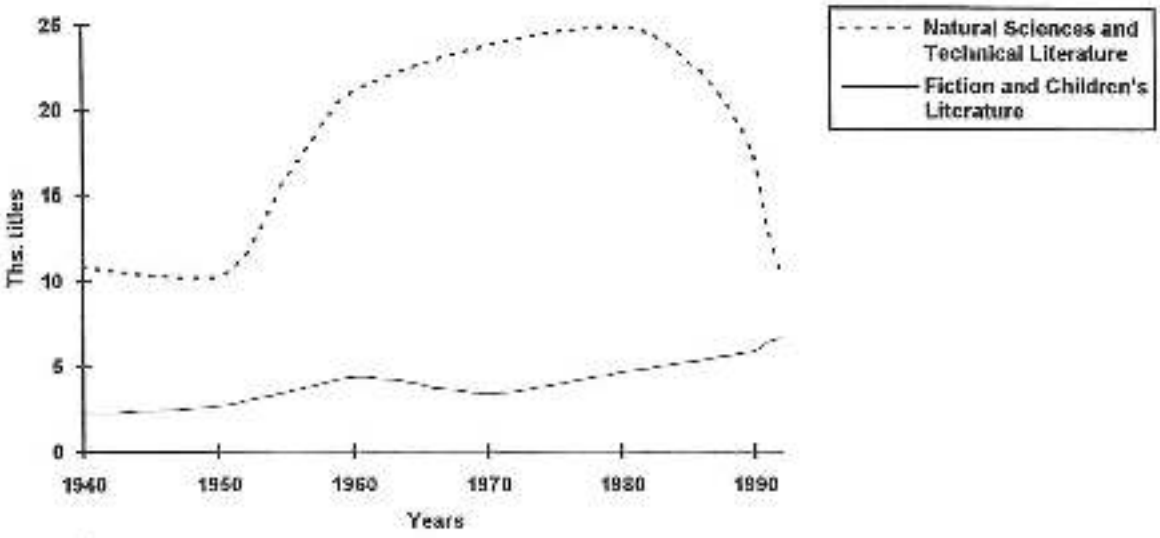

Fig. 2. Publishing of books and booklets in Russia, thousand titles

The change in the Library's acquisition of domestic literature [5] is shown on Fig. 3. The part of sci-tech publications, known as grey literature and reflecting the latests developments is also facing a crisis. We have analysed in detail the reasons for this decrease in our paper on the grey literature of limited circulation in the former Soviet Union [6]. In the conditions of the declining publications and increasing of their cost, libraries find it more and more difficult to meet the needs of their patrons in this type of information.

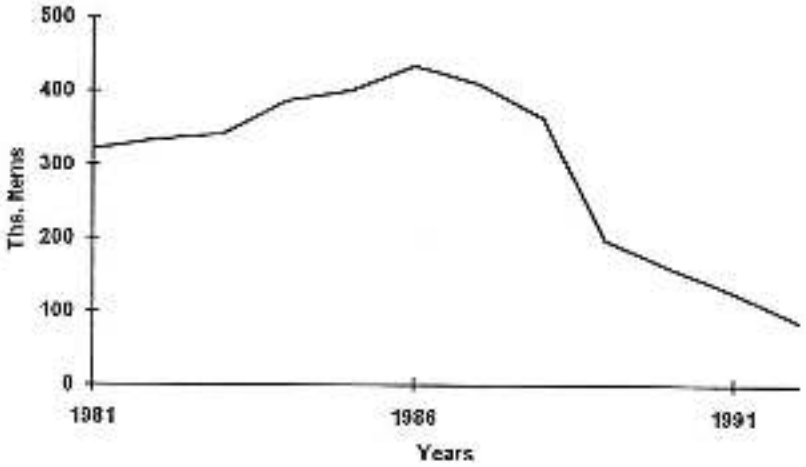

Fig. 3. Domestic literature acquisitions in NPLSaT, thous. items.

Many organizations do not register their publications in the Russian Book Chamber (The National Centre of Bibliography) and do not supply the mandatory copies. That is why our Library has established direct contacts with the major institutes and enterprises of Russia for the purchase of publications. We also conclude contracts on the acquisition of Russian language literature in the FSU countries using local libraries as mediators. This practice has allowed to increase our acquisition of grey literature by 25 percent.

ACCESS

"... *switching information, not document*" [1, p.13]

We are trying to compensate weakened acquisitions by the "shared resources" approach. The main tool of access to integrated collections is Union Catalog. Thanks to the Union Catalog libraries can develop their cooperation and inform patrons about the newly published literature.

Since 1987 the automated Union Catalog (UC) on domestic grey literature has been functioning in our Library. At present it is the Russian Union Catalog of grey literature, published in the Russian language. The bulk of 100

000 records (about 94 percent) is provided by the Russian libraries (Fig. 4), first of all by the major ones: Academy of Sciences Library, Russian State Library (former Lenin library), Saltykov-Shchedrin Russian National Library, National Public Library for Science and Technology of the Russian Academy of Sciences Siberian Branch, Natural Sciences Library, Central Scientific Agricultural Library. Libraries of the former Soviet Union are still contributing to the development of the Union Catalog: almost all of them took part in the UC in 1992; today, besides Russia, the four FSU republics supply data for the UC. Our contacts with the collegues prove that many libraries of the FSU republics are willing to return into the integrated information space.

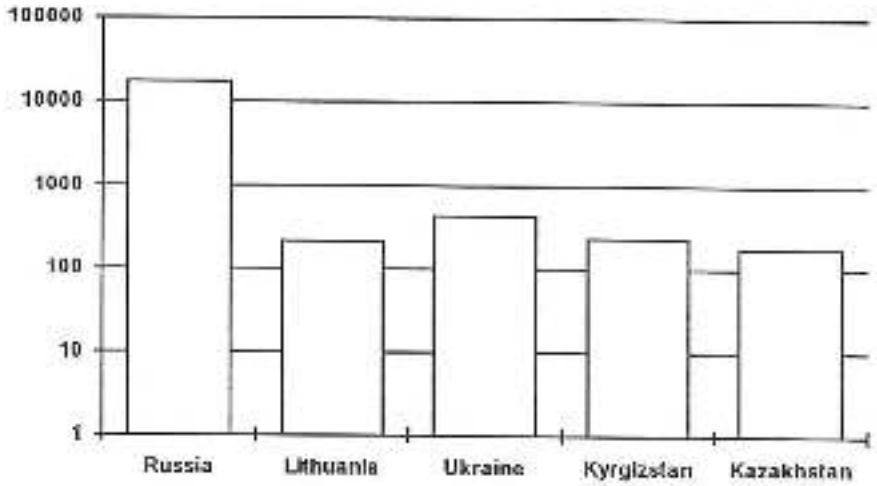

Fig. 4. Union Catalog entries from FSU republics, thous. entries.

The record of the Union Catalog contains the complete bibliographic data and elements of subject retrieval: headings of the State STI Classification System, UDC codes, subject headings, as well as codes of stock-holders. Publications are selected according to the subject (natural and applied sciences, engineering, technology, agriculture, medicine) and the number of printed copies (less than 1500 copies). The basic part of information the Library receives on magnetic tapes from the Russian Book Chamber and converts it in accordance with the system requirements. Being the UC holder, the Library is responsible for the development and maintenance of the database, preparation of the UC printed edition, user access to the database, user service and dissemination of information.

The automated Union Catalog ensures the supply of information by the libraries on current publications available. This very information is the basis for providing users with data on the distributed collections of the country. A substantial decrease in the flow (Fig. 5) has been observed lately. Nevertheless the situation is changing for the better (the main drop in the flow was recorded in 1992) and now a trend towards the increase of information

transfer is observed. This fact requires special attention. If our Library together with other libraries manage to develop this tendency, grey literature users will be able to get more information on the collections.

Fig. 5. Entries of library codes to Union Catalog.

The change of grey literature subject scope in the UC is illustrated on Fig. 6. If physics, agriculture, economics and medicine were the key subjects before 1993, physics, computer science, electronics and mechanical engineering are the subjects prevailing today.

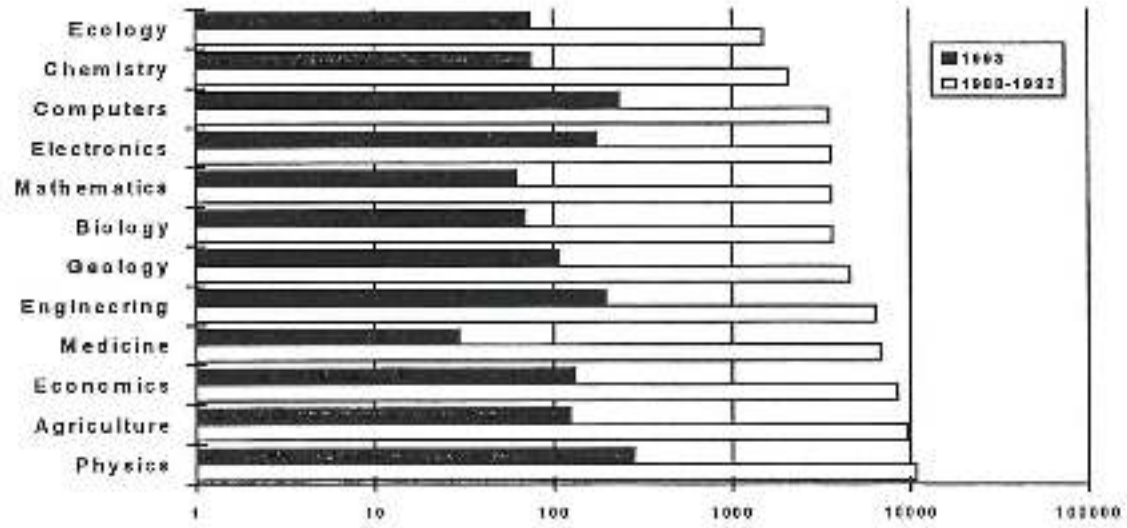

Fig. 6. Subjects in UC.

Since 1991, in order to facilitate the access to foreign users, the Library has been maintaining a grey literature database (8 thousands records). It is based on the Library's collections and presents a value-added part of the automated Union Catalog. It differs from the Union Catalog in the following way:

1) besides the basic elements of a bibliographic description the record includes an abstracts or the contents, which gives more information on the publication;

2) an English version of the database is available, requiring no drivers for cyrillic alphabet. A record contains the English translation of the title, subject headings, corporate authors and an abstract/contents as well as transliterated family names of the authors, place of publication, name of the publishing house;

3) database or its fragments are supplied in MARC format and ISO 2709 standard.

The main information source of the database (preprints, conference proceedings, institutes transactions, scientific reports, etc.) are acquired in one copy. Fig. 7 gives the distribution of editions according to their types. The literature is classified in accordance with the List of Subject Headings of the Russian National Public Library for Science and Technology.

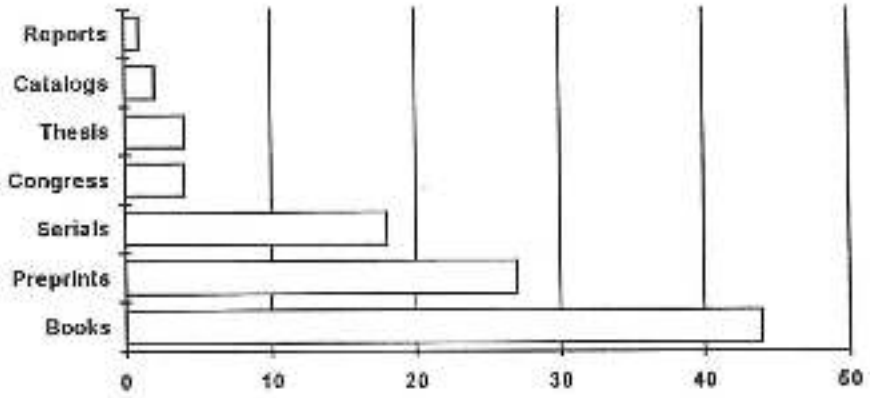

Fig. 7. Forms of publications in DB.

Subject search in the database is conducted by the subject headings, UDC codes in the local and telecommunication modes with the PC Anywhere software. Each database record is supported by a document and user can order a hard copy or microform of the required publication or its English translation. The database is maintained in the CDS/ISIS/M software package environment in the PC LAN.

Fields list is as follows:

08 a - date entered in file
15 a - national (Russian) bibl. number (translit)
245 a - title (translated), n - number of part, k- form
260 a - place of publication (translit), b - publisher (translit), c - date of publication
300 a - page, c - dimension (translit)
80 a - UDC
650 a - topical term (translated)
700 a - personal name (translit)
710 a - corporate (translated)
711 a - meeting name (translated)
520 a - abstract (translated)

The list of the record elements is quite necessary and sufficient for the bibliographic identification of a document and its subject determination. On user request the list of fields may be expanded and the output information presented as a text file in the required format. There is a possibility of a subject analysis and using the results for correction of additional acquisition policy. According to the statistics physics constitutes 45 percent of the database publications.

The Authority File of institutes and organizations whose transactions and publications are reflected in the database enables to find the needed one. The greatest amount of publications is issued by institutes dealing with physical and nuclear research problems and given in Table 1.

Table 1
Acquisitions from organizations

Organization name	Quantity of acquisitions
Institute of Theoretical Physics (Moscow)	100
Institute for High-Energy Physics (Protvino)	152
Research Institute of Solid-State Physics (S-Petersb.)	103
Joint Institute for Nuclear Research (Dubna)	686
P. N. Lebedev Physical Institute (Moscow)	124

The database analysis as to the place of publication shows principal cities in which leading institutes and enterprises are located (see Fig. 8). This distribution could be compared with the extracted (by V.E. Vaskovsky) from Science Citation Index list of Russian science-active cities [7]. The largest number of references is on the studies performed during 1992 in: 1 - Moscow, 2 - S-Petersb., 3 - Kiev, 4 - Novosibirsk, 5 - Minsk, 6 - Kharkov, 7 - Ekaterinburg.

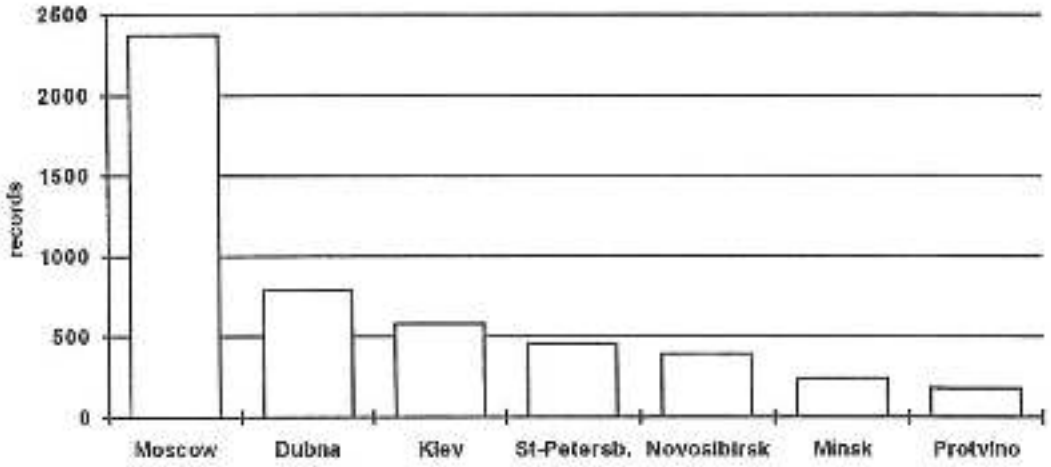

Fig. 8. Place of publications.

The amount of Interlibrary Loan requests for domestic books is presented in Fig. 9. No comments.

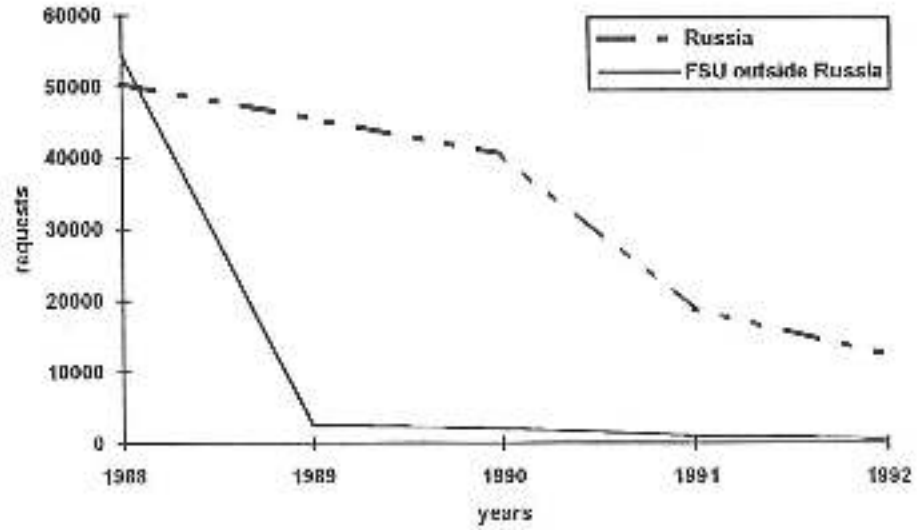

Fig. 9. ILL requests on domestic books.

PERSPECTIVES

"The technical publishing business may gradually be transformed into the information handling business in which the printing press as a means of mass production of identical documents no longer plays a dominant role". [1, p.21]

The present-day information technologies are mainly based on printed publications or microforms. In addition to multiple positive qualities they have some drawbacks. They have a large time gap between the detection of a fact and its publication, they are not quite suitable for information retrieval, for long-term (depository) storing and for fast full-text document delivery. The increased paper consumption provokes the resistance of ecologists. Problems of paper physical conservation as well as loss of control of giant collections are a challenge to major depository libraries.

Experience accumulated in the practical use of databases on magnetic and optical carriers, remote transmission of large information arrays leads to the abandonment of a printed form of publications, employing electronic recording.

In order to provide specialists with the opportunity of rapidly searching for required information and gaining full-text documents we suggest the creation of an electronic depository of grey full-text documents (on compact disks) as well as document retrieval and delivery system.

Compact disk technology provides:

a) machine readability, an efficient search for required information, exchange via telecommunication channels, automatic conversion of full texts as well as production of hard copies;

b) large information capacity allowing to reduce the area occupied by collections a thousand times or so. The reduction of the area, in its turn, makes it possible to form full-valued collections in inexpensive library buildings or to cancel running costs by 30-40% in existing buildings. One can create alternate depositories as well as to completely automate the service;

c) information preservation reliability due to contactless recording;

d) worldwide adherence to international standards;

e) relative cheapness of this technology, that is the lower cost of the recorded information unit compared to other carriers (printed publications, microforms, magnetic disks and tapes).

Offered technology:

1. Source information collection.

Here 2 techniques are used in parallel:

a) electronic files collection, which are generated during desk top publishing;

b) scanning and conversion of printed publications.

2. Bibliographic full-text file processing and text formatting, master-files preparation.

3. In house files recording on compact disks.

4. CD collection storage.

5. User service in the library and via remote access to the collection; establishment of a document delivery system.

All above-mentioned procedures and techniques are already tested and relevant juridical, mathematical, linguistic and technological tasks are outlined. The most challenging problems are: Copyright, OCR for cyrillic texts, full scale scanning of bindings.

We suppose that development of experimental operation techniques, will take 1 year and 100 000 USD.

Expected results:

- access to full texts of Russian grey literature for specialists of Russia, FSU and Eastern European countries; information support to specialists living abroad (not in Russia and the FSU) by providing them with necessary Russian-language literature;
- modeling of a scheme giving equal access to knowledge, for developing countries.
- generation of a technological base for an integrated, fully automated system of translating Russian sci-tech texts into European languages, as well as for providing the blind, weak-eyed and disadvantaged people with full-valued information in a suitable form.

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HISTORY OF US STI AND SUBJECT CATEGORIES

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The paper pays attention to the history of NTIS, DTIC, NASA and COSATI. The development of the TEST Thesaurus and the COSATI Subject Categories is described and attention is given to Subject Categories for Scientific and Technical Information (STI) and Research in Progress (RIP) and the need for Standardization of Subject Categories and Thesauri.

1. HISTORY OF US STI

The first part of this paper is partly based on the report "Chronology of Selected Literature, Reports, Policy Instruments, and significant Events Affecting Federal Scientific and Technical Information (STI) in the United States", which was published as report nr 11 of the NASA/DoD Aerospace Knowledge Diffusion research project of Thomas Pinelli (PINE 92), and on the report "Helping America compete. The Role of Federal Scientific & Technical Information", which contains more recent information about the STI policy in the US (WOOD 90).

1.1 WEINBERG AND OTHER REPORTS : CENTRALIZED OR MISSION ORIENTED

In 1950 the National Science Foundation (NSF) was created. Its mission included the responsability for the exchange of STI among scientists in the US. The Department of Commerce was directed to establish a central clearinghouse to make results of R&D available, for a fee, to industry, the public, all levels of government and the military. In 1957 the Sputnik 1 started "the space race" between the US and the Soviet Union and spurred debate on the value of centralized information services like VINITI in Russia and was responsable for Federal funding of a number of STI programs. In 1958 an Office of Science Information Services in NSF was recommended (BAKE 58). In 1962 a NSF report concluded that the Federal systems used to disseminate government technical reports were ineffective and in some cases wasteful and recommended a coordinated government wide policy for technical report documentation and dissemination (O'DO 62).

In 1963 the Committee On Scientific And Technical Information (COSATI) reported about the handling of STI by Federal Agencies to the House Select Committee on Government Research. In 1963 the WEINBERG report asserted that the Federal Government has overall responsability for the health of the Nation's scientific communication system and recommended that each Federal Agency should disseminate information about Research in Progress (RIP) as well as research completed (STI) (WEIN 63). In 1965 the Defense Documentation Center (DDC) developed the Work Unit Information System (WUIS) for Research in Progress.

In 1963 a NFAIS report gave a systems and economic study of secondary STI products and services. It proposed Organisation 'X' to act as a buffer between discipline and mission-oriented abstracting and indexing services and recommended greater cooperation between services (HELL 63). And in 1963 Mortimer Taube, the inventor of Uniterms, proposed a Government Corporation to serve as a central collection, storage and distribution center for STI from NASA, AEC and DoD. The American Library Association (ALA) explored the impact that advances in technology were apt to have on information systems and conceptualized the nature of future electronic libraries and information centers that would operate as part of vast regional information networks (ALA 63). In 1963 a NSF report concluded that a large centralized facility could probably achieve the provision of an effective, exhaustive document retrieval capability (LITT 63). The basis of this report was an operational analysis which could be used in formulating a government policy on centralization of such facilities. In 1964 a NSF report concluded that virtual no empirical work had been conducted to determine the effectiveness of US government technical reports; agencies producing these reports should develop methods to test their effectiveness and should develop experimental formats to determine their effectiveness as communication devices (RONC 64).

In 1964 Frederick Jonker advocated the creation of discipline- and mission oriented networks that would interact through a National Information Retrieval Network Coordination Center, to serve as a central depository and clearinghouse for all STI; Technical and financial aspects of a model information retrieval network were also described (JONK 64). In 1965 a conceptual framework was developed for improved national network of STI, including management and system requirements and need for planning, development, education and policy-making (KNOX 65). In 1966 COSATI and NSF reported the findings of a survey of selected abstracting and indexing organisations in the US and presented recommandations for immediate actions by the Federal Government. 5 appendices reviewed the assumptions and requirements already developed by COSATI for a national document handling system, previous system studies, user studies, advanced technology, and cooperation among abstracting and indexing organisations (SDC 66).

In 1968 COSATI and FCST appraised the role of the technical report in S&T communication and concluded that both the S&T journal and Technical Report are essential in the S&T communication process. Federal technical report producing agencies should demand full and high quality reporting of Government-funded research (COSA 68). In 1970 a NSF report was published, giving 125 recommandations from 4 COSATI studies and one study performed by SATCOM of NAS-NAE. Part I presented recommandations concerning the roles and responsabilities of organisations generating information for the scientific and technical community (COSA 70).

In 1979 the Government Accounting Office (GAO) discussed the management of scientific and technical bibliographic databases by the Federal Goverment, the existence of overlapping and duplicate bibliographic information services and the application of cost-recovery principles to bibliographic information services. GAO concluded that although the Federal Government spent billions of dollars to create, collect and disseminate scientific and technical information, it paid little attention to information policies of how information activities were managed (GAO 79).
In 1984 Andrew A. Aines detailed the failures and weaknesses of Federal STI policy for the previous 20 years and stated that STI policy in the US had been virtually nonexistent since the demise of COSATI in 1972 (AINE 84). In 196 Col. Aines had been involved in the NSF/COSI/SSIE Common Vocabulary study (HAMM 63) and in 1972 he was the last acting COSATI chairman). NSF sponsored studies about technical information transfer (BIKS 84)(BALL 86).

In 1988 the Office of Technology Assessment (OTA) published a report 'Informing the Nation; Federal Information Dissemination in an Electronic Age' which includes opportunities and challenges for NTIS, outlined strategies for GPO Deposit Library Program and NTIS (WOOD 88).

In 1989 the US National Academy of Sciences published a report about the user's view in the application of information technology to support the 'global research enterprise', examinating data collection and analysis, communication and collaboration, information storage and retrieval. Donald Langenberg writes in the preface that there is a revolution occurring in the creation and dissemination of information, knowledge and ultimately understanding. Increased possibilities for information exchange, collegial dialogue, collaboration and access to remote resources exist as high-speed networks, powerful workstations and large multiuser computational facilities are more frequently linked and commonly available (NAS 89).

In 1990 OTA published a report 'Helping America compete. The Role of Federal Scientific and Technical Information', which contains information about the STI policy in the US, the philosophy of OMB regarding contracting out and the insistence of OMB on privatization of NTIS
(WOOD 90). In this report a decentralized nature of STI is advocated, because centralizing all STI in one databank is neither cost-effective nor technically feasible at this time, could slow innovation and limit opportunities for improving efficiency in the agencies.

In 1991 the GPO Sales Program was discussed. There is a dual distribution policy for government publications. Very often the same publications being sold to the public by the Superintendent of Documents through the GPO Sales Program (by mail or in 23 government bookstores) are simultaneously distributed, free of charge, to the public by, in most cases, the agency/publisher. For 11 publications the government was giving away 2.2 million copies, while at the same time trying to sell 157.000 copies . 50 % of the 14.000 GPO titles sell for under 3 $, while the average handling cost is 4.51 $ (FOSS 91). GPO also distributes Government documents without charge to some 1405 depository libraries under the Depository Library Program.
In 1991 'GPO/2001: Vision for a new Millenium' was published (GPO 91) and the GPO Wide Information Network Data Online (WINDO) Act HR 2772 was proposed, to establish in GPO a single point of online public access to Federal databases containing Public Information. Government Information should remain equal available to all (ROSE 92). June 8 President Clinton signed it to Public Law 103-40, but unfortunately the Congress did not authorize funding for this program.

1.2 FROM COSATI TO CENDI AND OMB

In 1947 the Interdepartmental Committee on Scientific R&D (ICSRD) was authorized by president Truman to coordinate Federal R&D activities, including STI transfer, and the Office of Scientific Research and Development (OSRD) of Vannevar Bush was terminated. During the war Bush had been president Roosevelt's Science Adviser and since 1941 OSRD had coordinated the activities of 6000 scientists doing Defense R&D.
In 1945 Bush had published the article 'As we may think', in which he described the MEMEX machine, a combination of microfilm and photocells (BUSH 45). The MEMEX machine should improve the access to scientific information generated during the war (the roots of report literature) and has influenced Hypertext projects such as Augment (Douglas Engelbart, 1963) and Xanadu (Theodor Nelson, 1967). In the report "Science: The Endless Frontier" Bush proposed a model for the creation of a National Research Foundation (BUSH 45).

In 1959 the Federal Advisory Council on Science Information (FACSI) was established, to advise the Office of Science Information Services (OSIS) of the National Science Foundation (NSF), sponsored by NSF. In 1959 the Federal Council for Science and Technology (FCST) was authorized to promote closer cooperation among Federal Agencies, and ICSRD was abolished. In 1961 the Committee on Scientific Information (COSI) was established in FCST and FACSI abolished.

COSATI

In 1964 the Committee On Scientific And Technical Information (COSATI) was formed by FCST, by extending the scope of COSI to technical information services. COSATI provided leadership for the following 10 years. The Office of Science and Technology (OST) and COSATI of the Federal Council of Science and Technology carry responsabilities for program coordination and standardization that are exercised through 7 panels, 6 task groups, and ad-hoc working groups. The scope and magnitude of COSATI's concern, responsabilities, and breadth of membership were given in the COSATI 1969 annual report.
12 agencies have membership on the Committee; some
16 additional agencies were represented by observers (PARK 71).

In 1960 the Armed Services Technical Information Agency (ASTIA) published the ASTIA Thesaurus, which was the first Thesaurus in the USA and which led to the development of Thesauri by other Departments. The proliferation of retrieval languages (Thesauri) in the face of the growing need for worldwide cooperation between information systems raised the question :
Is there still the possibility of developing a standard language for general use.

COSATI proposed to create a kind of generic superstructure of terms that will subsume a group of thesauri, or other types of vocabularies, in diverse subject fields. This approach was first proposed as a means of interconnecting several vocabularies used by government agencies in the US. The "common subsumption scheme" was developed under the auspices of COSATI and published in 1964 as the COSATI Subject Category List "SCL" (COSA 64).
The list was used to arrange the Government Reports Announcements of NTIS. It has been used to "partition" the terms in several Thesauri
(e.g. the TEST) into broad subject categories. (LANC 86)

In 1966 COSATI created a standard for cataloging Government technical reports; followed by major Federal Agencies responsable for technical report processing (COSA 66). The latest revision, reflecting technological developments, was published in 1985 (CEND 85). In 1967 US GPO published the COSATI Guidelines for the development of information retrieval thesauri (COSA 67). In 1968 COSATI originated guidelines concerning a Report Documentation Page (RDP), which were included in the ANSI standard Z39.18 : Scientific and Technical Reports:
Organisation, Preparation and Production.

In 1968 COSATI and FCST appraised the role of the technical report in S&T communication and concluded that both the S&T journal and Technical Report are essential in the S&T communication process. Federal technical report producing agencies should demand full and high quality reporting of Government-funded research (COSA 68).
In 1971 NASA, NTIS and DDC agreed to implement the National Microfilm Association 24:1 microfiche reduction standard, based on COSATI-developed standards. In 1971 COSATI and FLC sponsored a Conference on Federal Information Resources, the second conference for information and research library communities (COSA 71).

With a change of administration COSATI was transfered from the Office of Science and Technology to NSF in 1971 and abolished in 1972. The Office of Science and Technology itself was abolished in 1973.

The leadership for STI went to international organisations such as UNESCO, ICSU, ICSTI, FUSIDIC and AGARD-TIP. In 1971 UNESCO and ICSU published the first UNISIST report concerning the feasability of a World Science Information System (UNIS 71). Later on NASA and NTIS (1976) started to collect foreign reports. In 1985 the UNISIST Guidelines on National Information Policy: (Scope, Formulation and Implementation) were published.
AGARD-TIP, the Technical Information Panel of the Advisory Group for Aerospace R&D of NATO, also published several landmark STI studies.

CENDI

In 1976 the Office of Science and Technology Policy (OSTP) was created, with a Federal Coordinating Council for Science, Engineering and Technology (FCCSET). Neither OSTP nor FCCSET has given much attention to the dissemination of STI documents or databases.

The lack of an equivalent to COSATI, or a formal FCCSET advisory body on STI, in part led to the creation of an informal interagency group CENDI in 1983, to coordinate STI activities of member organisations including DoC, DoE, NASA and DoD. The CENDI agencies represent over 90 % of the Federal R&D budget. CENDI supports a strong OSTP and FCCSET role in STI (WOOD 90). In 1985 the CENDI charter was signed by the member organisations.
CENDI also sponsored revision of the COSATI guidelines for Descriptive Cataloging which were published in 1985 (CEND 85) and defined a common standard report documentation page (RDP) to streamline exchange between the CENDI agencies. In 1986 CENDI was institutionalized by a formal Memorandum of Understanding (MOU) among participants DoC, DoE, NASA, DoD and NLM. During a CENDI meeting of Dec 12, 1989, Andrew A. Aines, former Acting Chairman of COSATI, stated that the last time that various STI constituencies collaborated for ideas, feedback and dialog was in the 1960s. In 1990 CENDI initiated an effort to shift from disciplinary and mission-oriented systems to decision support systems and personalized information systems by the Interagency Working Group on Data Management for Global Change (IAWGDMGC). Five federal agencies DoC, DoE, NASA, NLM and DoD are trying to integrate their information management systems to mobilize national resources in a coordinated manner, to move the nation into the next generation of information support systems (COTT 90).

OMB

The low profile of OSTP with respect to government-wide STI policy ceded the dominant executive branch policy role to the Office of Management and Budget (OMB). Under the Paperwork Reduction Act of 1980 an Office of Information and Regulatory Affairs (OIRA) was formed within OMB, to minimize the cost and maximize the usefullness of information collected, maintained and disseminated by the Federal Government. In 1985 OMB published circular A-130 on "Management of Federal Information Resources", emphasizing that Federal Agencies place maximum feasible reliance on the private sector for information dissemination and that cost be recovered through user charges where appropriate. In 1986 the Act was amended to explicitly include information dissemination within its scope. In 1989 some STI agencies, notably NTIS and various agency information clearinghouses and libraries, had to defend their programs against privatization proposals (WOOD 90). The Reagan and Bush administrations have thought of information as a commodity first. An Improvement of Information Access Act HR 3459 has been proposed.

A new National Science & Technology Council which consolidates the Space Council, FCCSET and the Critical Materials Council was proposed in the study "Reinventing Government" (GORE 93).
The new body will be given greater authority to set priorities, to direct policies and to participate in the budget process in areas such as high performance computing.

2. HISTORY OF NTIS, DTIC AND NASA

2.1 NTIS : 1945 : Publications Board (PB)
1946 : Office of Technical Services (OTS)
1965 : Clearinghouse for Federal Scientific and Technical Information (CFSTI)
1970 : National Technical Information Service (NTIS)

In 1945 the Publications Board (PB) was founded by President Truman, replacing the Office of Scientific R&D (OSRD) of Vannevar Bush. The Publications Board was authorized to disseminate technical reports to Industry. In 1945 the Office of Declassification and Technical Services of DoC combines the activities of the Publications Board, National Inventors Board and the Committee on the Release of Scientific Information (CORSI).

In 1946 the Publications Board was renamed the Office of Technical Services (OTS) of the Department of Commerce, that started publishing the "Biblingraphy of Scientific and Technical Reports". In this bibliography the reports were given PB-numbers as accession numbers.
In 1950 OTS was authorized to establish a central clearinghouse for STI, and in 1954 dissemination of STI through OTS became official DoC policy. Since 1963 unclassified reports about DoD R&D (50 % of all DoD reports) were processed by OTS and included in the Bibliography of Scientific and Technical Reports. The Defense Documentation Center also provided data processing services on a reimbursable basis till OTS/CFSTI in 1968 acquired its own IBM computer.
In 1964 indexing for database was changed to conform to COSATI Descriptive Cataloging of Government STI and a Selective Research In Microfiche (SRIM) was started.

In 1965 OTS was renamed Clearinghouse for Federal Scientific and Technical Information (CFSTI), created in the National Bureau of Standardization (NBS). Input from NASA, DoD and CFSTI was merged to issue a Government-wide consolidated index of Federal scientific and technical reports, the US Government R&D Reports (USGRDR).

In 1970 CFSTI was renamed National Technical Information Service (NTIS), designed to be largely self-supporting. NTIS was established by the US Department of Commerce to simplify and increase public access to federal publications and data files of interest to the business, scientific, and technical communities. The Clearinghouse for Scientific and Technical Information in the National Bureau of Standards was transfered to the NTIS; its functions merge with a broader mission for NTIS (PARK 71). The Government Reports Announcements (GRA) was published.
In 1976 NTIS initiated its international cooperative program.
In 1984 NTIS joined the Commerce, Energy, NASA and Defence Scientific and Technical Information Group (CENDI), to improve productivity of Federal R&D through efficient and responsive technical information cooperation.
In 1986 NTIS initiates computer-aided cataloging and drops COSATI subject categories in processing and announcing technical reports. In 1988 the Office of Technology Assessment (OTA) published "Informing the Nation - Federal Information Dissemination in an Electronic Age" which includes opportunities and challenges for NTIS, outlined strategies for GPO Deposit Library Program and NTIS (WOOD 88).

The NTIS database has an annual growth of some 60.000 reports. See table page 17.

Department	Annual growth	Accession number	Thesaurus terms	Original Subject Categories
DoD	14.500	AD-A	DTIC	DTIC
DoE	12.000	DE	Energy	
Education	800	ED	ERIC	
NASA	7.500	N	NASA	
NTIS	20.000	PB		SRIM

The NTIS database contains Accession nrs of the cooperating Departments.
PB numbers are being given to reports indexed by NTIS,
AD numbers to reports indexed by DTIC,
N numbers to reports indexed by NASA,

The NTIS database gives online access to 1,6 million items, 80 % of the 2 million titles collection. The NTIS database was one of the first databases that came online, in 1972 at Lockheed/Dialog. The NTIS database was also one of the first databases that came available on CD-ROM in 1985 (Silver-Platter, now Dialog too).

Since 1971 NTIS, NASA and DTIC are using 24:1 microfiches for the distribution of reports. Because NTIS has agreements with document supply centers all around the world which stock microfiches of NTIS reports, it is easy to obtain microfiches of reports after searching the NTIS database. NTIS users can also subscribe to Selective Research In Microfiche (SRIM), which allows them to automatically receive microfiches of all reports of a certain SRIM Subject Category (modified COSATI).

NTIS must operate its clearinghouse on a break-even basis with no appropriated funds. NTIS uses revenues from brokerage fees and services to other agencies, along with product-line pricing, to offset the losses that would otherwise occur due to the many NTIS documents that register no or very low sales volumes. NTIS ships about 3 million items each year, but in the past the maximum has been 6 million items each year. NTIS sales of paper or microfiche documents continue to decline. The average total demand for NTIS documents is 50 copies over the life of a document, and one-quarter to one-third of the documents never sell a copy.

From 1981 to 1991 the share of revenue from electronic products increased from 6 % to 28 %,
while the share for printed products fell from 73 % to 59 %,
and for microfiche products fell from 21 % to 13 %.

In 1989 NTIS had to defend its programs against a privatization proposal of OMB. After years of declining demand for paper and microfiche products and the debate over privatization, Congress has directed NTIS to modernize. But OMB insistence on privatization - which was overruled by Congress -, might have resulted in a 2-3 year delay in the modernization of NTIS (WOOD 90).
NTIS has developed a preliminary plan to increase its use of electronic formats, including CD-ROM, electronic bulletin boards, and ultimately, an electronic document system that could accept input from the source agencies and support electronic printing-on-demand.
To be successful, NTIS will need to reduce per-unit costs, decrease time delays between the existence of a document and its availability via NTIS, and increase user wareness of NTIS services (WOOD 90). In 1991 a feasability study for FEDLINE, a Government Information Locator system at NTIS, was proposed in HR 1989.

In 1984 NTIS began a quality management program. Order fulfillment time decreased from 14 days in 1989 to 6,4 days in 1991. In 1992 the NTIS Total Quality Management (TQM) Initiative led to such a good response that the latest success stories about 99,9 % accuracy and Super Duper Rush Emergency document delivery by FAX within one hour were published in summer 1993.
A catalog of Federal TQM documents is available free for the asking as PR-893.

FEDRIP

In 1949 the Science Information Exchange was created by 6 government agencies and departments engaged in medical research, to serve as a clearinghouse for in-progress scientific research in the medical and allied fields. In 1958 the Office of Science Information Service (OSIS) was recommended (BAKB 58) and created in NSF. In 1960 the Bio Sciences Information Exchange (BSIE) of the Smithsonian Institute was expanded to include Physical and Social Sciences, which made possible a Current Federal R&D information exchange. In 1962 the National Referral Center for Science and Technology (NRCST) of the Library of Congress was established to give information about who is working on what. In 1963 the director of OST asked NSF to continue BSIE as the Smithsonian Science Information Exchange (SSIE).

In 1981 the tasks of the SSIE went to NTIS. SSIE was replaced by the FEDRIP (FEDeral Research In Progress) database , that came available online at Dialog in 1983. The FEDRIP database has information about 100.000 projects and should prevent duplication of effort. Annually some 9.000 new projects are added. The projects are obtained from organisations such as NIST, NASA and DoE.

2.2 DTIC : 1950 : Armed Services Technical Information Agency (ASTIA)
at Wright Patterson AFB. 1958 : Arlington
1963 : Defense Documentation Center of DSA, Alexandria (DDC)
1979 : Defense Technical Information Center of DLA (DTIC)

In 1945 the Library of Congress was funded to collect, process and disseminate Scientific reports for the Navy (later Army too), this was called the LC Sci Tech project. In 1947 the Central Air Documentation Office (CADO) was created from the (WWII) Air Documents Division.

In 1950 the Armed Services Technical Information Agency (ASTIA) was established, to coordinate DoD STI activities. ASTIA absorbed the activities of the LC Technical Information Division (TID) and CADO. In 1953 ASTIA started publication of the Title Announcement Bulletin, by merging the Technical Information Pilot of LC and the Technical Data Digest (TDD) published by ASTIA (Technical News Service existed since 1926, TDD since 1932).
In 1957 the title became Technical Abstract Bulletin (TAB).

In 1952 ASTIA published the ASTIA Subject Headings and in 1960 ASTIA published the ASTIA Thesaurus: The first ASTIA Thesaurus was the authority used to translate the subject heading assignment of all AD documents beginning with AD 1 (february 1953) (KLIN 64). After more than 200.000 documents had been indexed a thorough revision was accomplished with the assistance from many Federal Government organizations and representatives from more than 100 industrial, educational, and research organisations. The second edition was published in December 1962 (GILL 61)(ASTI 62)(WALL 62). The Thesaurus contains 5 parts: A Scope Note Index, Descriptor Groups with Descriptors, Descriptor Fields with Descriptor Groups, Descriptor Fields, Generic Charts. An interim DDC Thesaurus was published in 1966.
In 1959 ASTIA libraries were automated using IBM solid state 90 for search formulation. In 1963 ASTIA was renamed Defense Documentation Center (DDC) of the Dedense Supply Agency (DSA), and used UNIVAC 1107 direct file batch processing for bibliographic printouts. Since 1963 15.000 unclassified DDC reports were annually integrated in the Bibliography of Scientific and Technical Reports of OTS, with an ASTIA document nr (AD-number) as accession number.
In 1965 the Research and Technology Work Unit Information System (WUIS) was established, which contains research management information and descriptions of R&D efforts at the work unit level currently being performed by DoD or DoD contractors.
In 1966 the Division/Section method of subject categorization of DDC was converted to the Field/Group structure of the COSATI Subject Category List, DoD Extended, AD 624 000, to make all DoD databases compatible by subject area; response to a need for uniformity (COSA 66).
The Thesaurus of ASTIA descriptors was named Thesaurus of DDC descriptors (AD 950 016), which later was renamed to DDC Retrieval and Indexing Terminology (DRIT, AD 773 000).
In 1970 the Current Awareness Bulletin (CAB) service was started. CAB is a customized automated subscription bibliography based on the Subject Category needs. When DDC started using microfiche in 1971, the Automatic Dissemination of Documents (ADD) service was started. Under the ADD program, users automatically receive microfiche copies of newly acquired reports which match their interests, twice a month. ADD is also based on the DDC Subject Categories.

In 1972 the Defense RDT&E Online System (DROLS) became operational, which is being used for input, search, retrieval and ordering of documents. The TR bibliographic database now contains nearly 1,5 million citations to technical reports, and about 30.000 new items are added annually.

The WUIS database contains information about ongoing DoD research and technology efforts : what, where, when, how, at what costs, by whom, and under which sponsorship research is being performed. The file contains more than 200.000 records, of which about 27.000 new records are added each year. Because formerly DD Form 1498 has been used for data-entry, the WUIS database is frequently referred to as the 1498 database. Presently work unit data is submitted in machine-readable form, and easy used PC software packages (type dBase IV) are available for inputting data to WUIS. In 1972 the Independent Research and Development (IR&D) database was also established, which contains research management information descriptions of Defense contractors' present R&D efforts that are funded independently by industrial organizations in order to compete for future DoD contracts. The file contains more than 124.000 records, of which about 7.500 new records are added each year. In 1981 Canada got access to DROLS.

In 1974 the Report Documentation Page (RDP) was introduced for data-entry of the TR bibliographic database, using DD Form 1473 which was based on the COSATI Guidelines that later led to ANSI standard Z39.18. Presently form SF 298 is being used. Each technical publication is required to have a completed SF 298, (NSN 7540-01-280-5500), preferably placed at the front of the publication. In block 14 of the form subject terms should be mentioned, terms from the DTIC Thesaurus and locally assigned ones.

In 1979 DDC became the Defense Technical Information Center (DTIC) of the Defense Logistics Agency (DLA). In 1980 the Information Analysis Centers (IAC's) of DoD became part of the DTIC mission. In 1986 the Technical Reports Awareness Circular (TRAC), an unclassified publication without subject index, replaced the Technical Abstract Bulletin (TAB). Because the lack of an subject index caused a significant drop in subscriptions, TRAC was abolished at the end of 1989.

In 1986 DTIC published a new DTIC Subject Categorization Guide for Defense Science and Technology AD-A172 650. The separate DTIC Thesaurus AD-A226 000 was published in 1990. Annual updates of the DTIC Thesaurus are published in october. The DTIC Thesaurus on Diskette is available for $49.

In 1987 DTIC published the STINET report, which describes several related development projects such as the DGIS Gateway, the Local Automation Model (LAM), the Directory of Resources, the Common Command Language, and the SearchMAESTRO/Easynet end-user interface (COTT 87). The Local Automation Model led to the development of the STILAS software by SIRSI, based on a combination of BRS/Search for retrieval and Unicorn for Library collection management. Simultaneous access of local files and databases on Dialog and BRS was made possible by the Retrieval Interface Manager (RIM). The Department of Defense Gateway Information System (DGIS) offers convenient access to DROLS, other major US Government databases, and commercial databases. In addition to gateway access, DGIS also offers electronic mail, downloading of search results, and post-processing features such as merging, editing, and sorting.
In 1988 a STINET bibliography was compiled (KUHN 88).

In 1991 DTIC was transferred from the control of DLA to that of the Office of the Under Secretary of Defense (Acquisition). 1992 brought a reorganisation and an increased movement toward fee for service, necessitated by the Defense Business Operations Fund (DBOF) :
$100 registration fee for the use of DROLS and fees for CAB.
In 1993 DTIC became very much involved with the DoD Corporate Information Management (CIM) Initiative, which charges DoD functional managers (IAC's) with the execution of process modeling and Activity Based Costing (ABC). DTIC is the focal point for the exchange of CIM information and a help desk service assists those interested in CIM.
Ordering DTIC products via E-mail (Internet) became available in 1993.

In 1991 DTIC produced a CD-ROM of the TR database. The two-disk set, which is updated quarterly, contains unclassified citations to technical documents entered into DTIC's collection since January 1970. In 1992 the Department of the Navy has produced a CD-ROM product containing all unclassified WUIS records and all Navy patents. January 1993 DTIC began accepting non-print products : Video-recordings, computer diskettes, and CD-ROMs.
A Report Documentation Page (RDP) for non-print media was introduced.

Microfilm/Microfiche From 1960 to 1970 Microfilm has been used by DDC.
Since 1971 DDC is using Microfiche, which made possible the ADD series.
TDCK has DDC Microfilms from 1960 (AD 205 855) to 1964 (AD 438 825)
TDCK has DDC Microfiches from 1966 (AD 485 455) to 1971 (AD 866 486)

2.3 NASA

The history of international aerospace information system development has paralled that of national aerospace research and development (R&D) programs. The US, a major and early entrant into aerospace R&D, created a national focus in the National Advisory Committee on Aeronautics (NACA) in 1917, when the early library system made extensive efforts to acquire documents from worldwide sources that related to NACA programs. (COTT 92)
In 1945 the National Advisory Committee for Aeronautics (NACA) was founded in Langley Laboratory, which was engaged in R&D for Guided Missiles. In 1955 NACA was authorized to construct certain research facilities at the Langley Aeronautical Library, the Ames Aeronautical Library, the Lewis Aeronautical Library, and the Pilotless Aircraft Station.

After the Russian Sputnik Affair in 1957, NASA was founded in 1958. In October 1958 the Pioneer 1 Space Probe was launched and by July 1969 NASA had amazed the world by landing the first men on the Moon.

From NASA's conception the need for and role of a centralized scientific and technical information system was recognized. NASA's enabling legislation requires NASA to "provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof" and to "continue to contribute materially to "cooperation by the US with other nations and groups of nations in work pursuant to the Act and in the peaceful application of the results thereof" (COTT 92).

In 1960 NASA gave birth to the NASA Office of Scientific and Technical Information (NASA OSTI), which now is called the NASA Scientific and Technical Information (STI) Program. In 1962 the NASA Scientific and Technical Information Facility (NASA STIF) was founded, a Government-owned, Contractor-operated facility, which now is called the Center for AeroSpace Information (CASI). In 1962 NASA started a cooperation with the American Institute of Aeronautics and Astronautics (AIAA). In 1963 NASA started the production of the Scientific and Technical Aerospace Reports (STAR), an abstract bibliography. H.P. Luhn of IBM developed the concept of SDI, and SDI-5 was designed and installed for NASA (HOLM 68). In 1964 NASA actively participated in COSATI. In 1967 the NASA Thesaurus was constructed (INFO 71)

In 1969 the RECON database was developed, providing access to the largest collection of aeronautical and space science STI in the world. The retrieval engine for this STI database, developed by Lockheed, was the first of its kind and was used as the basis for developing the Dialog Information Retrieval Service and other US and foreign government agency retrieval systems. When this infrastructure was developed, it placed NASA as a leader in STI processing from the mid 1960s to late 1970.
In 1984 a system was developed for automatically converting sets of terms assigned by DoD indexers to sets of NASA's authorized terms, which matches concepts rather than words, because 20 % of the report literature added to the NASA database is previously cataloged and indexed by DTIC (KLIN 84). In 1993 this Subject Switching system was improved into an operational online interactive machine-aided indexing tool (KLIN 93).

DTIC	NASA
administrative personnel	management, personnel
aircraft; drones	drone aircraft

In 1988 Thomas Pinelli of Langley Research Center wrote a Doctoral Thesis 'Role of the US Government Technical Report in Aeronautics: An Exploratory Study". In this study attention was given to the extent to which the selection of an information source is influenced by the factors of accessability, expense, relevance, timeliness and comprehensiveness; to the attitudes of aeronautical engineers and scientists toward information technology and toward scientific and technical libraries (PINE 88). This thesis led to the NASA/DoD Aerospace Knowledge Diffusion Research Project, with some 25 reports and papers about the value of STI, the role of Information Intermediaries, the diffusion of technology etc. In 1992 Pinelli mentions Active Diffusion and Intelligent Databases to improve Technology Transfer, coordinated by a body similar to the defunct COSATI (PINE 92).

The NASA STI program is currently pursuing a modernization effort that applies new technology to current processes, to provide near-term benefits to the user. In conjunction with this activity a long-term modernization strategy is being designed to transition the program to a
"multimedia global library without walls". Critical pieces of this long-term strategy include streamlining access to sources of STI by using advances in computer networking and graphical user interfaces; creating and disseminating technical information in various electronic media including optical disks, video and full-text electronic publishing (COTT 93).

The NASA Access Mechanism (NAM) prototype graphical user interface (GUI) provides access to remote heterogeneous and distributed information in a manner adaptable to both casual and expert users. Additionally, the NAM provides access to many INTERNET-based services such as Electronic Mail, the Wide Area Information Servers (WAIS) system, Peer Locating tools and electronic Bulletin Boards. The NAM is being developed in a multi-vendor platform environment and the screen formats are X-Windows based. The OSF/Motif toolkit is used for the GUI and SQL is used for database functions. The communications toolkit is TCP/IP based (HUNT 93).

NASA has exchange agreements with other US organisations such as the DTIC and the Department of Energy, Office of Scientific and Technical Information (DoE/OSTI). International exchange agreements consisting of Bilateral Document exchanges (39 with UK, 24 with Japan, 14 with France, 14 with Germany, 13 with Canada and 12 with the Netherlands), NASA/ESA tripartite exchanges and National level agreements are in place.
The NASA Aerospace database contains 2.252.000 English language research summaries covering 1962 to present. Approximately 27 % of the NASA database is made up of R&D results originally published outside the US. This percentage is increasing, in 1990 it was 36 %, as a result of better acquisition processes as well as as an increased proportion of the aerospace knowledge base being developed abroad. Material from 34 foreign languages is translated, SYSTRAN automatic translation.

As the aerospace programs of other nations grew, particularly in Europe with the creation of the European Space Agency (ESA), NASA found a natural partner for the cooperation in both its technical and its information programs. More recently in Europe we have seen the emergence of a European Aerospace Database (EAD) concept and an initiative for a Japanese Aerospace Information Reference System (AIRS). Because there is a desire for international cooperation, NASA and ESA have undertaken a survey concerning issues and opportunities for the future of information exchange, e.g. by unification of international aerospace database efforts toward a cooperative international aerospace database (IAD) initiative. The NASA STI program is working with its current exchange partners such as ESA to determine if there is enough support for an IAD to set up an advisory group in 1993 (COTT 92).

As a member of CENDI, NASA in 1990 became involved in the Inter Agency Working Group on Data Management for Global Change (IAWGDMGC). Because no one information center can hope to collect all the relevant text, bibliographic, numeric and visual data about Global Change, the inhabitants of the earth must be informed caretakers and form a coalition, North and South, to collect and provide access to disparate, multidisciplinary sources of information. Standardized tools for documenting and manipulating this data and information should be developed. Emerging information technologies can be utilized to build such decision support systems and personalized information systems. Outlines of some cooperative North/South strategies have been given (COTT 93).

The Continuous Improvements Program at CASI is the foundation for Total Quality Management (TQM) in NASA STI products and services. Four projects have been described (ERWI 93).

3. TEST THESAURUS AND COSATI SUBJECT CATEGORIES

In 1960 the Armed Services Technical Information Agency (ASTIA) published the ASTIA Thesaurus, which was the first Thesaurus in the USA and which led to the development of other Thesauri (VICK 60). In 1961 the American Institute of Chemical Engineers (AIChE) published the Chemical Engineering Thesaurus. By 1963, thesauri were cropping up on many fronts, especially in the fields of scientific research and development. The proliferation of retrieval languages (Thesauri) in the face of the growing need for worldwide cooperation between information systems raised the question : Is there still the possibility of developing a standard language for general use.
In 1963 Hammond, Klingbiel, Aines and SSIE studied a common vocabulary approach for government STI and proposed a single common subsumption scheme (HAMM 63).
In 1964 Klingbiel proposed a National Thesaurus from which selected subsets would be drawn (microthesaurus for specialized subject area's) (KLIN 64).

COSATI proposed to create a kind of generic superstructure of terms that will subsume a group of thesauri, or other types of vocabularies, in diverse subject fields. This approach was first proposed as a means of interconnecting several vocabularies used by government agencies in the US. The 'common subsumption scheme' was developed under the auspices of COSATI by a sub-panel headed by Paul Jaske of CFSTI and was published in december 1964 as the COSATI Subject Category List "SCL", having 22 major scientific and technical 'fields' in Alphabetic order, subdivided into 178 "groups" : 200 Subject Categories (COSA 64). The list was used to arrange the Government Reports Announcements of NTIS. It has been used to "partition" the terms in several Thesauri (e.g. the TEST) into broad subject categories. (LANC 86). COSATI also created the COSATI Guidelines for the development of information retrieval thesauri (COSA 67).

TEST THESAURUS

In order to ease the communication in the field of Engineering, the Engineers Joint Council (EJC), New York, started the building of a 'Thesaurus of Engineering Terms' in 1962 (WALL 62) (WALL 63). With funding by NSF this Thesaurus was printed in 1964. Sales of the publication had been quite successfull and it could be foreseen that a second edition would be self-sustaining. Simultaneously the US Department of Defense began its so-called "Project LEX" for the development of a DoD-Wide Technical Thesaurus, an official DoD standardization project MISC-0359 with the same purpose (HEAL 67).In a memorandum of 12 October 1965 the Office of Naval Research (ONR) was designated as the Assigned Responsible Agent by John Foster Jr of DDRE.

Both institutions decided later to work jointly on the same project. In the Foster memorandum a requirement of 910 man-weeks (17,5 man-years) of civil service employee time was established. The project used 876 man-weeks. 329 individual engineers and scientists participated an average of 5 days in panel/category sessions led by Eugene Wall. EJC provided the initial computer input, which was merged with terms from an additional 23 source vocabularies (DDC, NASA, NLM, VOLVO). All DDC terms had previously been categorized by DDC's modified version of the COSATI Subject Categories. The cooperation led to the 'Thesaurus of Engineering and Scientific Terms' (TEST), which was published by GPO using the new Linotron equipment in December 1967. The costs of building the TEST amounted US $ 500.000 (SCHO 70). The TEST contains 4 parts : Thesaurus of Terms (430 pages), Permuted Index, Subject Category Index (50 pages), Hierarchical Index.
The Fields and Groups of the Subject Category Index are nearly identical with the Subject Category List "SCL" of COSATI. The TEST contains 17.810 descriptors and 5.554 USE terms.

Director of the ONR project LEX was J. Heston Heald, who had some 10 lexicographers and 4 administrative staff on the project. Computer operations were led by W. Hammond (ARIES). Thesaurus rules and conventions were prepared by a Task Group of the Engineering Vocabulary Panel. Members of this Task Group were :

David M. Liston, Batelle Memorial Institution, Chairman
Margaret Hicks, CFSTI, assigned to Project LEX
Jack W. Hilf, Bureau of Reclamation, Dept of the Interior
Terry Gilliam, DDC, assigned to Project LEX
Eugene Wall, consultant to Project LEX (through the ARIES contract)

The complete terminology was made available to EJC and DDC on magnetic tape and to NASA on paper. DDC also received 10.000 paper copies. In 1967 DDC assumed responsability for the continued surveillance and maintenance of TEST, as recommended by ONR to DDRE&E.

Although US DoD had invested much money in the development of the TEST Thesaurus, DDC continued to use the DDC thesaurus for indexing of DoD reports, maybe because the terminology of the DDC Thesaurus and the terminology of the TEST were not quite the same and because DDC did not want to reindex old reports again (they had done that already in 1960).
In 1969 Paul Klinghiel of DDC, who had participated in the NSF/COSI/SSIE Vocabulary Study (HAMM 63) and who had been DDC focal point of the project LEX (HEAL 67), reported about Machine-Aided Indexing (KLIN 69). In 1970 he stated that machine-aided indexing of natural language is within the state of the art, and that highly structured controlled vocabularies are obsolete for indexing and retrieval (KLIN 70). In 1971 a planned revised TEST was not made.

But in Australia and Europe the TEST Thesaurus had a big impact.
A study was undertaken by ASLIB to compare existing general classification systems and Thesauri. Comparisons were made of 4 general classification schemes (Dewey/DDC, UDC, Bliss and Colon) many special schemes, and some major Thesauri (TEST, MeSH, and Euratom). The study concluded that no existing general scheme would be a satisfactory source for specialist uses and considered at what level standardization might be attempted (ASLI 69). In 1971 Sebor mentioned experiments of Aslib Cranfield, TDCK and VINITI concerning indexing with UDC and descriptors from TEST (SEB 71), while Wellisch wrote about a concordance between UDC and TEST (WELL 71).
In Australia the DEFTEST Thesaurus was developed, which is the Defence version of the TEST Thesaurus. Prior to 1984 American spelling was used, English spelling is used from 1984 onwards. The DEFTEST Thesaurus is being used for indexing 2500 items annually which are entered in the Cumulative Abstracts of Defence REadings (CADRE) database of Defence Central Library.
In 1988 a second edition of the DEFTEST Thesaurus was printed in 2 volumes by the Department of Defence, Canberra, Defence Reports Section.
DEFTEST Volume 1 A-L : AD-A198 267, DEFTEST Volume 2 M-Z : AD-A198 268.
In Europe the TEST Thesaurus was adopted by NATO-PCO for the NATO-PCO database on ESA, by PML-TNO in the Netherlands, by CDIFA in Portugal. A German TEST Thesaurus was published, which was the basis of the Thesaurus of DOKFz Bw.

NATO THESAURUS

From 1987-1991 the bilingual NATO Thesaurus was developed, which is based on an integrated combination of the DTIC Thesaurus with the DTIC Subject Categories (ZIJL 91). Because the DTIC Subject Categories are based on the COSATI Subject Categories of the TEST Thesaurus, the NATO Thesaurus combines the structure of the TEST Thesaurus with the DTIC terminology.
This means that there is no need for reindexing DTIC reports.
Because the AVOCON module of the Inquire software only allowed 4 digits for Subject Category Codes, the 6 digit codes of the DTIC Subject Categories had to be converted to 4 digit codes : 01.01.02 became 01AB, just as in the 1966 DDC Thesaurus (that also had a TEST structure).
New terminology to be included should be taken from other Thesauri, to promote compatibility with specialist databases such as INSPEC (electronics), NASA (aeronautics), or should be taken from NATO Glossaries, the Federal Supply Code (FSC), the IHS Technical Thesaurus, the International Military Dictionary.
The NATO Thesaurus has to be used as a common core for other NATO specialist databases such as the NIMIC database, because the NATO Thesaurus is not specific enough for the NATO Insensitive Munitions Information Center (NIMIC). The NIMIC vocabulary contains some 10.000 terms, of which at least 1.000 terms could come from the common core. In this case the NATO Thesaurus might develop into the Unified 'Total Thesaurus' (SOER 74) or the Superthesaurus.

In 1992 the development of the NATO Thesaurus on the mainframe unfortunately came to a standstill, because NATO started downsizing to minicomputers with ORACLE Rdbms for data and TOPIC retrieval software for text. TOPIC has no Thesaurus management module.
Proposals are being discussed for building a Thesaurus management module in ORACLE.

4. SUBJECT CATEGORIES, CLASSIFICATION CODES AND HEADINGS

BOOKS

In 1815 Thomas Jefferson sold his 6.487 volume personal library to the Library of Congress for $ 23.950, because the Library of Congress had lost most of its books when the Capitol, then home of the Library, was severely burned. The classification system that Jefferson had adopted for his collection, which accompanied the sale, was drawn from Francis Bacon's division of the sciences into 44 categories or chapters. The classification worked so well that the Library used it until the 1890s (LAMO 93).

In 1876 Melvil Dewey published the Dewey Decimal Classification (DDC) which is being used for shelf-classification of books. In 1892 the Des Moines Public Library was one of the first users. In 1979 the 19th edition was published. The print version of DDC is used by some 200.000 libraries.
The Library of Congress and the British Library are assigning DDC-numbers to English books.
Since 1992 DDC 20 is available on CD-ROM (Electronic Dewey) containing the full schedules, tables and index as well as related LC subject headings, which can be used during online cataloging. Because Dewey didn't want to include the amendments that were proposed by the Library of Congress, Hanson and Martel from 1989-1901 developed the Library of Congress Classification (LCC), which was published in 1901. The LCC has some 340.000 LC class numbers and is being used by the libraries of the Vrije Universiteit of Amsterdam and the Rijksuniversiteit Limburg in Maastricht.

LC Class	Class Caption
QA76	Electronic data processing
T385	Computer graphics
Z678.9	Libraries
Z699	Information storage and retrievals

A : General
Q : Science
T : Technology
U : Military Science
V : Naval Science
Z : Bibliography and Library Science

The national french subject headings authority list 'Repertoire d'Autorite Matieres Encyclopediques et Alphabetique (RAMEAU) is based on the LCSH subject headings (JOUG 89) and the RVM list of Laval University of Quebec (DESC 92). RAMEAU consists of 122.456 authority records and is available as public file to libraries via SUNIST, the national university network for STI.

In 1905 Paul Otlet and Henri Lafontaine published the Universal Decimal Classification (UDC), which can have up to 200.000 categories and allows for precoordination. For books a mini-UDC of 1000 categories is used in the library of Antwerp University.

In 1957 the SISO classification was published, which is related to UDC and is being used by public libraries in the Netherlands. 1980 : 4th edition.

In 1990 several Dutch libraries that participate in the PICA shared cataloging system have developed a tool for shared indexing, the Gemeenschappelijk Onderwerps Ontsluiting (GOO). The GOO is based on a classification and a separate Thesaurus with 40.000 keywords.
The Nederlandse Basis Classificatie (NBC) contains 2000 categories like the mini-UDC.

	UDC	NBC
Medicine	61	44
Economy	33	83

JOURNAL ARTICLES

The Universal Decimal Classification (UDC) of Otlet and Lafontaine became very popular in Europe before the second World War for 'deep' indexing of Journal articles. The UDC is even being used by VINITI in Russia and in the Netherlands by KUB/Tilburg, PUDOC/Wageningen, and TDCK.

In Engineering Science the CAL Classification Codes are being used by the Compendex database and Engineering Index Monthly.

	CAL code
Transportation	430
Automotive Engineering	660

EQUIPMENT

The Federal Supply Classification (FSC) is a Logistics tool being used by DoD for the classification of systems and materials. The FSC contains some 70 groups and 700 class numbers.
The FSC code is a part of the NATO Stock Number (NSN), which is used for identification.

Group

10 Weapons
11 Nuclear Ordnance
12 Fire Control Eqpt
13 Ammunition & Explosives
14 Guided Missiles
15 Aircraft & Arfrm Structural Cmpts
16 Aircraft Cmpts & Accessories
17 Aircraft Launching Ldng & Gnd Hdlg Eqpt
18 Space Vehicles
19 Ships, SM Craft, Pontoons, & Fltng Dock
20 Ship & Marine Eqpt
22 Railway Equipment
23 Motor Veh, Trlrs & Cycles
24 Tractors
25 Vehicular Eqpt Cmpts
26 Tires & Tubes
28 Engines, Turbines & Components
29 Engine Accessories
30 Mechanical Power Transmission Eqpt
31 Bearings
32 Woodworking Mchy & Eqpt
34 Metalworking Machinery
35 Service & Trade Eqpt
36 Special Industry Mchy
37 Agricultural Mchy & Equipment
38 Constn, Mining, Excvtng & Hwy Maint Eqpt
59 Elctrcl & Elctrnc Eqpt Components
67 Photographic Eqpt
72 Hshld & Commercial Frnshgs & Applncs
74 Off Mach, Txt Proc Sys & Vis Rcd Eqpt
75 Offc Supys & Dvcs

2305 Ground Effect Vehicles
2310 Passenger Motor Vehicles
2320 Trucks, Truck Tractors
2330 Trailers
2340 Motorcycles
2350 Combat Vehicles, tracked

7510 Office Supplies
7520 Office Devices & Accessories
7530 Stationery & Record Forms
7540 Standard Forms

RDP : NSN 7540-01-280-5500

STANDARDS

The British Standards Institute (BSI) has developed the ROOT Thesaurus to prepare and maintain databases of collections of standards. The subject display of the ROOT is as follows :

A General section
B Measurement, testing and instruments
C Science
D Chemistry
F Medical Sciences
G Environmental and safety engineering
H Agriculture, forestry and fisheries
I Food technology and tabacco
J Energy technology
K Electrotechnology
L Communication
M Control and Computer technology
N Mechanical engineering
O Military technology
P Production engineering
Q Transport engineering ----------
R Construction
S Mineral extraction technology
T Materials
U Metallurgy
V Chemical technology
W Wood, paper and textiles
X Consumer goods and services
Y Administrative sciences
Z Social sciences and humanities

QB	Transportation
QBV	Vehicles
QC	Road vehicle engineering
QE	Railway engineering
QF	Water transport engineering
QG	Hovercraft engineering
QI	Air transport engineering
QIC.IC	Aircraft engines
QIC.ICE	Aircraft petrol engines

In 1992 the International Classification for Standards (ICS) was published by ISO, the ISO/INFCO Consultative Group for Classification (CGC) being responsible for updating. A german version was published in 1993, which shows the following fields :

01 Allgemeines, Terminologie, Normung, Dokumentation
03 Soziologie, Dienstleistingen, Betriebswirtschaft, Verwaltung, Verkehr
07 Mathematik, Naturwissenschaften
11 Medizintechnik
13 Umweltschutz, Gesundheitswesen, Sicherheit
17 Metrologie, Messwesen
19 Prufwesen
21 Mechanische Systeme
23 Fluidsysteme
25 Maschinenbau
27 Energie und Warme ubertragungstechnik
29 Elektrotechnik
31 Elektronik
33 Telekommunikation
35 Informationstechnik
37 Abbildungstechnik
39 Feinmechanik
43 Kraftfahrzeugtechnik ----------
45 Eisenbahntechnik
47 Schiffbau und Meerestechnik
49 Luft und Raumfahrttechnik
53 Fordermittel
55 Verpackung
59 Textilindustrie, Lederindustrie
65 Landwirtschaft
67 Lebensmitteltechnologie
71 Chemische Verfahrenstechnik
77 Metallurgie
85 Papierindustrie
93 Ingenieurbau
95 Wehrtechnik

43.060	Verbrennungsmotore
43.080	Nutzkraftfahrzeuge
43.100	Personenkraftwagen
43.120	Elektrofahrzeuge
43.140	Motorrader
43.160	Spezialfahrzeuge
43.180	Prufausrustung

PATENTS

Although Patent organisations in the US, UK and Japan are using their own patent classifications, the patent organisations of most other countries are using the International Patent Classification (IPC). The IPC contains 8 sections, symbolized by a capital letter of the Roman alphabet, 20 subsections, 118 classes, 616 subclasses and over 64.000 groups.

A Human Necessities
B Performing Operations; Transportation ----------
C Chemistry; Metallurgy
D Textiles; Paper
E Fixed Constructions
F Mechanical Engineering; Lighting; Heating; Weapons;
G Physics
H Electricity

B 60 Vehicles in general
B 61 Railways
B 62 Land vehicles
B 63 Ships- B 63 GSubmarines
B 76 HMarine propulsion

TECHNOLOGY TRANSFER

In 1992 Technology Classification Codes have been developed by TII, Luxemburg, to classify technology offers and requests within the framework of the Technology Response Network (TRN) service. Because no appropriate classification could be found despite a quite intensive search, TII developed a new classification covering all areas of technology and manageable in size : 500 codes.

1 Biology, Biotechnology
2 Energy Technologies
3 Environmental Technologies
4 Information Technologies, Telecommunications
5 Basic Industrial Technologies
6 Sectoral Industrial Technologies - 69 Transport -
7 Materials Production and Processing

692 Motor Vehicles
693 Rail
694 Road
695 Shipbuilding

INDUSTRIES

For the Corporate America CD-ROM the US Government Standard Industrial Classification (SIC) product code is being used to describe the line of Business. SIC is used in many databases.

DATABASES : UDC

Now that there are several thousands of databases publicly available online, the inexperienced user needs help in selecting those appropriate to his needs. The basic criterion of selection must be of subject content, and some hosts already provide aid - e.g. DIALINDEX (Dialog), QUESTINDEX (ESA) - as does Easynet with its SMARTSCAN facility (VICK 93).
These help systems are based on Thesauri of databases, and hostspecific.

To help users select online and CD-ROM databases of different vendors other systems are being used. In the Netherlands at Katholieke Universiteit Brabant (KUB) the UDC is being used, in combination with the Nederlandse Basis Classificatie (NBC), for describing databases in the KUB Knowledge Navigator that was developed by Thomas Place.

The class numbers of the UDC are also being used in the EDOR system, which accepts natural language search queries. EDOR asks the user for an initial input, and scans it word by word. For example, the word "brass" is found to index a classnumber whose descriptor is : Copper alloys, Bronzes. Brass.
When a new term "corrosion" is entered, a classnumber is found for the descriptor : Physical and chemical influences. Corrosion. When this descriptor is too general, then "Chemical corrosion can be chosen from a menu, and then EDOR would search in an appropriate database for the UDC numbers of these subjects (VICK 93).

R&D REPORTS : COSATI CATEGORIES

In Europe several databases that contain report information are using Subject Categories that have been based on the COSATI Subject Categories :
NATO-PCO, SIGLE (European Report Literature), World Translations Index.

In the USA NTIS and DTIC are also using Subject Categories that have been based or are related to COSATI Subject Categories. Although the Subject Category Codes of NTIS and DTIC are different, the Subject Headings of the Categories still have much in common. (See table page 17).

R&D PROJECTS : MANY CLASSIFICATIONS

The 275 DTIC Subject categories that are assigned each year to 30.000 R&D reports for the DROLS Technical Reports database, are also assigned to the 27.000 R&D projects for the WUIS database of on-going research. So DTIC users can easily find information about published R&D reports and ongoing/current Research in Progress projects, using the same Subject category code.

In the US the FEDIX online information service, supported by DoE, ONR and NASA, provides information about Federal R&D opportunities for colleges, universities and research organisations. The FEDIX service is using the Keyword Thesaurus as a classification system for research opportunities. The Keyword Thesaurus has some 2500 Subject Headings and Codes.

010 Geographic Terms	070 Health/Safety/Medical Sciences
020 Agriculture/Food	080 Law
030 Arts/Humanities	090 Management/Commerce
040 Behavioral/Social Sciences	100 Science and Technology
050 Education	110 Other
060 Engineering	120 Energy

In Europe the COmmunity Research and Development Information System (CORDIS) describes R&D projects of the ESPRIT, IMPACT and other programmes of the European Community. Several classifications are being used for the subfiles RTD projects, RTD Results, and RTD Publications.

	RTD projects SIC code	RTD results Subject code	RTD Publications Subject code
Aerospace	AER		
Food	FOO	A18	020
Medicine	MED	A26	508
Telecommunication	TEL	D04	730
Transport	TRA	C28	314

In 1975 UNESCO published UNISIST Guidelines on the development of national information systems for current research and organised a symposium. In 1977 an informal meeting was organised about "the state of the art of on-going research information systems and services" : centralized national systems. In Europe the Comité pour la Récherche Scientifique et Technique (CREST) in 1978 preferred mission-oriented information systems.
In the Netherlands in 1977-1978 2 classifications were tested, the International Standard Nomenclature for fields of science and technology (ISN) of UNESCO, and the Nomenclature pour l'Analyse et la comparaison des programmes et Budgets (NABS) of the European Communities.
In 1980 the BSO classification and the NABS classification were chosen for the CILO database, which later became the NOD database of the Nederlands Bureau voor Onderzoek Informatie (NBOI), which contains descriptions of ongoing R&D at NL universities and laboratories :

Humanities/Social Sciences : NBOI classification
Technical Sciences : BSO classification of Eric Coates
Applications : NABS classification of European Community

Presently NBOI is using new Discipline Codes (DC), while Universities are still using ISN Codes.

	UDC	NBC	ISN	DC Publ	RTD	FEDIX	BSO	NABS
Physics			22				210	
Chemistry			23				230	
Medicine	61	44		23	508	0785	420	
Psychology			61			0414	450	
Economy	33	83		43				B Air transport
Economic Science			53					C Road transport
Economics						0408	580	D Railways
Transport technology					314		740	67-E Ships

aln 1992 the french department of Research and Technology published a report about Research in Progress (RIP) databases (FUNC 92). In 1992 Cuneke Tukker made a survey of Research in Progress databases (TUKK 92). The report mentions the IDRAS project (KEIT 89) and the activities of the European Community concerning the Common European Research Information Format (CERIF) (WOEN 88). The CERIF Format was published in 1991.

Cuncke Tukker and Laurens de Lavieter also designed a model (format) for the comparison of RIP databases. The model has the following fields : name, availability (online or offline), subject area, name and address of host, producer, conditions, participating organisations, fields of the database, language, coverage by country, update-frequency, costs, purpose and motives (TUKK 93).
Unfortunately they don't mention a good standard classification to be used for describing the subject area of the RIP databases.

December 2-4 1993 a congress concerning Research in Progress databases was organised in Amsterdam by NBOI. Much attention was given to standardization of RIP databases

5. STANDARDIZATION OF SUBJECT CATEGORIES AND TERMINOLOGY

The uncoordinated growth of databases is an impediment to online searching. Standardization and coordination are required if users are to be able to fully exploit the capabilities of online systems (FIDE 88). Standardization and improvement in Subject Access to recorded information worldwide must be accomplished before Expert systems can be truly useful for Information Retrieval (ALBE 90). Now that there are several thousands of databases publicly available online, the inexperienced user needs help in selecting those appropriate to his needs (VICK 93).
An ICSTI report also mentions the need for greater standardization in building databases (WEIS 93). What we need is a harmonized and standardized access to RIP databases and STI databases. This standardization can take place at different levels,

Level		Example	Application
25	Fields Missions	Medicine Defense	Dialog Blue-sheets
250	Groups Sciences		COSATI Subject Categories
2500			FEDIX keyword thesaurus
25000	Things Activities	Equipment	Descriptors
250000	Facets		Patent classes

Standardization at the 25 level isn't very useful,
and standardization at the 25000 level might be difficult.
Standardization might be easier at the 250 or 2500 levels.

5.1 STANDARDIZATION AT THE 250 LEVEL : COSATI

Many databases having classifications at the 250 level began using the COSATI Subject Categories that were developed in 1964 as a 'common subsumption scheme' for interconnecting thesauri used by government agencies in the US. In 1967 the TEST Thesaurus was based on a revised COSATI Subject Category List 'SCL', having 22 Fields (Disciplines/Missions such as : Aeronautics, Agriculture, Defence/Military, Medicine, Space) in Alphabetic order, each Field having some 10 Groups in Alphabetic order.
Because there was no custodian for the maintenance of the SCL since the demise of COSATI in 1972, there now are many modificated Subject Category Lists. In the US NTIS and DTIC both are using more (NTIS) or less (DTIC) modified COSATI Subject Categories. In Europe several databases are also using COSATI Subject Categories and modified COSATI Subject Categories : FIESTA, NATO-PCO, SIGLE, World Translations Index.

	Terminology	Number of Subject Categories		Number of Terms
SCL		200	(COSATI)	
DEFTEST	TEST	225	(TEST)	
Meeting Agenda		225	(TEST)	
NATO-PCO	TEST	225	(TEST)	17.000
WTI		225	(TEST)	
SIGLE		246	modified COSATI	
NATO	DTIC	275	modified COSATI	13.500
FIESTA/NST	CEDOCAR	400	modified COSATI	
NTIS/SRIM		400	modified COSATI	

COSATI Subject Categories have numeric codes : 01.01 to 22.09. Although the Category Codes are different, many Subject Headings of NTIS are similar to Headings of DTIC categories (see table).

TABLE

The SRIM Categories of NTIS are more or less closely related to the Subject Categories of COSATI and SRIM, but have different Category Codes (see below).

Users of the ADD and CAB services of DTIC have to subscribe to microfiches and abstracts based on DTIC Subject Categories and receive 824 reports about Aviation Technology in one year.

NTIS users of the SRIM service have to subscribe based on SRIM Subject Categories and receive 2616 reports about Aviation Technology in one year.

DTIC COSATI	NTIS SRIM	DoD AD	DoE DE	NASA N	COM PB	TOTAL
01 Aviation Technology	(51)	824	70	1184	295	2616
02 Agriculture	(98)	44	228	49	1348	1984
03 Astronomy and Astrophysics	(54)	82	292	701	122	1236
04 Atmospheric Sciences	(55)	441	359	435	404	1761
Administration and Management	(70)	1083	246	88	1380	2926
05 Behavioural and Social Sciences	(92)	1188	147	88	1241	3312
Business and Economics	(96)	112	113	11	1711	2023
Library and Information Science	(88)	231	242	107	3022	3968
06 Biological and Medical Sciences	(57)	1964	1854	116	4121	8526
Biomedical and Human Factors	(95)	385	80	184	362	1080
Health Care	(44)	172	34	0	1282	1515
07 Chemistry	(99)	1680	2666	254	1816	6901
08 Earth Sciences and Oceanography	(48)	463	1392	432	2531	5465
09 Electrotechnology and Fluidics	(49)	1049	631	410	669	3025
Power Propulsion and 10 Energy	(97)	208	5519	288	1046	7916
11 Materials	(71)	1084	2091	609	1662	6058
12 Mathematical and	(72)	600	374	355	284	1659
Computer Science	(62)	1681	517	769	1440	4684
13 Building Industry Technology	(89)	167	622	54	695	1762
Civil Engineering	(50)	326	132	12	931	1504
13 Mechanical and Industrial Eng	(94)	564	776	553	1269	3621
Manufacturing Technology	(41)	629	643	571	1378	3568
Marine Engineering etc	(47)	670	160	97	873	1929
Surface Transportation	(85)	237	227	160	1008	1889
14 Test Equipment						
15 Military Sciences	(74)	2755	263	19	1386	4442
16 Guided Missile Technology	(75)					210
17 Navigation,	(76)					275
Detection	(63)					827
18 Nuclear Science and Technology	(77)	77	6057	77	265	7282
19 Ordnance	(79)	492	236	23	109	887
20 Physics	(46)	3357	6252	1681	1512	12687
21 Propulsion						
22 Space Technology	(84)	231	118	1812	105	2424
23 Biotechnology						
24 Environmental Pollution	(68)	396	3069	132	4909	9226
25 Communications	(45)	448	43	375	501	1558

The SIGLE Subject Categories for European reports have been based on the COSATI Subject Categories of the 1967 TEST Thesaurus. Because this list dates from 1967 and had to be adapted to allow for new developments, SIGLE tried to cooperate with NTIS for the development of an Unified List. When this wasn't possible, SIGLE modified the COSATI/TEST list.

The DTIC Subject Categorization Guide of 1986 has 22 + 3 new fields. Some groups have been further divided : 01.01.02 etc. To help you select a category for an ADD or CAB subscription, the DTIC Subject Categorization Guide gives you the category codes of some 10.000 keywords from the DTIC Thesaurus.
The Subject Category Codes of the NATO Thesaurus have 4 digits : 01.01.02 became 01AB.

The SRIM Categories of NTIS have different Category Codes for similar Subject Headings. The SRIM Categories has 40 Fields, with Codes 40-90 (see Table), and 360 Groups

All agencies that are using (modified) COSATI Subject Categories for their Research in Progress (RIP) and Scientific and Technical Information (STI) databases should merge their Subject Categories and produce a standardized international Unified Subject Categories List 'USCL' with some 500 Subject Categories.

When this 'USCL' would be used by NTIS, SIGLE, WTI and other agencies such as EC/DGXIII (CORDIS RIP database), INIST, JICST, TII, this would really help inexperienced users and online information specialist, and enable easy SDI profiling and downloading, easy comparing databases, easy monitoring of trends etc.

Because many subject categories of STI databases are still related to the 250 COSATI subject categories, it is possible to develop a new standard Unified Subject Categories List 'USCL" at the 250-500 level, when the Custodian uses the 'USCL' for his own database.

R&D PROJECTS	R&D REPORTS	ARTICLES	BOOKS
DTIC/WUIS	DTIC/TR NTIS/SRIM SIGLE	WTI FIESTA/NST	 NATO-PCO

5.2 STANDARDIZATION AT THE 2500 LEVEL : METADATA

Another approach might be the development of an universal METADATA level of 2500 terms for describing databases, projects, reports and books. There are several classifications which could be used for developing this level.

R&D PROJECTS	R&D REPORTS	EQUIPMENT	BOOKS
FEDIX		FSC	DDC
CORDIS	CORDIS	TII	UDC NBC

In 1991 Eric de Grolier expressed his personal opinion that a new classification is needed in 1995 for the free access collections of the Bibliotheque de France, but also for university and public libraries. When Hanson and Martel could develop the LCC from 1898 to 1901, it would not be impossible for a French team to develop a new classification, with examples to draw upon as Bliss, DDC, LCC (GROL 91). If this French team should come available, they could start with merging FSC, DDC, UDC, NBC Categories and FEDIX into a new METADATA classification, that can also be used to describe databases that are related to the CALS standardization initiative.

5.3 STANDARDIZATION AT THE 25000 LEVEL : DESCRIPTORS

In 1964 Paul Klingbiel of DDC proposed a National Thesaurus. And in 1965 DoD and the Engineers Joint Council started working a common Thesaurus.
But when the TEST Thesaurus became available in 1967, it was not used by DDC.

In 1974 Dagobert Soergel proposed an Unified 'Total Thesaurus' based on a minimal set of general descriptors called an "Umbrella Classification'.
The general descriptors that are used by all participating institutions are presented as the inner circle (Core) of the total thesaurus, while the outer circle contains all the specialist descriptors that are used by any participating institution. So the total thesaurus can also be used as a 'Source Thesaurus' (SOER 72). This inner circle might be the 2500 level.
In 1975 Brian Vickery proposed a common set of search keys (descriptors) from a single generic (faceted) Thesaurus, to avoid the translation step between systems (VICK 75)

In 1989 Marcia Bates proposed to expand and enrich the TERM database of the BRS hostcomputer (which contains merged Thesauri from several fields) with an anormous variety of useful entry terms with all sorts of guidance to decide on the best term for a given search. In this case a Superthesaurus could be developed (BATE 89)

Databases such as CAB, AGRIS and AGRICOLA give acces to agricultural information. The CAB thesaurus (50.000 Descriptors) is used for CAB and AGRICOLA, the AGROVOC thesaurus (15.000 Descriptors) is used for AGRIS. In 1989 Information Specialists from NAL and PUDOC proposed to merge the CAB thesaurus and the AGROVOC thesaurus into the Unified Agricultural Thesaurus 'UAT'. A FAO Concordance list is available which maps CAB Descriptors with the corresponding AGROVOC Descriptors. The CAB and AGROVOC Descriptors and Subject Categories of AGRICOLA and AGRIS are knowledge bases of the AGRIRES expert system that is being developed by PUDOC and ZADI to assist retrieval from agricultural databases (KOEN 92). Presently CABI, FAO, NAL, PUDOC and ZADI are developing the 'UAT'.

The ERIC thesaurus is used for the ERIC database of the US Educational Resources Information Center, which annually grows with some 30.000 records, and also by a new Commonwealth Education database. This allows Dialog to produce the 'International ERIC' Ondisc with separate databases of the Australian Education Index, the Canadian ERIC and the British Education Index. But for the small European Documentation and Information System for Education (EUDISED) database, which annually grows with 1000 records of R&D projects, the very European EUDISED thesaurus has to be used.

A good international Thesaurus might be developed by the combination and integration of a good Subject Category Classification (NTIS/SRIM) with good Descriptors (JICST).

SUMMARY

	25 level	250 level COSATI	2500 level METADATA	25000 level DESCRIPTORS	250000 level
	Missions Fields	Sciences Groups		Things Activities	Facets
R&D Opportunity			FEDIX	JICST	
Project		DTIC CORDIS			
Report		DTIC NTIS			
Paper		DTIC			
Journal Article		FIESTA	Mini-UDC	UDC	UDC
Book		NATO-PCO	NBC	DDC	
Equipment			FSC		
Patent					IPC

6. CONCLUSIONS AND RECOMMANDATIONS

1. Inexperienced users and information specialists want harmonized and standardized access to mission-oriented and multidisciplinary RIP databases and STI databases

2. For mission-oriented databases in Aerospace, Agriculture, Education Unified Thesauri should be used : NASA UAT ERIC

3. For multidisciplinary databases the easiest way to obtain standardization is the combination and integration of the 400 SRIM Subject Categories of NTIS with the 50.000 Descriptors of JICST. NTIS could start by indexing foreign reports (PB numbers) with JICST terms. After 10.000 reports (6 months) a combination might be developed by using the ZOOM and HYPERLINE commands of ESA. NTIS and JICST : custodians and users.

4. An Unified Subject Category List 'USCL' should be developed by an international COSATI organisation with members such as : NTIS, JICST, SIGLE, CORDIS, The 'USCL' should be used for multidisciplinary databases, Current Content databases etc.

4. 'USCL' and JICST terms could be combined to a new International Thesaurus.
5. A METADATA level classification could be obtained by merging FEDIX, FSC, NBC

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Grey literature and the author/respondant relationship / H. Artus

Introduction

Grey literature is usually supposed to be a medium for informal scientific communication. Research reports are being copied and distributed to other research institutes or research units, to colleagues and friends or to anybody in the scientific scene whose interest shall be attracted to one's own research and research findings.

This idea of grey literature as a medium of informal communication is based on three assumptions:

1. Grey literature is still incomplete and preliminary, thus requiring criticism, discussion and communication.

2. The researcher or author is interested in deciding who receives his reports and preprints and who doesn't thus controlling the structures of information, awareness and communication himself; so he creates exactly the public he supposes to be the most adequate or the best for his findings or ideas.

3. On the other side, the recipients are interested in discussing the papers they receive thus taking their chance of being involved in informal communication about the latest results and helping improve them.

So the idea of informal communication presupposes a *reciprocity*, a commonly shared interest in a pre-discussion of recent results before they enter the (public) discourse of the scientific community. The social roles are different - researcher or author on one side, critic or referee on the other -, but the reciprocity of attitudes and rexpectations garantees the stabilization of this interactive system: next time the same game and the same people, but with reverse roles. (The expectation of this reciprocity, one could expect, controls the process of criticism: Since the critic expects the author to be his critic next time, he shall be somewhat cautious in his judgement and criticism.) And it is by this reciprocity or mutuality that the whole connexion of informal communication with its structures is stabilized in the course of time.

So we have to do with the assumption that is is a small circle, nearly a sort of *private scientific community*, consisting of friends and well-known and competent colleagues who discuss new results and ideas in secluded circles before they are formally presented to a wider, heterogeneous and - most of all - uncontrolled scientific public, the scientific community itself.

I think, the common attitudes about scientific communication cannot be expressed shorter and more precisely than *William Garvey* did. That is why I quote his description. Please note that we

have not to do with Garvey's private ideas, but that he is only the one who formulates the wide and undoubted consensus of the scientific community:

> *"When the scientist is clear enough about his research question to plan his investigation, he **interacts with his immediate colleagues**, usually to formulate his research problem more precisely...*
>
> *"During the first 12-18 months - from the time the work begins until the researcher believes he can give a complete and defensible report of it to colleagues working in the same subject-matter area - **the scientist is relatively uncommunicative about his work.** Exceptions ... are the casual ... discussions with immediate colleagues.*
>
> *"Very shortly after the researcher feels he can report his work, he begins to disseminate his findings, a process that continues for many months, **usually until he has submitted a manuscript** reporting his findings to a journal. **Usually the first reports are informal ones, presented to small, relatively sympathetic audiences** at gatherings such as **colloquia within the scientist's own institution.** Next, the researcher launches out into broader territory, perhaps responding to a request that he present his work at a **conference sponsored by the agency funding his research...***
>
> *"**Up to this point, the scientist's dissemination of information on his work is minor and primarily concerns persons who are already aware of the areas or problems he is working** on and who may need only the briefest communication to understand what he has accomplished. If all has gone well, the scientist, **having tested his findings and their interpretation on fellow workers, is now ready to disseminate his work to larger and larger segments of the scientific community.***
>
> *"Within a few months, about one productive scientist in four will report his work to a fairly large audience at a **meeting of a state, regional, or national professional society.** ... (This happens) **about 15-18 months prior to journal publication** of the contents of most of the papers presented" there*[1].

This is a very elegant and convincing description. Nevertheless, I shall try to prove that all these assumtions, hypotheses and interpretations are wrong or can at least be doubted. None of them can be corroberated in such an unequivocal way.

---

1 William D. Garvey: Communication: the essence of science: facilitating information exchange among librarians, scientists, engineers and students, Oxford, New York et al. 1979, p. 134f; all emphasizes added by me; HMA.

The data presented here are from an empirical survey with 1,600 Social Scientists in (West-) Germany, Austria, and Switzerland.[2] Please note that not only the data, but the conclusions as well do only hold for the area of the Social Sciences and cannot be generalized to other disciplines or even to Science at all. This would deserve further experience and empirical surveys.

I The data

1. Dissemination behaviour

Let us at first have a look at the genesis of grey literature in the context of the research process.

Explicitely or implicitely I always refer to the assumptions or hypothesis cited above. One of them says that it needs some time until the empirical data are gathered and at least partially analysed so that the first research report can be written and distributed. After this, it still takes some more time for informal communication, for re-writing and improving the manuscripts etc., so that - if a publication is intended that early stage at all - it takes place a considerable time after the first research report.

Production of literature in the course of research projects

In fact, the amount of grey literature as well as of formal publications grows nearly monotonously in the course of time (as table 1 indicates). It is interesting, however, that from the very beginning, there is a considerable number of formal publications, even during the first year of a research project:

2 A list of all grey and 'white' literature from this project is given in the appendix.

Table 1

Production of literature in the course of research projects: number of (grey and white) documents per research project

Duration time of project until now (in months)	Literature: number of grey documents (μ)	number of published documents (μ)	grey plus publ. doc. (μ)	number of projects	number of documents
1-12	1.5	0.4	1.8	72	139
13-24	2.7	1.3	3.6	99	358
25-36	4.6	0.6	5.1	63	322
37-48	3.9	1.8	5.4	35	190
49-60	8.1	1.9	9.3	12	112
>60	5.6	1.5	5.8	22	127
Total:	3.4	1.0	4.1	303	1,242

*) Some notes:
- The values of this column are not exact sums of the preceding ones. The reason is that in some cases we were given values for grey *and* 'white' literature, in others only for grey *or* white, and in some cases we were given no information at all.
- Please note that the values are *not cumulated*. So the data show the real amount of grey and 'white' documents at different stages of research projects.

The reason, I think, has not so much to do with communication behaviour or the like, but with completely different things. Although empirical research necessarily has to assume the shape of a project - i.e.: a temporary organisation, consisiting of a number of people dedicated to a well defined goal - in order to raise research grants, the real research questions, the topics and theories and everything of personal intellectual interest for the researchers go far beyond any such formalisation. Usually, scientists are working in the same field for years and years, so that their *continuous* activities are only arbitrarily segmented by formally defined projects. And so it is no wonder that already at the beginning of such projects there are not only research reports but formal publications as well.

The same holds for papers read at conferences of different kinds. The high rates of papers *already read* or *to be read in the next time* cannot be explained by the 'dynamics' of the research project itself, I think, but only with regard to such continuities trespassing the borderlines of any formal organisation and definition:

Table 2

Conference papers in the temporal course of research projects[3]

Project duration time until now (months)	Congress lecture is... already performed %	planned* %	undecided yet %	neither performed nor planned %	Total (100%)
1-12	27.0	22.6	19.0	31.4	23.4
13-24	30.6	30.6	21.5	17.2	31.7
25-36	37.1	22.4	21.6	19.0	19.8
37-48	50.0	25.0	13.3	11.7	10.2
49-60	56.1	26.8	4.9	12.2	7.0
>60	52.2	6.5	10.9	30.4	7.8

N=586
V=0.16154
Missing: 176

One could argue that these data were still in accordance with the hypotheses mentioned at the beginning. But actually they are not. The analysis of different types of conferences proves that there is not such a movement from the inside to the outside, from local or regional conferences to national and eventually international ones. Quite in contrary, the researchers seem to take each chance for reading a paper - where and when ever, be it a small session in a regional research committee, a regional or national conference or an international congress. The reason is quite simple: Most projects have a duration time of two or three years. Since conferences dealing with special topics do not take place regularly or periodically, no researcher can accept the risk to miss one of these rare opportunities. So the reason for offering a paper is by no means the idea of ideal scientific communication but quite a pragmatic one.) - - -

Another important question for the real usage and function of grey literature is the number of copies produced and distributed. Table 3 presents the absolute number of copies:

3 All tables present *row percentages* unless something else is explicitely mendtioned.

Table 3
Number of copies of grey literature

Number of copies	abs.	percent
< 10	13	10.8
10 - 20	17	14.2
21 - 50	28	23.3
51 - 100	27	22.5
101 - 200	11	9.2
201 - 1000	18	15.0
> 1000	6	5.0
Total:	120	100.0

Additionally, there were 16 cases indicating "more than 100 copies", but without further specification. The highest edition was 30,000 copies!

This distribution, I think, is very interesting. It shows clearly that in most cases the task cannot - or at least: not only - be communication. Twenty percent of all papers had an edition that is hardly equalled by some formal (social) scientific publications![4] By the way, the number of copies disseminated by the authors has obviously nothing to do with the size of the research team. The percentages are exactly the same for one-man-projects and for research groups of two or more.[5]

Actually, only one fourth of the copies is distributed to friends and colleagues personally acquainted with the author:

4 It could be interesting that there is a clear connexion between the *duration of research projects* and the number of copies of research reports:

Duration time until now (in months)	Number of copies (average) μ	Number of cases abs.	%
1 - 12	48	22	25.6
13 - 24	66	22	25.6
25 - 36	109	20	23.3
>36	96	22	25.6
Total:	79	86	100.1

5 Theoretical considerations as well as empirical data show that the decisive difference is that between teams of *one* and *more-than-one* researchers. The precise number is rather irrelevant. The researchers' academic degrees, however, have a certain importance. In nearly all cases informal communication is the better (the more 'ideal') the higher the (average) academic degree of the research team is.

Table 4
Recipients of grey literature I

Number of copies given...	Number of copies total	%
...to colleagues the author is personally acquainted with	1.740	26.4
...to colleagues not personally acquainted with	2.090	31.8
... to others	2.750	41.8
Total:	6.580	100.0

14 researchers said they did not distribute any copies, yet.

Consequently, the percentage of friends and colleagues personally acquainted with the authors decreasis with the total number of copies: The more copies, the less personal friends among the recipients:

Table 5
Recipients of grey literature II
(column percentages!)

Grey literature was given to colleagues the author is personally acquainted with:

Number of copies	Yes		No		Other		Number of recipients	
	abs.	%	abs.	%	abs.	%	abs.	%
up to 10	53	51.0	21	38.2	13	30.2	29	26.4
11-20	30	28.9	8	14.6	7	16.3	18	16.4
21-30	4	3.8	4	7.3	9	20.9	7	6.4
31-50	10	9.6	11	20.0	2	4.7	20	18.2
51-100	7	6.7	7	12.7	3	7.0	19	17.3
101-200	-	-	2	3.6	2	4.7	7	6.4
>200	-	-	2	3.6	7	16.3	10	9.1
Total: (100%) N=240	104		55		43		110	

Since multiple answers were allowed, the values of right column are *not* the sums of the preceding ones!

Additionally, we received answers without a numerical specification:

	15	8	17	25
Total (abs.):	119	61	60	135

N= 240

So far the data dealing with the production of grey literature and its dissemination among colleagues. *In toto* we can say that the dissemination behaviour of researchers does not exclude the attitude of informal communication, but that the number of copies as well as the manners of dissemination point out to goals going far beyond this. We should keep this in mind when dealing with response behaviour of colleagues and eventually with the impact of such communicative feedback.

2. Feedback by recipients

The distribution of responses to grey literature, I think, is very interesting. Remember that I mentioned that the high number of copies pointed out to goals other than informal communication. My argument was that there is only a relatively small number of colleagues who are as well competent for communication as personally acquainted with the author, thus being suitable for informal communication by grey literature.

Table 6 shows quite clearly that the number of colleagues fulfilling these two requirements cannot be enlarged arbitrarily. Up to 20 copies, the percentages of responses remain the same. Any attempt to enforce more responses turns out to be a failure: The more copies, the lower the response rate in percent.

Table 6

Responses to grey literature

Copies distributed by author	Number of responses 0 %	1-10 %	11-20 %	21-30 %	31-50 %	Total %
1-10	37.0	63.0	--	--	--	26.5
11-20	38.9	61.1	--	--	--	17.6
>20	47.4	40.3	7.0	3.5	1.8	55.9
column-percent:	43.1	50.0	3.9	2.0	1.0	100.0

N=102
Missing: 51

As if there was a kind of natural law, in nearly all cases (93%) the number of responses is 0 or 1-10. When I constructed my questionnaire, I was unfortunately still a believer of the "official" attitude of grey literature as a medium of informal communication. So I expected lots and lots of responses. That is why I did not specify the range from 1 to 10. If I had, I am sure, most of the answers would read "just 1 or 2 responses".

Not even personal acquaintance really influences the response behaviour, as is proved by table 7. The response rates remain the same no matter whether author and respondant know each other or do not:

Table 7

Personal acquaintance and response to grey literature

Colleague personally acquainted?	Response yes % abs.	no % abs.	Total (100%)
yes	60.7 (71)	39.3 (46)	66.1% (117)
no	61.7 (37)	38.3 (23)	33.9% (60)

N=177
Missing: 39

The only factor with a real impact is the *professional age*: researchers being on the scientific scene for more than ten years receive 40 percent more responses than the 'youngsters'. Scientists, one could argue, do not only build up more but also qualitatively different relations to their colleagues in the course of their professional career, among them contacts that provide for informal interaction including communication. This, I think, is a clear remark that *social* factors or relations could be as important as *cognitive* ones. In this case the distribution of grey literature as well as the feedback to it could turn out to be part of quite another game than that of informal communication.

There is another set of data indicating the same connexion. Looking at the temporal course of research projects, I found that the response rate grows monotonously from year to year. Projects running more than 36 months report 50 percent more responses as compared to those running up to one year:

Table 8

Responses to grey literature in the course of the research project

Duration time of project until now (in months)	Number of responses						Total (100%)
	0		1-10		>10		
	%	abs.	%	abs.	%	abs.	
1-12	57.7	(15)	30.8	(8)	11.5	(3)	24.1% (26)
13-24	40.7	(11)	44.4	(12)	14.8	(4)	25.0% (27)
25-36	29.2	(7)	50.0	(12)	20.9	(5)	22.2% (24)
>36	38.7	(12)	51.6	(16)	9.7	(3)	28.7% (31)

N=108
Missing: 28

Please note that the values in table 8 are not cumulated. So the trends are not trivial in that they were just products of a mathematical operation (addition).

Just to complete this chapter, I would like to mention the projects' *methodological orientation* as a factor influencing the response rates:

Table 9

Projects' methodological orientation and the response rate

Method	Feedback by colleagues yes % abs.	no % abs.	Total (100%)
empirical	55.6 (70)	44.4 (56)	98.4% (126)
theoretical	44.0 (11)	56.0 (14)	19.5% (25)
methodological, statistical etc.	39.1 (9)	60.9 (14)	18.0% (23)

N=128 (Multiple responses were allowed, so that we received percentages more than 100)
Missing:30

This would allow for a convincing model:

Theoretical level	Communication
meta-theoretical	lowest communication
↓	↑
theoretical	medium communication
↓	↑
empirical (un-theoretical)	highest communication

which means that the higher the theoretical degree the lower the degree of informal communication and *vice versa*.

This looks very nice, but I have to make two limitations: *Firstly*, the absolute numbers are relatively small (N=128), and *secondly* I cannot give a convincing explanantion for these observations - at least not a simple one...

3. Impact of feedback on reworking/re-writing the papers

a) Planning formal publications

One common idea about grey literature is that it is a preliminary version of a following publication, so that the informal communication is a process aiming at criticism and improvement of the unpublished papers.

Actually, in most cases a formal publication is planned by the authors:

Table 10
Publication of grey literature

Already formally published	18.5%	(53)
Accepted for publication	12.9%	(37)
Publication intended	39.5%	(113)
Undecided, yet	12.6%	(36)
Publication not intended	16.4%	(47)
Total:	99.9%	(286)

Note: All answers concerning distribution and responses, number of copies, processes of reworking and publication etc. refer to documents sent in along with the questionnaires. This is a special feature of our survey: We asked for the grey documents themselves so that we could analyse them as well; and so we were able to ask for the real 'publication career' of exactly these documents. On the other hand, this procedure sometimes spoils the sample sizes.

Although in many cases we have to do with intentions, not with facts, the direction is clear: The authors want to have their papers published, be it as a book (25%), as a journal article (31%), as an article in an omnibus volume (20%), or something alse: part or chapter of a book, more than one article etc. (14%); just 16 percent do *not* intend a formal publication at all. (In the temporal course of the project, the percentage of those not intending a formal publication at all decreases from 25% (first year) to 10% (third year), after that time, however, going up again to 17%.[6])

6 This is an effect that could be observed all over the data of my survey: Projects with a long or even 'super long' duration time were somewhat different in nearly all respects. The projects themselves resp. their social settings seem to be of a different kind. For those interested in this topic cf. *Artus, Helmut M.:* Graue Literatur: zum informellen Kommunikationssystem der Sozialwissenschaften..., op. cit.

b) Processes of reworking grey literature

The assumption quoted above turned out to be true: Actually most unpublished papers undergo severe (??)/ <tiefgreifende> changes of any kind. Only about one third of them is not subject to considerable processes of reworking:

Table 11

Reworking of grey literature for formal publication, case I: Literature already published

Cannot tell because more than one papers were put together			26.3%	(45)
No considerable difference			31.6%	(54)
Considerable changes*		total:	42.1%	(72)
- text	100.0%	(72)		
- data/tables	44.4%	(32)		
- appendix/documentation etc.	22.2%	(16)		
Total:			100.0%	(171)

*) Multiple responses were allowed. The basis for the percentuation of changes was N=72, although only a certain (but unknown) part of the reports really included data and appendices/ documentations. That is why we have to assume that the percentages in these two rows are too small.

Just for comparison, I add the data for the other case, where we asked for the *intention* of reworking and publication. Obviously, the data are quite similar:

Table 12

Reworking of grey literature for formal publication, case II: Publication still planned

Considerable difference	38.5%	(74)
No considerable difference	42.2%	(81)
Undecidable, yet	19.3%	(37)
Total:	100.0%	(192)

The following table 12 shows the incredible variety of changes made in any part of the papers and in any respect. There are changes of any kind and of any importance. Texts are enlarged or abridged, they are subject to stylistic polishing or to theoretical improvement, the data are aggregated - or disaggregated (or even dropped at all). And so on, and so on. There is only one trend: No trends!

Just in order to illustrate this situation, I present the different cases and the absolute data in the following table:

Table 13

Reworking grey literature - the details

a) Changes concerning the paper's text:

The text was...	
... considerably abridged	19
... considerably enlarged	14
... stylistically polished	15
... presented in a more theoretical mannor	14
... changed in other ways	8
Additional references given	17
Not pertinent since no text at all	--

b) Changed concerning data/tables:

Data/tables were...	
... considerably abridged	13
... considerably enlarged	16
... completely deleted	1
Stronger aggregation of data	6
Other changes	4
Not pertinent	4

c) Appendices, documentations (questionnaires, documents, computer programs etc.)

Appendix etc. was...	
... considerably abridged	9
... considerably enlarged	14
... completely deleted	7
... changed in other way	1
Not pertinent	7

*) Multiple responses were allowed - as well *within* the different 'chapters' (a to c), as *between* them.

c) Impact of responses

Summarising, we can describe the situation as follows:

- *Firstly*, from the very beginning of their research projects, scientists produce a considerable number of unpublished reports. Usually, the number of copies is 50 or (much) more, and in most cases, the authors of such reports distribute a considerable number of copies to collea-

gues personally known or unknown. That means that researchers make considerable efforts towards disseminating their papers.

- *Secondly*, the number of responses, however, is very small. In most cases there is not even 1 response.

- *Thirdly*, the authors make tremendous efforts towards reworking their papers and preparing them for formal publication.

So one should assume, that the few responses the authors have got from their colleagues are very precious and valuable. The hypothesis is that important, if not decisive impulses for improvement or changes of any kind are given by the colleagues critical feedback.

The reality, however, is quite different.

Table 14
Impact of responses on reworking of grey literature

Number of responses	No or only little impact % abs.	Undecidable, yet % abs.	Considerable impact % abs.	Total (100%)
1-10	48.2 (27)	39.3 (22)	12.5 (7)	77.8% (56)
>10	37.5 (6)	50.0 (8)	12.5 (2)	22.2% (16)

N=72
Missing:65

Only 12.5% of the authors report a considerable influence of the responses on the reworking of papers and the process of their preparation for formal publication. The percentages are somewhat higher with researchers with higher academic degrees and in research teams, but they never exceed 25 percent. Just 57 percent of the authors report any response at all, and of these 57 percent just 12 percent really make use of them.

One could argue that there are 40 or even 50 percent of *undecided* cases. It is true that in these cases the authors *could* decide to use the criticism, the suggestions and proposals made by the responding colleagues. But there are good reasons not to believe in this possibility: We asked another question referring to the past. Researchers who had read papers at conferences of any kind were asked for the impact of the discussion following the paper's presentation:

Table 15

Conference papers: impact of dicussion

There was no discussion at all	3.6% (7)
There was a discussion but no reason for considerable changes	86.0% (166)
Discussion leading to considerable changes	10.4% (20)
Total:	100.0% (193)

My conclusion is that in most *undecided* cases the authors will decide against impact. They will put lots and lots of work and labour in the reworking of their papers - but they will hardly give way to "external" criticism, proposals or the like. *Informal communication? Oh, yes! But only with myself!*

II Conclusions

So far the empirical part of my paper. Now we have to ask what all this means and how it can be explained.

After all the empirical data I have presented above, we can say that what Garvey describes is *not reality as it is*, but *as it should be*. It is not an empirical *de*scription but rather a normative *pre*scription. The picture of informal communication he draws is not completely wrong, but *idealised* by far. At least in the Social Sciences we do not find the researcher acting according to the rules (or laws) which Garvey postulates. His model of communication starting from the focus (where research work is done) and then, step by step, going from the inner to the outer circle - this model of informal communication is brilliant and fascinating, but unfortunately it is wrong.

The empirical data are showing a rather strange and contradictory situation: Although there are strong efforts towards the dissemination of grey literature, there is only very little feedback by the recipients of the papers no matter whether they are personally acquainted with the author or not. The strangest result, however, is that the authors hardly make any use of this feedback, of critical remarks or suggestions, although they make strong efforts towards reworking their papers for subsequent formal publications. They change each and everything - text, data/ tables, appendices etc. -, but communication does not seem to have any remarkable influence.

So, what is the production and dissemination of grey literature for? What are the reasons and expectations of authors disseminating their papers (and ignoring the rare responses)? And what are the normative orientations of the receivers responding or - usually - not responding to the litera-

ture? Are there perhaps orientations completely different from those that are suggested by our theories?

My *first conclusion* is that we possibly did not understand the process of reworking and formally publishing grey literature correctly, yet. The data show rather clearly that at least in a multitude of cases we cannot speak of the *formal publication of a certain grey paper* because two or more papers are compiled and worked in into just one single publication; or just the other way round, one grey paper is cannibalized for two or more publications. And there is quite a lot of cases reporting so tremendous changes in all parts of the papers (i.e. text, data, appendices) that we can hardly speak of simple reworking but rather of completely different versions of such papers. This means that the *process of reworking and publishing* is rather different from what we usually suppose.

My *second conclusion* is that as a consequence the *process of (informal) communication* is different as well. At least at times where authors are preparing their papers for publication, it seems, they are looking for anything but communication. The reason may be that the whole paper - its argumentation, its formal and logical structure, the interpretation of quantitative data etc. - is an unstable equilibrum that could be disturbed by any external influence. So at this time the author wants to be quite alone with his thoughts and his paper. This does not mean that the rare informal communication has no impact at all - but not now and not upon the publication prepared at the moment.

My *third conclusion* is that it is not the eager and communicative colleagues who understood the rules of the game but exactly those who do not respond, not those who communicate but those who refuse to communication.

Maybe our theoretical model of producing and publishing knowledge resp. papers is too simple and 'mechanistic'. Actually, we have to do with *steady* processes, with a continuous cognitive process and progress going on for years, not with *discrete* events like 'producing a research report', 'having it discussed', 'reworking it' and finally 'publishing it'. These are the different logical stages, but in fact they do not help understand what is really going on but cover it with a smoke-screen instead. Following such a conceptual segmentation, we cannot understand the process of research and knowledge creation as a continuous intellectual effort.

If my data and explications help make this a little clearer, my paper was not quite in vain.

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APPENDIX

Literature from the project on grey literature, performed by the Informationszentrum Sozialwissenschaften (Bonn, Germany)

Artus, Helmut M.: Graue Literatur in der Soziologie/ Soziologie der Grauen Literatur: Begleitforschung der Fachdokumentation Grauer Literatur (GRAULDOK) des IZ: Materialien, Grundlagen, Vorschläge, unveröff. Bericht, 148 p. + Anhänge, Informationszentrum Sozialwissenschaften: Bonn 1980

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Value and use of grey literature: the implications of networked publishing

J.S. Mackenzie Owen

Abstract

Digital information networks provide an opportunity for grey literature to become an important type of electronic publication. The concept of 'grey' literature itself will disappear as it evolves into a new concept of networked institutional publishing. This development will greatly increase the value of grey literature and lead to qualitative and quantitative changes in its use.

This paper discusses the underlying developments, the necessary steps in moving from grey literature to networked publishing, and the expected benefits in terms of added value and utility.

1. The value of information

Our society is often called the 'information society'. That does not necessarily mean that information is more readily available than in other societies. On the contrary, the concept of an information society seems to mean that we need an ever increasing amount of information in order to function in a normal way. Information is not a contribution to our society, it is a prerequisite for survival.

Information is a valuable commodity. It has economic, social and cultural values. I believe nobody would wish to challenge this statement. Enormous amounts of money are spent on creating, distributing, processing and using information. A large number of organizations and individuals can make a living out of the commercial value of published information. In most countries, diminishing library budgets are more than offset by investments in new technologies for networked distribution and retrieval of information. Without information, business activities become far more difficult; teaching, research and development become almost impossible, and society at large would come to a standstill. Information is of great value indeed.

Many institutions find it important to make information available in printed or electronic form - often with no intention of making a profit out of it. This is what we call 'grey literature'. It is institutional

information, in many cases with no commercial value to the producer. Nevertheless, there must be intangible values involved. Why else would people produce and disseminate grey literature, and others spend great effort in acquiring and it and making it available to end-users? Why else are there end-users for such publications? Why else do we spend a number of days in Amsterdam to discuss the subject of grey literature?

Information is a strange commodity, if a commodity at all. Let us look at some of its characteristics (Mackenzie Owen, 1992):

- Information has no *intrinsic* value. Information only acquires value in the context within which it is used. One can never tell *a priori* what the value of a piece of information is. The value of information is a *potential* value.

- In an economic sense, information has a '*value-in-use*' when it adds value to the process in which it plays a role. The extent to which value is added through the use of information does not depend on the value of the information alone. It also depends on the quality of the information system (which determines what information is available when and in which way to whom), and on the ability of the user to obtain maximum benefit from the information he or she acquires.

- Information systems (i.e. the organizational and technical infrastructure through which information is acquired), have an added value if they contribute to obtaining maximum benefit from the potential value of information.

- The value of information is not unambiguously related to its use or to the passing of time. Sometimes the value increases in time, as more and more people become informed. This is especially the case with public information. In other situations (e.g. commercial information), the value of information diminishes both in time and by use. This is especially true of information which can provide a strategic benefit in relation to others (e.g. competitors).

- Information cannot be quantified. There is no measure or unit to express the amount of information in relation to its value. In many cases, increasing the amount of information diminishes its value.

- The relationship between cost and value of information is unpredictable. It is no more than a statistical concept. Many information-based activities cost money but do not result in measurable benefits. On the other hand, there are many (but unpredictable) cases where the cost of information is but a fraction of the value obtained from its use.

- Much information (e.g. scientific knowledge) is produced with public funds. It hardly ever happens that the full cost of production is expressed in its market price. This leaves both the producer and the user of information with no sense of the real cost of information.

- When one acquires information, neither the seller nor the buyer have any certainty that its price will have a relationship to its value. People buy information (subscriptions) even before it exists.

- Having knowledge of information equals owning it. Therefore, suppliers of information usually do not tell what they are selling. Purchasers of information, for that reason, usually do not know what they are buying.

- The cost of acquiring and storing superfluous information is usually much lower than the cost of not having essential information (Feldman & March, 1981). This leads to over-production and over-consumption of information.

One of the major problems in discussing the value of information stems from the fact that we have no common language for describing information resources. In a recent study by F.W. Horton (1993), the existing systems of definition, measurement and classification have been identified as barriers to understanding and exploiting the role of information resources in an economy. There is a great need for further work on the role of information in the economy, involving many partners at an international level. It is unfortunate that NCLIS - who requested the preparation of the report by Woody Horton - has had to postpone further work in this area.

The type of information we are discussing here, and the information systems we use to distribute, store and retrieve such information, are of a rather specific kind. The main reason that the value of such information and information systems cannot be determined beforehand,

is not too difficult to understand. The reason lies in the fact that there is no direct relationship between the information as produced, and the tasks or problems for which it is used. This is nicely expressed by Taylor (1982, 1985) in the following way:

> 'All long term information systems - those that acquire, process, store and disseminate messages - are essentially a gamble that in the next minute, day or year these messages will be useful.'

> 'There is no simple, reliable, generally accepted means of measuring the value of information, particularly ex ante. - There are no accepted or standardized ways of assessing value. In fact, consensus on a basic definition of value does not exist.'

It is now clear that we have no generally accepted way of measuring the value of information to society. This is strange indeed. Why do we spend money on something which has no measurable value? Why invest in information and information technology if we do not understand its role? Why put an effort in something which can never guarantee to recover its cost? Why do we disseminate information without wanting to get paid for it? These are intriguing questions which deserve separate deliberation, rather than a superficial discussion here. So we shall now move away from the intriguing subject of *information* to the more tangible subject of information *systems*.

2. The value of the information infrastructure

It is important to emphasize the distinction between information and information *systems*. Taylor has argued that the value of an information system (and in general the *infrastructure* for providing information) is derived from the value of the information as such. The more value the information has for the organization, the more value will be added by the information system.

However, the added value of the information infrastructure also has a significance of its own. Information only acquires value when it is used in a meaningful way within a certain context. As long as information resides in the information system, it has only potential value. Any system or infrastructure which makes this potential value accessible and helps to realize its practical value, adds value to the process. Information systems achieve this by signaling the potential value of information and relating it to the needs of a specific environment.

Taylor's work is of particular interest, because he describes a number of ways in which information systems can increase the value of information to users. These are related to issues such as user friendliness, noise reduction, information quality, adaptability of the system, and savings in time and money. In addition, he argues that end-users should be allowed to choose the level of added value themselves. The system's interface should offer such choices, while the processes which provide added value would, of course, have to be implemented in the system.

In order to use this approach in the development of information systems, one needs both insight into the organizational context and the psychological aspects of information use. In other words: one has to understand the tasks and problems for which information is needed, as well as the way users acquire and apply information. In addition, users will have to have a sufficient understanding of the role of information in order to cope with the value-choices offered by the system. This includes an understanding of the cost and benefits of these choices. Unfortunately, we know very little about the relationship between cost and value of information, and most users understand even less of it.

In general, the following can be said with respect to the added value of the information infrastructure. An information system can never provide more value than the information it makes accessible. However, the quality of the information system - or information infrastructure at large - determines to a high degree if, how and to which extent the potential value of the information is realized. The cost of the information infrastructure proportionally decreases the value of the information. In order to assess the value of an information service, separate cost-benefit analyses is needed for the information provided and the information system to be used. The value of the information service as a whole is determined by the combination of both factors.

3. The information infrastructure for grey literature

An important conclusion can be drawn from the preceding discussion of the value of information. That is that the value of grey literature can be increased by improving the quality of the information infrastructure. There are many contributions that the information infrastructure can make. Networked publishing provides an important opportunity to do this.

In recent years, one of the most important applications of information technology has been in the area of communication networks for science, government and business. Local networks within institutions, national and specialized networks, and the almost global combination of these, the Internet, are rapidly becoming the principal communications highway. It is through the network that scientists inform each other about their work. The network is also a means for obtaining all kinds of published and unpublished information. In many ways - and increasingly so in years to come - the network is becoming a substitute for traditional information media such as published journals, libraries and online databases.

Networked publishing - using electronic networks for the dissemination of documents - can significantly improve the quality of information services and therefore enhance the value of information. This is especially true for information which is not readily available through traditional publishing channels. There are many potential benefits, including the following:

- Networks can be a cost-effective way of making information available. Expensive printing, binding and physical distribution become unnecessary.

- The cost of acquiring networked information is usually very low, both in terms of resource cost and in terms of time spent on obtaining the information.

- Electronic networks make information available immediately and without geographic restrictions. This can provide users with a much greater variety and timeliness of information.

- Electronic networks can potentially offer sophisticated retrieval mechanisms which enable end-users to directly access information relevant to their tasks and problems. This can reduce the effort spent on finding relevant information and prevent resources being spent on acquiring and processing irrelevant information.

- Much information acquired by end-users has to be processed, stored, integrated end re-used. Having information available in electronic form greatly improves the possibilities of doing so in an easy and cost-effective way.

4. The future of grey literature in networked publishing

The amount of documents available through electronic networks is increasing in a spectacular fashion. To give just one example: the universities in the Netherlands, in cooperation with the national research network, are already making internal documents (theses, research reports, image collections etc.) available on the network through document servers. It is highly likely that in future, more and more organizations will use the network as a distribution channel for their publications. Increasingly, the problem of grey literature will become a problem of networked publications.

The end-users of the future will acquire all their information through integrated desk-top systems, providing access to information resources world-wide. Working in such an environment, people may not be prepared to go to a library to acquire grey literature in paper form. Networked publishing therefore provides direct access to the future end-user environment. Official publishers already understand this. Although they are sometimes frightened by the many uncertainties involved, many publishers are already experimenting with networked distribution of their publications. Once this takes on, grey literature will have to follow.

The main problem with grey literature is that of *control* (hence the term 'grey'). Traditional or 'official' publishers have set up a distribution system which provides optimal control and access within the constraints of the technology and medium (paper) used. What we should try to do, now that grey literature is moving into the area of networked publishing, is to create an infrastructure which provides at least a similar level of control and access. There are two benefits in doing so. First, the value of grey literature to society will be greatly enhanced. Second, networked publishing will become an attractive and cost-effective alternative to traditional publishing.

If one extrapolates the present developments in information networking, two major trends become apparent. One is that the network is rapidly becoming a cost-effective publishing channel. Many mechanisms are being put in place (e.g. document servers, navigation systems) which enhance the attractiveness of the network for disseminating publications from a wide variety of organizations. One can expect a major increase in the use of networks for this purpose in the next decade. It is even

conceivable that in certain areas, e.g. in scientific communication, networked publishing will become the predominant mode. In that case, authors will not turn to official publishers any more, but disseminate their publications through the network.

The second trend is that networked publishing will lead to a much higher level of use of many publications which we now think of as 'grey' literature. If networked dissemination of institutional publications is organized well, access to such information will become much easier. Dissemination will become more rapid. Information acquired will be re-usable. Feedback to the author will be easy. These are all things that can enhance the value and usefulness of grey literature. This will all lead to an increased role of grey literature in relation to official publications.

The view that grey literature will transform into networked publishing, to the benefit of the end-user, is, of course, an optimistic one. A great deal of work still remains to be done before this can become feasible. To give a few examples:

- The main network for dissemination of electronic publications is the Internet. This is in fact the global *academic* network. In order to use Internet for networked publishing, it will have to become much more open and accessible to non-academic and commercial organizations. In fact, this is already happening, but developments are still very slow and diffuse.

- A proliferation of publications on the network and of organizations and *document servers* offering them, creates difficult problems in the area of retrievability. There is a need for improved access and *navigation* systems which help users to find the documents they need. Already, a number of such systems exist (e.g. Gopher, Veronica, Archie, WAIS, WWW - cf. Foster ea., 1993) but are in need of improvement.

- Access systems in general do little more than provide pointers to documents avaialble on the network. In order to do this in an unambiguous way, there is a need for some equivalent of 'standard book numbers' and 'shelf marks'. Work is already being done on so-called *Uniform Resource Identifiers* which serve this purpose.

- Using the network is a bewildering experience for many users. There is a need for user-friendly desktop environments which

provide transparent access to networked information resources and integration with local resources and applications. Environments such as X-Mosaic and Cello are examples of a first approach to this issue.

- Document distribution on the network is still predominantly text-based. For networked publishing there is a great need for *multimedia* capabilities in order to disseminate more sophisticated types of documents (cf. Adie, 1993).

- Although a certain proportion of grey literature is provided free of cost, many organizations need to recover cost or even create some profit from their publications. In order to achieve this on the network, there is a need for *cost recovery mechanisms* which allow some kind of payment to be transferred from the end-user (or his organization) to the originator of the publication.

- Electronic document distribution poses many problems in the area of *copyright* which cannot be resolved by applying existing legislation. This is - in conjunction with the issue of cost recovery - one of the major barriers to the development of networks as a medium for publishing (cf. Crews, 1992; Publisher's Association, 1993).

- A great deal of work still remains to be done on standardization for electronic document distribution. This work includes aspects such as bibliographic descriptions, resource identifiers, document formats and retrieval mechanisms (e.g. the Z39.50 and ISO-10162/3 protocols), among many others (cf. Dempsey ea., 1993; Dillon ea., 1993).

- In order to prevent a confusing proliferation of document providers on the network, a certain amount of *coordination* will be necessary. A solution may be to have National Document Distribution Centres which can act as clearing houses for networked publications.

- Finally, networked publishing and its value to users would benefit greatly from some kind of mechanism for quality control. Several options come to mind, such as linking user-feedback to access systems, and - at the institutional level - editorial boards (e.g. at universities and larger institutions).

It is clear that networked publishing can have an impact on both the producers and the users of grey literature. But what about intermediary organizations such as libraries? Here too, an impact can be expected:

- Networked publishing will accelerate the already visible shift from collection-based to access-based libraries. Once information is available on the network, there is less reason to retain it at the physical library location. The role of the library therefore shifts to that of a linking-pin: helping users obtain access to networked resources in a user friendly and cost-effective way.

- In order to obtain this new role, librarians will have to acquire specific network skills, both in a technical sense and as regards knowledge of 'gopher-space', i.e. being entirely familiar with the network resources available and their value to end-users.

- Libraries will also have to become involved in the further development of the network, with the development of access and navigation systems, and with standardization.

5. Conclusions

Using electronic networks for the dissemination of grey literature has potential benefits which increase the value of institutional publications both to the end-user and to the institution itself. If networked publishing continues to develop, it will lead to an increase in both the production and use of grey literature. It is not unlikely that networked publishing will indeed become the predominant way of disseminating institutional publications. For that reason, networked publishing and grey literature may provide significant competition to official publishers. However, if the world of grey literature does not make the transition to networked publishing, they will miss the link to the future end-user environment. In that case, the value of grey literature will diminish significantly.

The networked future of grey literature will stimulate the transformation of libraries from collection-based to access-based institutions. Libraries will have to acquire new skills in order to make this change, and will have to become involved in the major developments in the field of networked information resources.

Finally, a great deal of work still remains to be done in order to obtain maximum benefit from electronic networks for the distribution of grey literature. This includes issues such as commercial access to the Internet, development of access and navigation tools, uniform resource identifiers, multimedia, cost recovery, copyright, standardization, coordination at the national level, and quality control.

The developments described in this paper point to an important message for organizations involved in the dissemination of grey literature. It is not their mission to collect, store, index and provide documents, and in future there may even be no need for those functions. People involved in grey literature have a more important responsibility, which is *to make the potential value of grey literature available to society*. They should use information technology to do just that. Therefore, the strategy to be followed is to stimulate the use of electronic networks for the distribution of grey literature by the organizations that produce such literature. That strategy will increase the value of grey literature.

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The U.S. Government Technical Report and Aerospace Knowledge Diffusion: Results of an On-Going Investigation

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Abstract

The U.S. government technical report is a primary means by which the results of federally funded research and development (R&D) are transferred to the U.S. aerospace industry. However, little is known about this information product in terms of its actual use, importance, and value in the transfer of federally funded (U.S.) R&D. To help establish a body of knowledge, the U.S. government technical report is being investigated as part of the *NASA/DoD Aerospace Knowledge Diffusion Research Project*. In this paper, we summarize the literature on technical reports and provide a model that depicts the transfer of federally funded aerospace R&D via the U.S. government technical report. We present results from two surveys (one of five studies) of our investigation of aerospace knowledge diffusion vis-à-vis the U.S. government technical report and close with a brief overview of on-going research into the use of the U.S. government technical report as a rhetorical device for transferring federally funded (U.S.) aerospace R&D.

1. INTRODUCTION

NASA and DoD maintain scientific and technical information (STI) systems for acquiring, processing, announcing, publishing, and transferring the results of government-performed and government-sponsored research. Within both the NASA and DoD STI systems, the U.S. government technical report is considered a primary mechanism for transferring the results of this research to the U.S. aerospace community. However, McClure (1988) concludes that we actually

know little about the role, importance, and impact of the technical report in the transfer of federally funded R&D because little empirical information about this product is available.

To help fill this knowledge void, we are examining the U.S. government technical report as part of the *NASA/DoD Aerospace Knowledge Diffusion Research Project*. This project investigates, among other things, the information environment in which U.S. aerospace engineers and scientists work, the information-seeking behavior of U.S. aerospace engineers and scientists, and the factors that influence the use of STI (Pinelli, Kennedy, and Barclay, 1991; Pinelli, Kennedy, Barclay, and White, 1991). The results of this investigation could (1) advance the development of practical theory, (2) contribute to the design and development of aerospace information systems, and (3) have practical implications for transferring the results of federally funded aerospace R&D to the U.S. aerospace community.

In this paper, we summarize the literature on technical reports and provide a model that depicts the transfer of federally funded (U.S.) aerospace R&D through the U.S. government technical report. We present results from two surveys (one of five studies) of our investigation of aerospace knowledge diffusion vis-à-vis the U.S. government technical report and close with a brief overview of on-going research into the use of the U.S. government technical report as a rhetorical device for transferring federally funded (U.S.) aerospace R&D.

2. THE U.S. GOVERNMENT TECHNICAL REPORT

Although they have the potential for increasing technological innovation, productivity, and economic competitiveness, U.S. government technical reports may not be utilized because of limitations in the existing transfer mechanism. According to Ballard, et al., (1986), the current system "virtually guarantees that much of the Federal investment in creating STI will not be paid back in terms of tangible products and innovations." He further states that "a more active and coordinated role in STI transfer is needed at the Federal level if technical reports are to be better utilized."

2.1 Characteristics of Technical Reports

The definition of the technical report varies because the report serves different roles in communication within and between organizations. The technical report has been defined etymologically, according to report content and method (U.S. Department of Defense, 1964); behaviorally, according to the influence on the reader (Ronco, et al., 1964); and rhetorically, according to the function of the report within a system for communicating STI (Mathes and Stevenson, 1976). The boundaries of technical report literature are difficult to establish because of wide variations in the content, purpose, and audience being addressed. The nature of the report -- whether it is informative, analytical, or assertive -- contributes to the difficulty.

Fry (1953) points out that technical reports are heterogenous, appearing in many shapes, sizes, layouts, and bindings. According to Smith (1981), "Their formats vary; they might be brief

Second, the formal part relies heavily on information intermediaries to complete the knowledge transfer process. However, a strong methodological base for measuring or assessing the effectiveness of the information intermediary is lacking (Beyer and Trice, 1982). In addition, empirical data on the effectiveness of information intermediaries and the role(s) they play in knowledge transfer are sparse and inconclusive. The impact of information intermediaries is likely to be strongly conditional and limited to a specific institutional context.

According to Roberts and Frohman (1978), most Federal approaches to knowledge utilization have been ineffective in stimulating the diffusion of technological innovation. They claim that the numerous Federal STI programs are "highest in frequency and expense yet lowest in impact" and that Federal "information dissemination activities have led to little documented knowledge utilization." Roberts and Frohman also note that "governmental programs start to encourage utilization of knowledge only after the R&D results have been generated" rather than during the idea development phase of the innovation process. David (1986), Mowery (1983), and Mowery and Rosenberg (1979) conclude that successful [Federal] technological innovation rests more with the transfer and utilization of knowledge than with its production.

4.0 AEROSPACE KNOWLEDGE DIFFUSION AND THE U.S. GOVERNMENT TECHNICAL REPORT: AN ANALYSIS OF TWO SURVEYS

We have surveyed aerospace engineers and scientists in the U.S. and abroad as part of five studies. Survey populations have included members of professional (technical) societies as well as aerospace engineers and scientists at comparable aeronautical research facilities. Data follow that deal with technical report use from two surveys. A self-administered (self-reported) mail survey was used to gather data. A brief overview of the methodology is provided for each study. Data are presented in the order in which the surveys were conducted.

4.1 Study of the AIAA Membership

Two self-administered (self-reported) questionnaires were used for data collection. The membership (approximately 34,000) of the American Institute of Aeronautics and Astronautics (AIAA) served as the study population. Survey 1 investigated the relationship between the use of U.S. government technical reports and selected (seven) institutional and (seven) sociometric variables. Survey 2 investigated the use and importance of Advisory Group for Aerospace Research and Development (AGARD), DoD, and NASA technical reports; reasons for non-use of these reports; how U.S. aerospace engineers and scientists find out about (become aware of) and physically obtain these reports, the influence of seven factors on the use of these reports; and the use of specified technical information (e.g., computer program listings) in electronic format. The sample frame for both surveys consisted of 6,781 AIAA members (1 out of 5) who reside in the U.S and who were employed in academia, government, and industry. Survey data were analyzed using the Statistical Package for the Social Sciences (SPSS).

Survey 1. Systematic sampling was used to select 3,298 members from the sample frame to participate in survey 1. Two thousand and sixteen (2,016) usable questionnaires were received by the established cut-off date. With an adjusted sample of 2,894 and 2,016 completed questionnaires, the adjusted response rate for survey 1 was 70 percent. The survey spanned the period from May 1989 to October 1989. The following composite participant profile was based on survey 1 demographic data: works in industry (52.6%), works in management (37.5%) or in design/development (28.1%), has a graduate degree (70.3%), was educated (trained) as an engineer (83.0%), currently works as an engineer (67.5%), has an average of 21 years of professional work experience, and has had some part of this work funded by the U.S. government (82.9%).

Survey 2. Systematic sampling was used to select 1,735 members from the sample frame to participate in survey 2. With an adjusted sample of 1,553 and 975 completed questionnaires, the adjusted response rate for survey 2 was 63 percent. Survey 2 was conducted from July 1989 through February 1990. The following composite participant profile was based on survey 2 demographic data: works in industry (49.3%), works in management (35.1%) or in design/development (26.9%), has a graduate degree (72.5%), was educated (trained) as an engineer (83.6%), currently works as an engineer (66.7%), has an average of 21 years of professional work experience, and has had some part of this work funded by the U.S. government (84.3%).

4.1.1 Survey 1

Data regarding the use of U.S. government technical reports were collected from survey 1 participants. Within the context of other technical information products (i.e., conference-meeting papers, journal articles, and in-house technical reports), survey respondents were asked to indicate their use of and the importance of these four information products and approximately how many times they had used each product in the past 6 months in performing their present professional duties. As shown in table 1, almost all the U.S. aerospace engineers and scientists in survey 1 use the four information products in performing their present profes-

Table 1.
Use of Technical Information Products

Information Products	Percentage Using Product In --			Overall Percentage Using Product (n = 1,839)
	Academia (n = 341)	Government (n = 454)	Industry (n = 1,044)	
Conference-Meeting Papers	99.4	99.1	95.5	97.1
Journal Articles	99.4	97.4	95.5	96.7
In-house Technical Reports	97.9	99.6	98.8	98.8
U.S. Government Technical Reports	98.9	99.1	96.6	96.6

sional duties. There is no statistical difference in use among the academically-, government-, and industry-affiliated respondents. In terms of the highest level of education, career, and years of professional work experience, almost all the respondents use the four information products in performing their present professional duties.

Respondents rated the importance of conference-meeting papers, journal articles, in-house technical reports, and U.S. government technical reports using a 1 to 5 point scale (table 2). Of the four information products, in-house technical reports received the highest overall mean rating. The overall mean importance rating, although lower, does not differ considerably for conference-meeting papers, journal articles, and U.S. government technical reports. Statistically, academically-affiliated respondents attribute a higher importance rating to conference-meeting papers

Table 2.
Importance of Technical Information Products

Information Products	Average[a] (Mean) Importance Rating In —			Overall Average (Mean) Importance Rating (n = 1,839)	Total Respondents
	Academia (n = 341)	Government (n = 454)	Industry (n = 1,044)		
Conference-Meeting Papers	4.04	3.64	3.31	3.53	1,777
Journal Articles	4.35	3.49	3.26	3.52	1,775
In-house Technical Reports	3.02	3.98	4.05	3.84	1,766
U.S. Government Technical Reports	3.45	3.73	3.44	3.51	1,778

[a] A 1 to 5 point scale was used to measure importance with "1" being the lowest possible importance and "5" being the highest possible importance. Hence, the higher the average, the more important the product.

and journal articles. Government- and industry-affiliated respondents attribute a higher importance rating to in-house technical reports. (Government-affiliated respondents probably view U.S. government technical reports as synonymous with in-house technical reports.)

Statistically, participants who hold a doctoral degree attribute a higher importance rating to conference-meeting papers and journal articles. Survey participants who hold a master's, bachelor's, or no degree rate in-house technical reports more important than do survey participants who hold a doctoral degree. Scientists rate conference-meeting papers and journal articles more important than engineers rate them. Engineers rate in-house technical reports more important than scientists rate them. Engineers and scientists rate the importance of U.S. government technical reports about equal. With two small exceptions, the importance rating of the four information products increases as years of professional work experience increase.

Survey participants were asked to indicate the number of times they had used each of the four information products in a 6-month period in the performance of their professional duties (table 3). Data are presented both as means and medians. On the average, in-house technical reports are used to a much greater extent than the other three information products are used. Conference-meeting papers and journal articles are used to a greater extent by academically-affiliated participants. In-house technical reports are used to a greater extent by government- and industry-affiliated participants. Average use of U.S. government technical reports is about equal for all three groups. With the exception of in-house technical reports, use of the three remaining information products increases as the level of education increases. Survey participants possessing a doctorate make significantly greater use of conference-meeting papers and journal articles.

Table 3.
Frequency of Technical Information Product Use

Information Products	Average Number of Times (Median) Product Used In 6-Month Period For Respondents In --			Overall Average Number of Times (Median) Products Used (n = 1,839)	Total Respondents
	Academia (n = 341)	Government (n = 454)	Industry (n = 1,044)		
Conference-Meeting Papers	17.98 (7.00)	13.41 (4.00)	9.23 (4.00)	12.02 (4.00)	1,527
Journal Articles	26.60 (10.00)	15.41 (5.00)	9.99 (4.00)	14.74 (5.00)	1,503
In-house Technical Reports	9.22 (5.00)	17.91 (6.00)	23.91 (8.00)	20.30 (6.00)	1,535
U.S. Government Technical Reports	10.01 (5.00)	12.41 (5.00)	11.49 (4.00)	11.45 (5.00)	1,495

Scientists make greater use of the four information products than do engineers. Engineers and scientists make about equal use of in-house technical reports. Scientists make greater use of conference-meeting papers and journal articles than do engineers. The use of the four information products does not seem related to increasing years of professional work experience.

To help define the role of the U.S. government technical report within a formal information structure, survey respondents were asked to indicate what percentage of the conference-meeting papers, journal articles, in-house technical reports, and U.S. government technical reports they use are for purposes of education, research, management, and other. Overall, they use conference-meeting papers most often for research, followed by education and management (table 4).

About 74 percent of the conference-meeting papers used by survey participants working as scientists are used for research, and about 55 percent of the conference-meeting papers used by survey participants working as engineers are used for research. It is noteworthy that as the years of professional work experience increase, the use of conference-meeting papers for purposes of education and research decreases. The use of conference-meeting papers for purposes of management increases as years of professional work experience increase.

Table 4.
Use (Purpose) of Conference-Meeting Papers

Purpose	Average Percentage Of Use For Respondents In —			Overall Average Percentage Of Use (n = 1,839)	Total Respondents
	Academia (n = 341)	Government (n = 454)	Industry (n = 1,044)		
Education	20.16	25.27	25.41	24.23	1,355
Research	70.37	50.09	47.86	53.34	1,355
Management	6.05	17.62	18.16	15.38	1,355
Other	3.41	7.02	8.57	7.05	1,355

On average, journal articles are used most often for research, followed by use for education and management. Overall, journal articles are used about 52 percent of the time for research (table 5).

Table 5.
Use (Purpose) of Journal Articles

Purpose	Average Percentage Of Use For Respondents In --			Overall Average Percentage Of Use (n = 1,839)	Total Respondents
	Academia (n = 341)	Government (n = 454)	Industry (n = 1,044)		
Education	23.09	29.76	28.86	27.80	1,327
Research	69.14	49.41	45.60	51.83	1,327
Management	5.27	14.04	16.22	13.22	1,327
Other	2.50	6.79	9.32	7.15	1,327

Statistically, survey participants who hold a doctorate make greater use of journal articles than do participants with a master's degree or less. About 72 percent of the journal articles used by survey participants who work as scientists are used for research, and about 53 percent of the journal articles used by survey participants who work as engineers are used for research. As years of professional work experience increase, the use of journal articles for education and research decreases. The use of journal articles for management increases as the years of professional work experience increase.

In-house technical reports are used most often for research (52.86 percent), followed by management (21.54 percent) and education (16.20 percent) (table 6). Academic participants use

in-house reports most often for research, followed by use for education and management. Government and industry respondents use in-house technical reports most often for research, followed by use for management and education.

About 71 percent of the in-house technical reports used by survey participants working as scientists are used for research, and about 57 percent of the in-house technical reports used by survey participants working as engineers are used for research. As years of professional work experience increase, the use of in-house technical reports for purposes of education and research decreases. The use of in-house technical reports for management increases as years of professional work experience increase.

Table 6.
Use (Purpose) of In-house Technical Reports

Purpose	Average Percentage Of Use For Respondents In --			Overall Average Percentage Of Use (n = 1,839)	Total Respondents
	Academia (n = 341)	Government (n = 454)	Industry (n = 1,044)		
Education	14.76	18.20	15.61	16.20	1,349
Research	66.94	50.73	50.38	52.86	1,349
Management	11.70	23.73	22.94	21.54	1,349
Other	6.70	7.33	11.07	9.39	1,349

Overall, U.S. government technical reports are used most often for research, followed by education and management. Overall, U.S. government technical reports are used about 56 percent of the time for research (table 7.)

Table 7.
Use of (Purpose) U.S. Government Technical Reports

Purpose	Average Percentage Of Use For Respondents In --			Overall Average Percentage Of Use (n = 1,839)	Total Respondents
	Academia (n = 341)	Government (n = 454)	Industry (n = 1,044)		
Education	17.04	18.79	18.11	18.09	1,332
Research	70.50	52.60	52.18	55.89	1,332
Management	7.71	20.09	19.25	17.22	1,332
Other	4.75	8.52	10.47	8.80	1,332

NASA technical reports (74%) than DoD technical reports (59%), the average number of DoD technical reports used was slightly higher. Although the percentage of respondents using AGARD technical reports and technical translations was low, the frequency of use rate and the overall use rate for these information products were consistent.

The use of the four technical information products was correlated with their importance rating (table 11). Although the correlations were statistically significant, they were low for each of the four products. NASA technical reports had the highest use-to-importance correlation.

Table 11.
Technical Information Product Use Correlated With Product Importance

Information Products	Pearson's *r*	Number
Technical Translations	0.191*	128
AGARD Technical Reports	0.161*	188
DoD Technical Reports	0.198*	418
NASA Technical Reports	0.239*	516

* $P \leq 0.05$

Survey 2 participants who did not use selected technical information products were asked to indicate their reasons for non-use of these products (table 12). About 69% of the survey respondents gave not relevant to their research as their reason for non-use of technical translations, followed by availability/accessibility (54.8%), the time it takes to physically obtain

Table 12.
Reasons for Non-Use of Selected Technical Information Products

	Technical Translations		AGARD Reports		DoD Reports		NASA Reports	
Reasons	%	n	%	n	%	n	%	n
Not Available/Accessible	**54.8**	**278**	**53.7**	**212**	49.6	127	**39.0**	64
Not Relevant To My Research	**68.8**	**366**	**70.0**	**297**	69.0	194	**72.9**	159
Not Used In My Discipline	**45.1**	**205**	**51.1**	**181**	**37.1**	85	**47.5**	86
Not Reliable/Technically Inaccurate	7.9	27	3.1	8	5.5	10	2.3	3
Not Reliable/Language Inaccurate	13.5	47	16.2	44	17.1	33	5.4	122
Takes Too Long To Get Them	**51.0**	**214**	----	----	----	----	----	----
Not Timely/Current	39.1	152	----	----	----	----	----	----

a translation (51.0%), and not used in their discipline (45.1%). Reliability, in terms of either technical accuracy or language accuracy, was not a major factor in the non-use of technical translations.

Seventy percent of the survey participants gave "not relevant to my research" as their reason for not using AGARD technical reports. About 51 percent of the respondents listed "not used in my discipline" and about 54 percent of the respondents listed "not available/accessible" as reasons for not using AGARD technical reports. Sixty-nine percent of the survey participants gave "not relevant to my research" as their reason for non-use of DoD technical reports followed by "not available/accessible (49.6%) and "not used in my discipline" (37.1%). About 73 percent of the respondents gave "not relevant to my research" as their reason for non-use of NASA technical reports followed by "not used in my discipline" (47.5%).

Survey 2 participants were asked to rate selected technical information products on the following characteristics: quality of information, accuracy/precision of data, adequacy of data/documentation, organization/format, quality of graphics, timeliness/currency, and "advancing the state of the art" in their discipline (table 13). Survey participants rated the quality of information highest ($\bar{X}$ = 4.11) for AGARD technical reports, followed by the precision/accuracy of the data ($\bar{X}$ = 3.99), and adequacy of data/documentation ($\bar{X}$ = 3.83). Survey participants rated the quality of information in DoD technical reports highest ($\bar{X}$ = 3.89), followed by precision/ accuracy of data ($\bar{X}$ = 3.81), adequacy of data/documentation ($\bar{X}$ = 3.58), and organization/format ($\bar{X}$ = 3.58).

Table 13.
Average (Mean) Rating of Selected Technical Information Products

Characteristics	AGARD Reports		DoD Reports		NASA Reports	
	Average (Mean)[a] Rating	Number	Average (Mean)[a] Rating	Number	Average (Mean)[a] Rating	Number
Quality Of Information	**4.11**	**227**	**3.89**	**500**	**4.18**	**625**
Precision/Accuracy Of Data	**3.99**	**227**	**3.81**	**501**	**4.12**	**626**
Adequacy of Data/Documentation	3.83	225	3.58	499	3.90	622
Organization/Format	3.81	225	3.58	499	3.92	624
Quality of Graphics (e.g., charts, photos, figures)	3.62	228	3.41	500	3.88	626
Timeliness/Currency	3.60	225	3.56	498	3.80	622
"Advancing the State of the Art" in Your Discipline	3.57	223	3.52	493	3.84	612

[a]A 1 to 5 point scale was used to measure importance, with "1" being the lowest possible importance and "5" being the highest possible importance. Hence, the higher the average (mean), the greater the importance of the product.

Survey participants rated the quality of information in NASA technical reports the highest ($\bar{X}$ = 4.18), followed by precision/accuracy of data ($\bar{X}$ = 4.12), and organization/format.

Survey 2 participants were asked the purpose(s) for which they use the four technical information products. The bulk of these products are used for research, followed by management, and education. Use (purpose) responses from survey 1 and 2 were compared (table 14). The use patterns are very similar: the technical information products from both surveys are used most often for research.

Table 14.
Use (Purpose) of Technical Information Products

Information Products	Percentage* (Number) Used for the Following Purposes			
	Education	Research	Management	Other
Survey 1				
Conference-Meeting Papers	24.23 (1,355)	53.34 (1,355)	15.38 (1,355)	7.05 (1,355)
Journal Articles	27.80 (1,327)	51.83 (1,327)	13.22 (1,327)	7.15 (1,327)
In-house Technical Reports	16.20 (1,349)	52.86 (1,349)	21.54 (1,349)	9.39 (1,349)
U.S. Government Technical Reports	18.09 (1,332)	55.89 (1,332)	17.22 (1,332)	8.80 (1,332)
Survey 2				
Technical Translations	40.2 (101)	86.5 (142)	45.0 (27)	34.7 (15)
AGARD Technical Reports	47.1 (56)	85.5 (207)	43.0 (28)	45.3 (19)
DoD Technical Reports	40.5 (37)	83.9 (413)	51.9 (131)	50.9 (63)
NASA Technical Reports	45.7 (169)	84.9 (530)	47.3 (107)	51.1 (59)

*Percentages do not total 100 percent for Survey 2 responses.

Survey 2 participants were asked to indicate the extent to which their use of the selected technical information products was affected by seven factors. Their responses are contained in table 15. Accessibility, technical quality, and relevance exert the greatest influence on overall use. Technical quality, ease of use, and familiarity or experience influence the use of technical translations. Accessibility, relevance, and technical quality are the factors that influence the use of AGARD technical reports. Relevance and accessibility influence the use of DoD technical reports. Relevance and accessibility influence the use of NASA technical reports.

Survey 2 respondents were asked how they find out about AGARD, DoD, and NASA technical reports and how they obtain them. The findings are shown in figure 2 and figure 3. Survey 2 respondents who used AGARD, DoD, and NASA technical reports were asked to indicate the various means by which they find out about these reports (figure 2). For presentation and discussion, the awareness choices are grouped into 3 categories: **Producer**, which includes announcement journals such as *STAR*; **User**, which includes colleagues and coworkers; and **Intermediary**, which includes interaction with a librarian or technical information specialist.

Table 15.
Factors Affecting the Use of Selected Technical Information Products

Information Products	Average[a] (Mean) Influence of the Factor on Use							Total Respondents
	Accessibility	Ease of Use	Expense	Familiarity	Technical Quality	Comprehensiveness	Relevance	
Survey 1								
Conference-Meeting Papers	3.79	3.43	2.50	3.56	3.74	3.38	3.97	1,552
Journal Articles	3.88	3.51	2.64	3.58	4.03	3.59	3.87	1,509
In-house Technical Reports	4.01	3.61	2.50	3.78	3.77	3.51	4.15	1,538
U.S. Government Technical Reports	3.65	3.38	2.51	3.52	3.73	3.55	3.90	1,573
Survey 2								
Technical Translations	3.54	3.43	2.34	3.40	3.68	3.73	3.86	223
AGARD Technical Reports	4.09	3.78	2.74	3.84	3.91	3.74	4.07	621
DoD Technical Reports	3.79	3.36	2.33	3.27	3.47	3.19	3.83	155
NASA Technical Reports	3.89	3.45	2.55	3.59	3.54	3.43	3.94	492

[a] A 1 to 5 point scale was used to measure influence, with "1" being the lowest possible influence and "5" being the highest possible influence. Hence, the higher the average (mean), the greater the influence of the product.

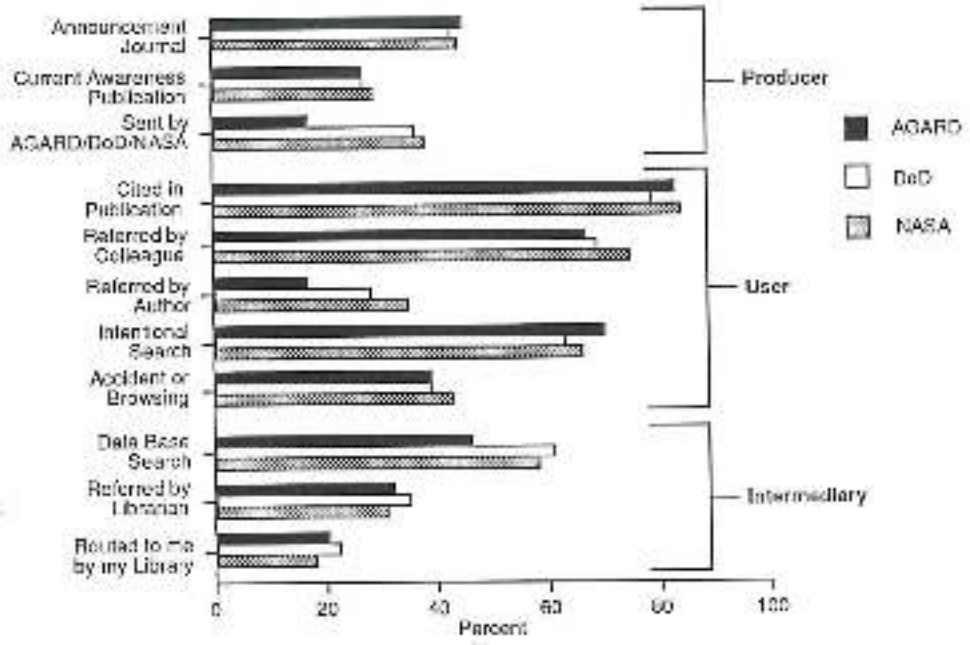

Figure 2. How U.S. Aerospace Engineers and Scientists Find Out about DoD and NASA Technical Reports.

Little difference was demonstrated in how U.S. aerospace engineers and scientists find out about DoD and NASA technical reports. **User** methods dominate awareness choices with "cited in a publication" and "referred by a colleague" being selected most often. **Intermediary** methods ranked second with "data base search" being selected most frequently. **Producer** methods ranked third with "announcement journals" such as *STAR* being selected most frequently.

From a list of seven sources, survey 2 respondents were asked how they actually access or obtain copies of DoD and NASA technical reports (figure 3). For presentation and discussion, the acquisition choices have been grouped into 3 categories: **Producer**, including sent by author; **User**, including obtained from a colleague; and **Intermediary**, including routed to me by my library.

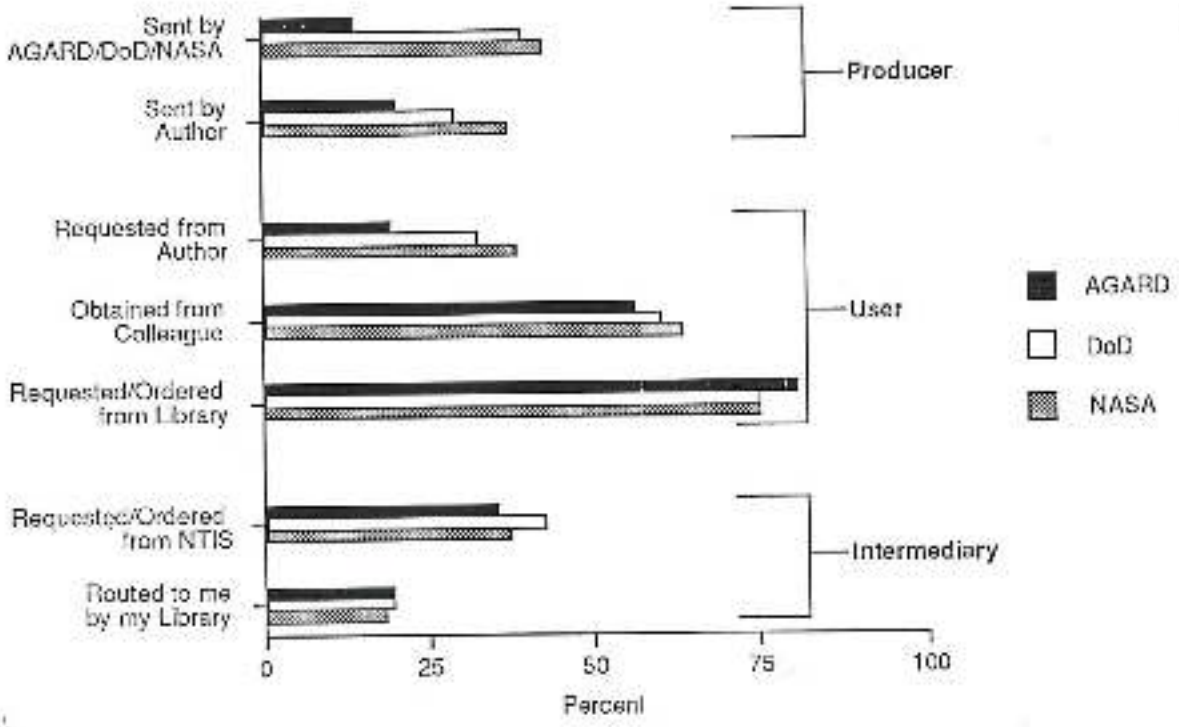

Figure 3. How U.S. Aerospace Engineers and Scientists Acquire DoD and NASA Technical Reports.

Overall, **User** methods dominate access choices with "requested/ordered from my library" being selected most frequently. (See figure 3.) **Producer** methods ranked second with "sent by DoD and NASA" being selected most frequently. **Intermediary** methods were third with "requested/ordered from NTIS" being selected most frequently.

5.0 FINDINGS

Readers should note that the data reported in this paper reflect responses of U.S. aerospace engineers and scientists belonging to the AIAA. The data may not be generalizable to U.S. aerospace engineers and scientists who are not members of the AIAA or who are members of some other professional (technical) society. Because the samples came from the AIAA, the responses may not necessarily be generalizable to the population of all U.S. aerospace engineers and scientists.

1. U.S. government technical reports are used by and are important to U.S. aerospace engineers and scientists. Overall, U.S. government technical reports are used most often for research. As years of professional work experience increase, the use of U.S. government technical reports for education and research decreases. The use of U.S. government technical reports for management increases as years of professional work experience increase.

2. "Not relevant to my research" and "not used in my discipline" are the reasons most frequently given for the non-use of (U.S.) DoD and NASA technical reports.

3. The quality of information and the precision/accuracy of the data in DoD and NASA technical reports are highly rated.

4. Relevance, accessibility, and technical quality influence the use of DoD technical reports. Relevance, accessibility, and familiarity influence the use of NASA technical reports.

5. **User** methods, with "cited in a publication" and "referred by a colleague" being selected most often, dominate the choices by which U.S. aerospace engineers and scientists find out about DoD and NASA technical reports. **Intermediary** methods ranked second with "data base search" being selected most frequently. **Producer** methods ranked third with "announcement journals" such as *STAR* being selected most frequently.

6. **User** methods, with "requested/ordered from my library" being selected most frequently, dominate the access choices by which U.S. aerospace engineers and scientists acquire DoD and NASA technical reports. **Producer** methods ranked second with "sent by DoD and NASA" being selected most frequently. **Intermediary** methods were third with "requested/ordered from NTIS" being selected most frequently.

6.0 CLOSING REMARKS

The data reported in this paper provide valuable insight into the use of U.S. government technical reports. Research presently underway will help determine the use of U.S. government technical reports by non-U.S. aerospace engineers and scientists. An empirical investigation of the U.S. government technical report as a rhetorical device for transferring the results of federally funded (U.S.) aerospace R&D is also being considered.

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Using grey literature in informal information service in Africa

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Abstract

There are increasing numbers of experiments (in countries as diverse as Sierra Leone, Tanzania, Benin, Senegal, Botswana, and Zimbabwe) with informal community information services dealing with health, hygiene, child care, cultivation, stock-rearing, trades, crafts and repair work, in the way in which surveys show that citizens require. Conventionally published material is in very short supply and seldom has relevant content. Services make use of such materials as are available, whether printed in leaflet, pamphlet, newspaper, poster, or flipchart form, or deliver information orally, on tape, filmstrip, or in the form of song, story, or dramatic presentation. Preliminary investigations show that the mechanisms for obtaining appropriate information to repackage for use in such information centres, and the capacity to carry out the repackaging exercise, are poorly developed in most of Africa. The official publications, reports, planning and policy documents from parastatals, development agencies, aid and charitable organisations and research centres, which contain this information, are poorly represented in the holdings of national library systems, research collections, or government agencies. Equally significantly, such institutions are not oriented in the dynamic way required to permit an effective repackaging exercise. There are, however, a few examples of appropriate arrangements for the acquisition, repackaging and distribution process which are cited as partial models of the way this work might be done.

1. INTRODUCTION

Grey literature is capable of being used to make an unusually significant contribution to the future of library and information service in Africa. Yet if this is to be done, it must be done despite the existence of a sustained crisis in the information sector of the continent. Received wisdom on how information and library service should be delivered has not provided effective answers to the needs of the poorest countries of the world. In Africa, librarians agonise over their marginalisation and powerlessness, whilst attempting to put into practice the lessons learned from information-rich, library-oriented societies. University libraries which are supposed to be 'the heart of the university' sit in imposing but neglected buildings, engaging ineffectively with learning patterns based on the words of the teacher. Research libraries flounder in the gratuitous complexity of their retrieval systems and struggle to meet the expense of

imported journals and monographs. Public libraries provide services suitable for a few expatriates and a western-educated elite, but provide very little in response to the clamourous demands of the school children whose desire to read is ever likely to be stifled by lack of things to read. Meanwhile, the semi-literate and non-literate majority population living in the rural and urban marginal areas strive to come to terms with a changing and frequently inimical environment. Their efforts to be better fed, healthy, better housed, more productive and generally secure have little assistance from formal information service of any kind. This is true of both libraries and extension services.

It is true that sensible things have been said about library services in Africa from their very inception in the years immediately before and after the independence of the majority of states. In particular, the Ibadan Seminar of 1953 suggested that "Dynamic public library service (in Africa as elsewhere) must be rooted in and evolve out of the needs, interests and conditions prevailing in the service area."[1] It also advocated surveys to establish just what the relevant conditions were. Yet thirty years on from Ibadan the situation could be characterised as follows - "Instead of playing an active role as change agents, most of these libraries play an information suppressing role to their community in failing to disseminate information geared towards bettering the lot of the rural poor. The public libraries still lack the interest or capacity for carrying out an analysis of the community, isolating its needs and satisfying them. They are yet to make a real commitment to the free flow of information, harnessing and providing ready access to information on rural development that would change the social circumstances of the rural poor."[2] Whilst some might argue that libraries were not intended to perform such a role, extension services were intended to do just that.

Extension services are typically attached to government ministries in the areas of agriculture, health, community development and adult education. They are designed to spread 'development messages' into the community by a variety of means. Agricultural extension, for instance has been closely associated with the so-called 'green revolution' in which new farming techniques, inputs such as seed, fertilisers and pesticides, and marketing opportunities were publicised by extension agents who visited farms explaining and distributing literature. The tendency was for the services to reach mainly the larger and better capitalised farms to the near exclusion of the rural poor. There has since been a shift in emphasis towards skills and practices more appropriate to smaller landholders on more marginal land. Integrated projects, involving the contribution of local people, have been launched to replace massive government planned schemes. However it has proved hard to change the perception that extension is about sending down messages from above, based on policies devised without regard to the needs and interests of their intended receivers in the countryside.

Some of this has been attributed to a general alienation between government and the masses. As Frantz Fanon put it in 1965 "The men at the head of things distrust the people of the countryside"[3] and, as might be expected, the people of the

countryside in turn distrust the men at the head of things. The existence of a 'development coalition' between government, industrial employers and agribusiness has been alleged,[4] with the bulk of the rural population excluded and fed messages intended to direct them towards official goals. In consequence, "Avoiding publicly monitored markets, working private plots, and seeking refuge in the most private of all institutions- the family - the peasants pursue private solutions to the problem of economic welfare."[5] In such a context of alienation, extension's messages are not well received, however well they might be conveyed. In fact they tend not to be well conveyed either.

Extension has always emphasised face to face contact between agent and local people, backed by printed and audiovisual materials, and messages conveyed through the mass media. In practice the agents have often been isolated and not very welcome figures, sometimes treated as if they were government spies. Use of media has often been strident and clumsy with radio messages relayed at the wrong time of day in unsuitable language and tone. There have also been problems with ill-designed and poorly-distributed literature. Namponya, in a survey of the literature on extension services,[6] concluded that they tended to reach only about half of the farming community and that about one third of farmers used radio as a source of information. He also found that the literature designed for farmers was not widely received though "most of them [the extension workers] have bought kitchen salt, soda, or curry powder usually sold by the spoon in groceries and markets in the townships and villages and found copies of the publications used as wrapping."[7]

The problem of extension service is not merely that it is too identified with officialdom, or that its messages are conveyed clumsily, but that is based on a misapprehension of the ways in which information acquires acceptance by the community. This has long been perceived by sociologists of communication and Leonard Doob summed it up well as long ago as 1961. "Development in rural Africa will not be achieved through centralised control and manipulation of the rural masses by urbanised, distant bureaucrats. A more localised, more personalised, more situation-realistic approach, which allows an interchange of initiative, which explicitly involves the talents of rural people and people whom they respect and trust, using media which are familiar and accessible to them, will in the long run, lead to the creation of a climate for changing the life of rural communities."[8] In particular, information service must construct its messages with in respectful acknowledgement of the existing body of oral indigenous knowledge.

This knowledge system has been defined as the "accumulation and dissemination of information in the form of shared environmental knowledge, beliefs, rules and techniques for productive activities... developed over generations as a product of man-environment interactions."[9] To take only a single example of the significance of this type of knowledge, recent research into the practice of storing and fermenting the maize porridge eaten as a staple in Ghana, shows that, contrary to the advice of health workers, this is much more likely to produce a diet free of diarrhoea-causing bacteria than fresh food.[10] Thus an examination of a traditional practice has proved it is more

appropriate to local circumstances than one imported from other conditions and other knowledge structures. It is also true that the oral indigenous knowledge contains beliefs and traditions which have no proven value, but these have to be addressed rather than merely overridden if new knowledge is to be effectively absorbed.

Social structure is crucial to the way in which messages are received and absorbed, and the communicator needs an understanding of the ways in which knowledge is passed on in rural society. Certain kinds of knowledge, for instance, are passed on as part of coming of age ceremonial, and systems of traditional apprenticeship are also widespread. Work and education were more or less indistinguishable, as "Both in childhood and adulthood, the traditional African contributed to family and communal economic wellbeing by acquiring the practical skills relevant to his immediate environment and practised by most of the other members of the community: animal husbandry , agriculture, dyeing, weaving, carving, skin tanning, fishing and so on."[11] Modern African governments seem to have inherited some of the colonial incomprehension of the significance of this mode of learning, and of the social organisation, methods of land tenure, religious beliefs which also influence how ideas and information are accepted. They have persisted with distinctly mechanical models of information transfer in the face of the evidence of the organic complexity of the system into which messages must be absorbed. Extension service has suffered from being at the meeting point of this conflict between mutually uncomprehending parties, whilst librarianship was somewhere off on the margins.

2. INFORMAL INFORMATION SERVICES: THE IDEA

It is the failure of both libraries and extension to function effectively which has turned attention towards the idea of new, informal services. Adimorah in a 1983 analysis of the failures of public libraries in Nigeria, suggested that 'Further research is needed on the information needs of Nigerians and their information gathering habits to enable public library directors to plan society-based services and create a true library tradition."[12] In fact in Nigeria itself some important research of just this type had already been done in Olabimpe Aboyade's RUDIS project at Ibadan University.[13] Researchers made regular visits to a selected village community, offering information, but taking good care to discover from the villagers just what kinds of information they wanted and in what forms they could accept it. The conclusion reached about the types of information required were in the first place unremarkable - health, occupations, education - but did include two areas - recreation and religion - which had not actually been anticipated. As for the conveyance of the information, the preference was for oral transfer, but tapes and posters, in association with opportunities for discussion, were very positively received. The important point was that the villagers reacted very positively to the service because they were seekers obtaining a reaction

from the service, not, as was usually the case with extension service, supposed to be passive recipients of messages prepared without reference to their sensibilities.

There has also been work in particular subject areas. Work on the expressed information needs of farmers by Oladele[14] suggests that there are three broad elements, market and demand information, inputs and supplies, and production technologies. Extension service was seen to concentrate on the latter more or less to the exclusion of the first and second. Slightly earlier research, such as Adimorah's survey of farmer's information needs in Imo State, Nigeria,[15] had found that the chief requirements concerned fertilizers, pest control and financial loans. Aina's research from the same period[16] largely corroborated this, identifying fertilizers, pest and disease control, seeds and other planting materials, and financial loans, as the chief concerns, with agricultural prices not far behind.

There has been less research with a whole community scope, but the International Development Research Centre (IDRC)'s INFORD survey in Botswana, Malawi and Tanzania is a major exception to this generalisation. The published Malawian results[17] show that the chief problems in their lives which respondents identified were overwhelmingly in the health area, with farming and fishing ranked second. When asked to think in terms of their information needs as such, many respondents could not suggest anything that they identified in this way. For those who could conceptualise their needs, health and hygiene ranked high, but literacy, agriculture and home crafts ranked higher. These two sets of responses, taken together with information from the survey on the places and personnel associated with information exchange, develop quite a full and convincing picture of the needs of villagers, and their perception of them in information terms.

Other projects on information transfer in rural communities are not numerous, but some are moving beyond the broad sweep of the INFORD survey. An example is research in progress in 1993 on how to make the most effective transfer of information to rural communities in Akwa Ibom State, Nigeria.[18] The aim is to examine why and how information is absorbed in some communities and yet fails to penetrate others which are superficially the same. This is partially inspired by the observation that an information campaign failed to persuade all its target villages that filtering water does not remove the goodness which promotes wellbeing, but does reduce the incidence of health problems caused by the Guinea Worm. The hypothesis that heightened economic activity, such as that generated by a scheme of small loans for fisheries development, encourages behaviour change including receptivity to the content of information campaigns, is being tested.

What the results of such research begin to do, is to lay the groundwork for the design and implementation of responsive information services, rooted in a knowledge of needs. Meanwhile the calls for such services and tentative suggestions for the form they might take have multiplied. Rahnema in 1982[19] outlined an information service wholly based on audio tapes, but particularly concerned with using recording technology to preserve and disseminate local culture and knowledge. Adimorah in 1983[20] saw a future for libraries in Africa as information

and documentation centres, and in 1984[21] developed the idea of integrated rural development units making use of mobile libraries, book boxes and village library centres. The locus for dissemination was a major concern for Durrani,[22] who identified kiosks selling food in Kenya as existing points for informal information transfer, at or near which information service could very effectively be provided. Mchombu in 1985[23] considered various alternatives to the National Library systems which are generally provided by African states as their means of giving information service to the public. Agbeleye in 1986[24] suggested re-orienting existing public libraries in Nigeria to an information and referral mode.

The most fully realised version of such ideas was published in book form in 1987 by Aboyade.[25] This elaborated in some detail the potential form of services that would: reinforce development messages put out by various agencies by permitting reference to the materials containing these messages at a fixed information point; repackage information into forms acceptable to the local population; acquire and organise specialised materials to permit deeper levels of information provision; fill the information gaps not tackled by extension services (eg the leisure and religious interests identified by her earlier research); provide information links between other information services and campaigns, and act as a source of feedback on local response. The services would be explicitly rooted in local languages, use acceptable media for information transmission, and interact with traditional patterns of communication.

This programme in its essence has continued to be advocated and expanded since. Iwuji in 1989 envisaged a community information resource: "This civic centre would be pulsating with community activities like work-based adult education such as agricultural extension instructions on new ways of doing old things, generation of reading materials for new literates, art and cultural exhibitions and festivals, viewing of recorded oral literature and tradition, meetings and workshops organised by the various interest groups in the community, and a whole range of other activities aimed at enhancing the social craft of the people."[26] Sturges and Neill in 1990 attempted to develop the idea of the personnel to be involved, talking of an 'information animator'.[27] Kedem, in 1991,[28] looked at library services from the literacy campaign point-of-view and concluded that new types of service should be an essential support for such programmes. Nthiga[29] contrasted the protected existence of the African professional librarian with that of the rural information seeker, and called again for new informal services. In 1992, Mchombu[30] discussed a number of information delivering options in the rural areas, and Kantumoya[31] made a number of suggestions for more effective community information service.

The informal information service, rural library, or whatever it is called, also has a widely available manual by Shirley Giggey,[32] based on her own experiences in Papua-New Guinea and piloted in various African countries. This carefully written and pleasingly illustrated book shows how a community can help itself to set up a plain and serviceable information and study centre, matched to its needs, using simple materials and local skills. There have also been a number of very useful workshop meetings

devoted to the organisation of such services. The German Foundation for International Development (DSE) promoted such a meeting in 1984, and published the proceedings.[33] There was a national seminar in Nigeria in 1989 on Rural Library Development,[34] and in 1991, the Commonwealth Library Association (COMLA) organised a Regional Workshop for West Africa on Rural Community Library and Information Centres.[35]

3. INFORMAL SERVICES IN PRACTICE

The response to these promptings has been widely distributed and varied, but has an essential consistency with the programme to which the various writers on the topic have contributed. Some initiatives have a quite limited initial purpose, others seek to provide a much more extensive and ambitious service, more or less from the inception.

At the more modest level, in several areas there has been work done with the concept of simple reading rooms. These are places for children to do their homework, and for anyone else to study, or read newspapers. Such rooms provide little more than tables and chairs, and the artificial light many homes lack, supervised by a member of the community. They usually have some basic reading material, often of the kind generated by adult literacy schemes. A system of such rooms in Tanzania has been established for some time with a certain amount of success.[36] A recent UNESCO mission to investigate these Tanzanian reading rooms drew attention to their potential for maturing into community resources with a role broader than the simple reading facility.[37] This of course should be the aim with such facilities: to begin with a limited role matched to immediate need, but to develop as the needs of the community members expand, and the ability of the community to support something more elaborate grows.

In experiments with reading rooms in Botswana, the Botswana National Library Service has linked up with various kinds of local community organisations to support the rooms.[38] This has included the provision of book boxes containing small, but regularly exchanged, collections of publications. A similar idea was included in the Malian Five Year Plan, 1984-1988, with public library service decentralised through the provision of collections of fifty books to rural communities. There were also related plans, including "The organisation of cultural tours, including shows in local languages, as well as the setting up of reading areas in the six villages of the Bamako district."[39]

Humble, but effective, community-generated initiatives of more than one kind are also to be found in a number of centres in Zimbabwe. The country has some of the best conventional libraries in Africa, and in the Bulawayo townships a library system giving excellent service to the less privileged sector of society despite financial constraints and great pressure of reader demand. This same area also has the Bulawayo Home Library Project, supported by the Swedish International Development Agency. This was based on the home library idea, used some years before in Harare, which utilises an individual's home as a centre

for reading and exchange of materials from a small collection.[39] Although in Bulawayo the collections are, in fact, held at literacy centres, home libraries (sometimes also referred to as suitcase libraries) can be found in other African countries. Also in Zimbabwe, there several examples of community libraries stemming from the initiatives of Obadiah Moyo and his Rural Libraries and Resources Development Programme.[41] The programme currently supports 23 school/community libraries which have grown from expressed need, involve the community itself in organisation, have no formal bureaucratic structure, and provide service in an improvised, low-cost way. They are a real workshop for generating ideas and experience in the informal services sector.

A more ambitious group of services, conceived in the context of an internationally fostered programme, can be found in francophone Africa. Centres de Lecture et d'Animation Culturelle en Milieu Rurale (CLAC) have been set up under the aegis of IFLA's Advancement of Librarianship in the Third World Programme (ALP). Such centres are already established in Benin and Senegal, and others are to be established in Ivory Coast and Burkina Faso. The objectives of the CLAC centres are "to break the isolation of the rural communities by creating access to modern media to make it possible for the population to contribute more to the economic, cultural and social development; to develop in rural environments active centres for education and training in health and medicine, agriculture, literacy, literature,etc; to promote the flourishing of the local cultures and popular traditions."[42]

Finally in this brief account of existing informal services, there is current activity in Sierra Leone, where Rural Community Resources Centres, intended to embody the full informal services programme already outlined here, are being set up as pilot projects with support from the British Council and UNESCO. The ultimate functions of the centres are listed as: information exchange centre and clearing house; repository of development-related information; information mediating centre, translating collected information into a more appropriate form; search and find centre for requested information; live information promoter, through drama, song and story; publicity agency for information providers and development agents; literacy sustaining centre. The organisers say of them that: "The challenge is to move into a more dynamic-interactive mode suitable for dealing with rural communities, to serve not only as repositories of 'stored knowledge' but also a centres of 'knowledge in the making' and, finally, to adopt a diversified approach to the media/technologies used for collecting as well as for storing, retrieving and disseminating information."[43]

4. THE CONTRIBUTION OF GREY LITERATURE

Grey literature in its original forms may, on occasion, be used in informal information services, but much more significant is the potential use of its information content in new forms. What most of the proposals for informal services refer to, though sometimes rather indirectly, and what the existing services

practice, as far as they are able, is the transformation of information, whether it be from publications, grey literature or the oral tradition, into forms capable of absorption by the information seekers. The stress, for instance, on 'knowledge in the making' amongst the functions intended for the Sierra Leonean Rural Community Resource Centres is just one of the many explicit and implicit references to this throughout the literature on the topic. The process they allude to is probably known most correctly as 'information consolidation', though generally referred to, by a term which strictly only describes part of the process, as 'repackaging'.

Saracevic and Wood, in the standard manual on information consolidation, define it thus "Consolidated information is a text or message purposefully structured from existing public knowledge to affect the private knowledge and decisions of individuals who otherwise may not be able to effectively and efficiently access or use this public knowledge from the original amounts or in the original structure and form".[44] The consolidation process begins with the study of potential users, selection of primary information sources and the evaluation of their information content. Analysis of this content to permit restructuring (condensation, rewriting, etc.) and packaging or repackaging of the restructured information can then follow. The diffusion, or dissemination of the packages should be accompanied by feedback from users to enable evaluation and adjustment of the process to take place.

For information centres to engage with knowledge in the making, and practice effective information consolidation, the centres must have access to a range of resources, amongst which grey literature is of central importance. This is well recognised in Sierra Leone where organisations holding grey literature were surveyed by the British Council to produce a directory for use in providing development information.[45] Some African librarians too, have grasped the need for a more effective exploitation of grey literature. Raseroka, for instance, has declared that "Libraries in developing countries should make this [collecting grey literature] their primary task".[46]

Nevertheless, in Africa generally, the significance of grey literature is only imperfectly appreciated. It is true that there is some evidence of the content of grey literature being studied for academic research purposes. Aina, in a survey of the use of grey literature in agricultural research in Nigeria found that 14% of the citations in a group of theses he examined were to technical reports, conference proceedings, annual reports and theses.[47] In contrast, and perhaps more typically, the Dean of the Faculty of Science in an African University, when faced with the suggestion that a collection of grey literature could be useful to his faculty members and students, claimed that nothing of this kind could be relevant to science in any of its branches. Presented with listings of the material, he was surprised to find significant material on botany, and zoology, and even some relevant to chemistry, in the form of natural resources data on water, soils, minerals and consumer products.[48]

Just as African academics may not be well-oriented towards the use of official and semi-official material, so government planners make insufficient use of academic research findings.

Akan, looking at academic research relevant to planning in Ghana, found it essentially scattered and lost in university libraries.[49] Academics too, sometimes perceive the problem of access as one of library attitudes and practices. Witness the academic administrator who "requested that all academic-oriented information be sent to the faculty instead of the library where its catalogued and shelved unnoticed by those who could otherwise need the information. She quipped that librarians at ---- University are still information keepers as compared to information disseminators."[50] The total picture at research level is one of limited appreciation of grey literature, and that appreciation, such as it is, frustrated by ineffective systems for delivering its content to the user.

Thus, the case for the utilisation of information from grey literature in informal information service is not based on its easy availability, or on a high level of appreciation of its value at the top. Rather, it is based on sheer crying necessity. African countries lack the conventionally published material that would in other parts of the world be a first resort for those establishing information services. Their own publishing industries are, almost without exception, insufficiently developed to meet more than part of the demand for textbooks or library materials. Imports are not merely horrifically expensive, but finance ministries and central banks do not have the foreign currency to release for purchases, even if budgets contain the necessary local currency funds. The methods of ordering and payment required by overseas booksuppliers, the bureaucratic formalities, particularly those of customs services, complicate matters and sometimes impose extra costs, all of which effectively block off all but a trickle of imports. Under these circumstances, the providers of any kind of information service cannot reasonably defend the under-exploitation of grey literature on any point of principle.

It remains to be shown, however, how the exploitation of grey literature can be achieved to full effect. There are three main requirements: first that the grey literature should be collected and organised efficiently; second that there should be the capacity to research its content and create new information packages from it; and third that these new products should be disseminated effectively. To some extent the ultimate answer to the third of these requirements is contained in what has already been discussed here. New informal information services, alongside extension services and libraries, provide the outlets. Ensuring that there are the means to supply the packages to them is the vital link in the information chain. The first two requirements therefore remain to be discussed.

5. ACQUIRING GREY LITERATURE IN AFRICA

Collection of grey literature worldwide has been, until recent years, less than satisfactory. In less developed countries it is still very unsatisfactory. A natural answer to the question this raises is to say that legal deposit regulations take care of it. Of course, this is just not true. Take for example Botswana,

which has a regularly appearing national bibliography based on legal deposit receipts and a specialised development bibliography in DEVINDEX Botswana. The deposit law in force requires all monographs, pamphlets, government publications, conference proceedings, and theses to be deposited with the Botswana National Library Service. The issues of National Bibliography of Botswana for 1984 and 1985 contained a high proportion of government and NGO reports and other documents, suggesting that maybe legal deposit was producing a national collection of grey literature. However, a small survey in 1985 of material printed in Setswana, the national language, showed that by enquiring at government ministries and agencies, the enquirer, could obtain numerous titles.[51] Virtually none of these are listed in the national bibliography 1984 and 1985 issues, and indeed the material in the bibliography is predominantly in the English language. None of the 21 Ministry of Agriculture, Agricultural Information Office booklets and pamphlets, or the 6 from the 4B Youth Section, identified in the survey, appeared in the volumes, nor did 15 booklets from the Ministry of Health, Health Education Unit. More recently Aina found that, while the DEVINDEX Botswana issues for 1987, 1988 and 1989 had fairly good coverage of material from government departments, their coverage of other sources was less effective.[52] He stressed the need to solicit such material actively, rather than wait for it to arrive under arrangements such as legal deposit.

More systematic surveys of grey literature in less developed countries show what a significant proportion of the total material available they represent. Sly in 1982 suggested that development literature globally was 60% grey literature, and the proportion was certainly even higher in the information output of the poorer regions of the world.[53] Obasi suggested that about 70% of Nigerian publishing evades the national bibliographic process.[54] Much of this would be trade books elsewhere, but its undercapitalised young publishers, operating from no fixed address, constantly dodging creditors and the interest of government officials, made acquisition of their products by national bibliographic agencies very difficult. The main reasons why grey literature evades collection are well known, but in Africa they can be accentuated by local circumstances. Documents are a source of power and even money. The economist Balabkins researching in Africa found that officials deliberately hoarded grey literature, not least because they hoped to derive financial advantage from its release to enquirers.[55]

Diligent collecting efforts can, however, assemble a very high proportion of what is notionally available. Indeed, actively pursued legal deposit can be effective. In Zimbabwe both the National Archives in Harare and the Historic Reference Collection of the Bulawayo Public Library should receive legal deposit material under the Printed Publications Act of 1975. Deposit with national archives services is not an uncommon arrangement, and in Zimbabwe the National Archives acquire a high proportion of conventionally published material and government publications, and good quantities of non-conventional publishing from other sources. The underfunded, but excellently housed and maintained, Bulawayo collection is also effective, estimating an 80% to 85% success rate in acquiring relevant Zimbabwean imprint. In 1985

the National Archives began to publicise their facilities to senior personnel from government, local government and parastatals. This was to counter the observation that "The administrative authorities tend to view archives only as the means of preserving their country's history but perhaps overlook their importance as an essential development and planning tool."[56] These efforts can be supported by anecdotal evidence of the value to planners of the publications held in archives. For instance, in the late 1980s tentative plans to utilise the enormous reserves of bat guano found in caves in Zimbabwe for fertilizer were aborted when analyses done in 1920-23 were discovered in the Bulawayo Public Library Historic Reference Collection. These showed too great a range of quality to make economic exploitation a practicality.

National archives services can indeed redefine their function to focus on the collection and exploitation of grey literature and other current documentation. Possibly the best example is the Kenya National Archives which set up a National Documentation and Information Retrieval Service in July 1989. The NDIRS actively publicises the archives service's holdings of report literature. Leaflets announcing the availability of the material are widely distributed and members of the service's staff visit schools, colleges, universities and other research centres to back up the message. The lists of acquisitions produced at six-monthly intervals are used to illustrate what the service has available. The reports of these visits show the magnitude of the educational effort required to implant the idea of grey literature as a source, and archives as the place to find it, but the programme is an admirable attempt to meet this need.[57] It also suggests that an archives service, suitably organised, is capable of providing the means to feed the content of grey literature into a system of informal information services.

However, experience suggests that specialised institutes are usually more effective than national library or archives systems in identifying and collecting grey literature. They are less concerned with decisions over whether material really fits the categories they are supposed to acquire and are much more interested in the subject content. They more often adopt an active collecting policy, rather than relying on the awareness and good will of producers towards legal deposit or archives regulations. For instance, in the late 1970s the Documentation Centre of the Senegal River Basin Development Programme made a systematic search for relevant material and discovered 20,000 items.[58] Ambrose's study of grey literature in Lesotho[59] identified over 150 sources of grey literature active over a ten year period in this small country. From these the Documentation Centre of the Institute of Southern African Studies had collected nearly 3000 items, more than 100 serials and 190 annuals. The significant point about these examples is that most of the material had not been collected or listed by any of the other services which might notionally have accepted responsibility for it.

6. SERVICES TO REPACKAGE GREY LITERATURE

This outline of some collecting and exploitation of grey literature stops well short of describing any fully-fledged service to transpose the information content of grey literature into different forms for different purposes. Writers on the topic have seldom made very specific suggestions as to the form this might take. Several writers have suggested units attached to agricultural information services. Oladele in 1987, claimed that 'The librarians must not only have the capability to identify sources of information of value to the farmers from the financial houses, commodity boards, government policy makers, or from any other sources, but must also be capable of restructuring such information through the process of analysis, synthesis, and repackaging in a format other than print, Such repackaging should take into consideration the prevailing illiteracy, cultural divergence, and idiosyncrasies of the small farmers."[60] Alemna also identifies a need for such units. 'The results of expensive research submitted in the past are still lying in dusty files in offices or laboratories and have not been efficiently communicated to policy makers, planners, industry, extension workers and others who must apply them. This is due to the lack of information workers/scientists to distil and repackage research information into a form which extension workers can use to communicate to farmers."[61] He discusses the potential for the Ghana Scientific and Technological Network (GHASTINET) to exploit radio, TV, posters, meetings, comic and folk plays for the dissemination of the agricultural information.

Other writers have suggested different arrangements. Gooch opted for a combined agricultural/medical service in which there was a [female] information specialist "Gathering information from her country/regional internal sources (grey literature): selecting, filtering, translating, repackaging the information collected; delivering the information (at the right level) to (a) the scientific community (b) the extension/agri-med community, and (c) the general community."[62] Kantumoya identified the problem very precisely when he said that "What they [the people] need is information on modern farming methods, importance of vaccination for children, sanitations and civil rights. There is plenty of such in the offices of various government ministries and departments, as well as the offices of some non-governmental organisations. This information, which for so long has been neglected, should be collected, repackaged and put at the disposal of the people by public libraries."[63] His suggestion that the work should be done by 'community information departments' within the public library service, is less convincing than his analysis of the problem.

Although what is quoted above is still at the level of suggestion and exhortation, services which repackage information do exist, and others are being set up. Rosenberg, for instance, describes a number of specific instances of the presentation of information in forms designed for easy absorption by rural people in the Sudan.[64] Three other examples, in technology, health care and women in development, will be described here because their

structure illustrates an important requirement. Saracevic and Wood argue strongly that the information consolidation unit needs a host organisation which contains subject experts. It has already been argued here that collection of grey literature is done most effectively by an organisation with a commitment to a particular subject area. This applies at least as strongly to repackaging. The work needs to be done by people who have a full understanding of both the message they must repackage and the audience for which it is intended. A specialised institution offers this, whilst a broad based service, such as a public library, does not. The three examples are quite different from each other: the Botswana Technology Centre has been consolidating information effectively for many years; the Malawi Ministry of Health Library and Documentation Centre has fairly recently begun to make good use of modern technology for this purpose; and the Zimbabwe Women's Resource Centre and Network has, as yet, not moved fully into the consolidation work included in its plans. All, however, are illustrations of the type of unit which is most suitable for this type of work.

The Botswana Technology Centre (BTC) was established in 1979 as the arm of the Ministry of Finance and Development Planning devoted to promoting appropriate technology in the country. Some of its work is concerned with the development of technologies, but it also works at the policy formation level, and, most significantly, provides information service. The Technology Information Service is closely connected with the monitoring and evaluating of technologies by the Technology development Division and the Technology Assessment Division. Engineers with backgrounds in civil, electronic, mechanical, systems, and renewable energy, are amongst the experts employed by the Centre. The types of project in which they have been involved include the design of electronics products which are suitable for manufacture and use in Botswana; study of alternative designs for rainwater catchment tanks using ferrocement; experimentation with indigenous materials, such as stabilised soil blocks, for building purposes; development of hand-operated workshop equipment for rural entrepreneurs.

The Technical Information Service has Publications, Audiovisual, Extension, Library and Information Sections. The library is one of the best in Botswana and in addition to publications it maintains a database of resource persons, suppliers, and technology experts. The Technical Enquiry Service provides advice and answers to the public and private sectors. The Extension Unit promotes BTC at meetings, seminars and conferences. The Publications Section handles the formal output of BTC's research and technology monitoring in the form of a Technical Paper series directed at the administrative and technical level reader. Titles include Rainwater catchment possibilities for Botswana, Ferrocement tank construction manual, Rural workshop equipment, Growing vegetables in little water, and Lightning protection in Botswana.[65] They are easily identifiable as grey literature and, although clearly written and illustrated, would present problems for the vast majority of potential users of the information they contain. Therefore a series of Technical Bulletins are produced to present information from these, and from other sources, in a more accessible form.

The Technical Bulletins deal with discrete, practical topics likely to appeal to and be useful to a large number of people. They are only 3 to 4 A4 pages long; the language in which they are expressed is simple and direct; layout is clear and uncluttered; there are plenty of simple, sometimes amusing illustrations. The very first Technical Bulletin illustrates the way in which the repackaging process within this organisation. It is a 4 page treatment of Better care for your car battery (TB1), which first appeared in March 1986. This relates directly to a Technical Paper Battery operation and maintenance (TP6) by Gerrit Jacobs, which had appeared in October 1985. The Technical Paper derives from the published literature on the topic and in 33 pages mixes practical advice on maintenance with detail of the construction and operation of lead acid batteries. There is a certain amount of technical information, such as an explanation of how battery capacity is measured, and chemical reactions in the discharge and charge cycles. This is supported by tables of figures and diagrams. The Technical Bulletin takes the same subject and in 4 pages concentrates entirely on providing the essential instructions for someone using a battery, ranging from what to check to make sure the battery keeps running, to how to jump start an engine when a battery is flat. Other topics in the series include Making pickled beetroots, An easier way to make tomato crates, Segwana handwasher (which appeared in Setswana), Bread recipes for small village bakeries, and Protect your home against lightning.[66]

In addition to the information products on paper, there is the work of the Audiovisual Section. This produces regular programmes for broadcasting on Radio Botswana, slides, videos, and photographs. In fact the whole information spectrum, from the original research, assembling of documentation, through to production of information products, consolidation of information and dissemination, is integrated within the organisation.

To turn to an example from health care information, the way in which information consolidation works in the Ministry of Health Library and Documentation Centre in Malawi has been described by Lippman.[67] In this case the inter-reaction between acquisition and dissemination, through the repackaging process, is of particular interest. The library had considerable difficulty in acquiring reports, research findings, conference and seminar proceedings generated within Malawi itself. It suffered from the perception amongst health care workers that the maintenance of a library was not an essential expenditure when funds were scarce, and when libraries had little visible output. As part of a United States Agency for International Development (USAID) project called Promoting Health Intervention for Child Survival (PHICS), the Ministry library was able to expand its role to include the production of information materials. A desktop publishing unit was established for this purpose, first of all publishing the research reports and findings of the PHICS project. This opened the way to publishing on behalf of other health personnel and because the library was more noticeable as a publisher it began to attract more deposits of report literature.

A repackaging element was included within this programme. Abstracts and reviews of material in the library, which by now

had a strong grey literature element, were included in a newsletter, Malawi Drug Bulletin. Although this, as are the unit's other information products, is essentially targeted at health workers of all kinds, it is distributed right down to village level. The content is intended to be relevant and useful to those providing health care at all levels in Malawi. The library's access to databases, notably MEDLINE on CD-ROM, also facilitated the repackaging of bibliographic information, through the downloading of bibliographic records. But what is more important here is that a local database was also created, including the whole range of grey literature which the library was now receiving. This database was published in hard copy as A select bibliography of health information in Malawi 1980-1991. Publication resulted in the receipt of large quantities of reports, articles, conference papers, and theses, sent in by authors because they had not been included. This improved the library's holdings once again, both upgrading the database and providing further potential content for Malawi Drug Bulletin. Lippman stresses the good effect of this whole process on the library's role in operational research leading to more effective planning and administration.[68] The importance of this should not mask the essential significance of the mutual benefits which publishing, repackaging, acquisitions and library services derive from each other when combined within the one institution. Each activity benefits the other and, indeed it might be argued that some could not exist without the others. Certainly this complex of activities provides a platform for effective dissemination of health care information from both published and grey literature to every relevant level.

As a final example, the Zimbabwe Women's Resource Centre and Network, which is currently being developed,[69] illustrates the same point but relating to different subject content. ZWRCN was a response to the lack of coordination of information from the various researches on women in development which have been carried out since independence in 1980. Institutions, such as the Zimbabwe Central Statistics Office, Zimbabwe Institute for Development Studies, and the University of Zimbabwe, were known to hold large quantities of relevant information, without the resources or will to make it more widely available. Not only does this hamper current researchers, but virtually none of the information has been filtered back to the ordinary women who have been the subjects of research and who could benefit from the knowledge to which they have contributed. The Women's Resource Centre and Network was set up in 1990 to meet this and related needs. It is compiling details of projects and personnel involved with women's issues. The aim is not merely to list, however, but to disseminate information in packages which can be used by women in the villages, just as much as researchers in the universities. These packages are to include regular newsletters, meetings and seminars, simple information packs, educational materials and booklets. Distribution of the materials is to be enhanced by training workshops on gender awareness in project design, for development organisations.

The first phase of the project, which began in 1990, was concerned with identifying and collecting materials and data on women in development from government departments, NGOs, and other

organisations in Zimbabwe. The second phase includes the preparation of packs and booklets repackaging some of the information originally acquired. The extent to which this activity can be sustained has been dependent on fund-raising to pay for staff, equipment and premises. Whatever level of success and permanence the project achieves, it illustrates very well the way in which sectoral information projects are being conceived as more than mere collecting exercises, or means to engage in policy formation or development of the research agenda. The dissemination function, and the information consolidation work which is at the heart of it, is built solidly into the planning of the project.

7. CONCLUSION

What these examples show is first that this awareness that information work for African communities must utilise the whole range of sources, firmly including the grey literature. Second that mere collection of materials is not enough, and that an active information consolidation and repackaging exercise is required so as to provide information capable of effective dissemination. The way in which this dawning realisation provides new impetus for development communication, and in particular, for informal, community-based, user-oriented, information service is exciting. It confirms the assertion made very strongly by Saracevic and Wood that consolidation has to be done in the context of expert involvement and guidance. These projects exist and have some measure of success because of this. So far there is little evidence of such work stemming purely from an information collecting or delivery service, as provided by libraries and archives, despite calls for them to become information product creators on a serious scale.

The future for the use of grey literature and other non-conventional information sources in informal information service seems to lie in a close alliance of those involved in acquisition, consolidation and distribution. National institutions - national libraries, national archives, national institutes of research - are capable of strong acquisition activity. Specialised research institutions in particular subject areas provide the technical expertise in interpreting the source materials, re-writing and re-presenting the information for different media of communication. Community-based services, understanding their public and able to mediate the delivery of information, in the context of places and situations accepted by that public, are the best means to complete the chain. The relationships between institutions involved should never be exclusively defined so as to confine elements of the process to particular players, since it is obvious that in different historical and geographical circumstances roles may best find different balances. Nor should a total national information system (along the lines of NATIS, or any similar concept) be seen as a pre-requisite for such cooperation. Ad hoc relationships which work to achieve specific purposes are infinitely preferable to grand, all embracing plans. Within a context of such practical

arrangements, the rare and precious information resources of the poorest countries can be put to best use for information service to the poor of Africa's villages and slums, whose need is greatest, but whose ability to help themselves is severely constrained.

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Supply and Demand of Grey Literature. The Case of Japanese Governmental Information

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Abstract

The semi-governmental GMD Tokyo Office is providing grey literature of all kinds to the German government, to academic circles and to industry since 1977. As a rule this service is provided through German libraries with nationwide responsibilities. This ensures that the material is publicly available and does avoid double work. From the beginning, the activities concerning information on Japan were supported by the various Japanese agencies etc. When the liaison activities were started, mostly technical information and copies of prewar articles in the field of humanities were requested. In recent years however, policy papers of the Japanese Government have also drawn attention from abroad. To some extend, this kind of information is well available. The yearly White Papers of the various ministries and agencies can be bought at the Government Publications Service Center or even in larger bookstores. However, many governmental documents appear in a more informal way and hence are grey. Because they give additional information, or information at an early stage of a development, they are very valuable und therefore worthwhile extra efforts. This paper describes the different information channels for governmental information, ranging from specialized databases to full text journals. All this information is in Japanese, so a stepwise approach is necessary to minimize the burden of translation. As an example how to do this, the flow of information in the case of MITI sponsored R&D projects is described.Conclusions are: (1) In addition to "white" governmental literature there is a wealth of grey governmental literature. (2) Access is not easy but not impossible. If channels are established, the information can be accessed even from abroad, but for "maintenance" a (small) liaison office in Tokyo is important. (3) As the staff is concerned, at least the head of the office should be a native of the country to be served. (4) To fulfil bridging functions, an office at home close to the user is of advantage.

1. INTRODUCTION

E. Vogel remarked once, "if any single factor explains Japanese success, it is the group-directed quest for knowledge" [1]. The group-directed approach to knowledge acquisition and handling implies some kind of organisation, and hence a chance to access the organised information from outside. Actually, bookstores have large non-fiction sections with information about government, economics, industry, environment, research and development, companies, technologies etc. to an extend, probably not found elsewhere in the world. In addition there exists a large amount of information which is grey, not handled by the bookstores, but available through other channels. Thirdly there is a large section of informal information, not documented at all. Partly this fact is common to all information systems in

the world, partly it is due to the cumbersome Japanese writing system (virtually no typewriters were in use before the electronic age, when wordprocessors became feasible), partly it is related to the communication environment provided by the capital Tokyo, where governmental officials, business people, scientists meet and can easily exchange information. Japanese outside of Tokyo maintain access to this informal exchange of information by travelling to Tokyo frequently. It is easy to access the large amount of published information, the "white" literature. From outside of Japan this can be done through the well established agencies. It is much more difficult for the other types of information mentioned, but it is possible. The Japanese work hard to access information, and they are ready to pay for it. The same attitude is necessary for foreigners. The GMD Tokyo Office has helped to improve the access to the grey part of Japanese information for the past fifteen years with success [2], which would not have been possible without the help from the Japanese side. The Japanese support is, maybe, not pure altruism, rather the feeling, that better information to the Western World on the political, scientific and technical aspects of Japan is in her own interest. We may classify information into scientific-technical information, business information, governmental, political information and general information. This paper will concentrate on the problem of grey governmental literature. There are many definitions for "grey", but for our discussion here it is sufficient to define it as "not available through book stores or general purpose libraries". "Literature" means any kind of documents.

2. THE ROLE OF GOVERNMENTAL INFORMATION

2.1. Background

Today¹s Japan was shaped essentially 120 years ago, when the Meiji Restauration led to a complete revision of the government, economic order, education and science organisation. This quick and far reaching change was a necessary reaction to the outside pressure. A strong central government seemed the best way to catch up with the West and to avoid the fate of neighbouring countries, which had to accept foreign rules and rulers. To run the whole state from the top, a good flow of information (bottom up) and orders (top down) was essential. By the years, especially after World War II, business became more and more independent. So today, information has replaced orders in many cases and is essential as a unifying band between government, industry and the general public. This is, of course, not unique to Japan, but the extent of information prepared by the government or with the help of the government, is much broader, than, say, in the case of Germany. As the political structure is concerned, there is a central government with seat in Tokyo with which the political power rests. In addition, there are 47 prefectural governments producing information, which is however not discussed in this paper.

2.2. "White" Governmental Literature

Before discussing the grey part of governmental information, the white part has to be indicated. The Japanese Government is engaged in, resp. promotes, a wide range of measures to provide information to the general public. The National Bibliography prepared by the National Diet Library (NDL) [3] lists as new titles per year :

- 2800 publications of the central government,
- 500 publications by the universities,

- 6400 publications by the local governments.

Out of the 2800 publications 900 are published by the Printing Office, others through private publishers. As a rule, theses publications are charged. The government publications are distributed by the "Government Publications Service Center" [4], which is under the Printing Office, by its branches, but also by large bookstores. The production of the publications is supervised by a committee at the Prime Minister's Office, but in practice, selection and editing is done by the ministries and agencies quite independently. A catalogue in Japanese is produced regularly, but there also exists a "List of Publications. Governmental & Similars" in English. It is important to realize, that about half of the publications listed above are grey, not available through normal publication channels.

Table 1: Central Government Publications at NDL

Editing Agency	Number
Prime Minister's Office	609
Ministry of Justice	27
Ministry of Finance	139
Ministry of Education	131
Ministry of Health and Welfare	221
Ministry of Agriculture	354
MITI	255
Ministry of Transport	90
Ministry of Posts	53
Ministry of Labour	113
Ministry of Construction	231
Ministry of Home Affairs	38
Others	526
Total	2826

Source: NDL (1993)

The Japanese Government provides also printed information on a daily basis. Among the daily gazettes are

- Kanpo (Official Gazette of the Government) with publications of new laws and important calls for tenders etc.,
- MITI Koho (MITI Gazette) with topics related to economics and technology and call for tenders for projects promoted by MITI, and many others.

Publications of special importance are the 28 White Papers, prepared by the various ministries and agencies, which appear annually. MITI e.g. prepares the White Papers of International Trade and Industry, actually in 3 volumes. One volume contains the summary, the two other volumes contain detailed data and the discussions.

2.3. Governmental Information in Electronic Form

Within the government a large amount of statistical information is collected. An older summary from 1981 reports 700 different files, mostly containing statistical data. At that time, more than half of them were publicly available, 40% of those were available on magnetic tapes. Passing-on to the general public is done by various organisations, e.g.

- Prime Minister's Office -> Japan Statistics Organisation
- Min. of Finance -> Nihon Kanzei Kyokai
- MITI -> Inst. of International Trade and Industry
- Weather Office -> Japan Weather Association
- Min. of Agriculture -> Nōrin Tokei Kyōkai
- others -> others

The statistical data collected in these files could be of interest also to investigators abroad.

3. GREY LITERATURE

3.1. General Remarks

So far published governmental information was described, which comprises a large volume. An even larger amount of information is produced in the government every day, which is, as already mentioned, grey. Most of it is for internal use but a part of it is available or even intended for broader circulation. An important part are reports (hokokusho) of study committees of all kind. Fortunately, there are two organisations handling grey governmental literature.The "Seifu Jōhō Shiryō Center"[5] publishes the monthly journal "New Policy", which collects original documents (in Japanese) in full text from the various ministries, agencies and local authorities around Tokyo and Kinki area (Western Japan). In addition information on government supported projects, material from think tanks and other research institutes is collected. All together more than 1500 documents are collected every month. Each volume contains 50-70 selected papers, giving about 600 pages altogether. The titles of all papers can be found in "NPIS Monthly Report", which appears as a supplement to the "New Policy" Journal. The journal is well done and lifts a part of grey governmental information up to the level of white literature. It can be ordered through the channels of the international agencies in book trade. One year½s abonnement comes to 220,000 Yen, a single copy to 20,000 Yen. Whether the contents will also appear on CD-ROM is not yet decided.The other organisation is the "Institute for Dissemination and Research of Government Data"(IDRGD) [6], which runs the "GD Center". The Center works on a membership basis, with more than 500 member organisations. Registration fee is 50,000 Yen, annual membership fee 200,000 Yen. It publishes the monthly "Seifu Shiryo Abstracts". The Abstracts use a classification into the following 18 fields:

1. Government	2. Administration	3. Economics
4. Planning	5. Labour	6. Agriculture
7. Construction	8. Mining	9. Trade, Service
10. Finance	11. Transport	12. Communication
13. Research	14. Land	15. Environment
16. Resources	17. Society	18. Overseas Affairs

Full texts of material cited in the monthly abstracts service can be found in center. The reading room is free of charge, a copying service and other services are available.

3.2. Databases on Grey Literature

An early improvement for the access to governmental reports was a database produced by the publicly funded JICST (Japan Information Center of Science and Technology) [7] since the eighties. In 1990 the hitherto separate file JICST PUBLIC was merged into the general JICST FILE. About 5000 items are collected per year, they also appear in the English edition of the JICST FILE, which is called JICST-E. Due to recent lack of funds, only titles and keywords are prepared in English, there abstracts con be found only in the Japanese original. Information on new projects under the Ministry of Construction can be found within databases of the "Japan Construction Information Center" (JACIC) [8]. Hints on governmental publications can be also found within the newspaper databases, which are offered by several companies. A list of providers can be found in the "Directory of Japanese Information. Jōhōgen" [9], compiled by Th. Consigny at the "EC-Japan Centre of Industrial Cooperation" in Tokyo. The second revised and enlarged edition appeared in March 1993. To improve the access to general information about Japan in foreign countries, the "Japan Center for Information and Cultural Affairs" (JCIC) [10] received funds from the Japanese Foreign Office and established the "Japan Information Network" (JIN) in 1990. JIN prepares databases and runs a host computer 24 hours a day. The following databases are offered:

- Index of Government and Organisations Publications.
  (A list of 1000 titles of publications in English).

- Government Text
  (Information Bulletin, Bilateral Relations, Press Releases, White Papers, Speech and Statements, Press Conference.

- Facts on Japan
  Statistical data concerning 33 topics, ranging from weather to literature.

- Organisations for International Communication
  List of over 100 organisations with international activities.

- Prefectures and Cities
  Information on the 47 prefectures and on important cities, including touristical information.

The centre has provided terminals in foreign countries, four in the USA (Washington, New York, Chicago, San Francisco), one in Singapore and three in Europe (Paris, London, Berlin). A further extension of the network is discussed. In Berlin, the JapaneseGerman Berlin Centre is the site of the terminal. The Berlin Centre is answering e-mail requests from all over the country. In 1991 the number of calls was as much as five a day.

3.3. A Case Study including Translations

Over the years, Japan has made efforts to prepare English translations of White Papers and other important documents. Sometimes there is a time lag of about half a year between the

THE CNR CENTRAL LIBRARY AS THE ITALIAN NTIS CENTRE OF REFERENCE: CONTRIBUTIONS AND PERSPECTIVES

by

AnnaMaria Campanile and Annunziata Fazio

Wide-ranging changes, which have taken place and are still taking place in the world of information, are due to various factors:

- Application of new information technology;
- The quasi-exponential growth rate of available information;
- The growing rate at which information becomes obsolete;
- The significant cross-border trends in information.

Apart from the contents of the information itself and the related services, information is increasingly becoming the object of large scale trade, and is therefore an essential resource both for industry and commerce.

All this makes information - an item with highly specific characteristics - a basic national resource, while at the same time a product which is difficult to handle.

The development of a country in various sectors

depends increasingly on the capacity of organizing access to and processing of information. Therefore, the aim of the organizations involved is to ensure a better management of their data, using information experts which besides just safeguarding the information also manage it.

It is necessary to accelerate and speed up the compilation of a data base for the results of scientific research or the use of technology, since these form the background for scientific knowledge needed for further research, especially in fields requiring the constantly updated, rapidly available data which is an essential tool for formulating development strategies and for proper professional updating on techniques and methodologies.

The CNR Central Library, originally founded for the information requirements of CNR researchers and later developing into the National Library for Science and Technology, has bibliographical resources reflecting the organization's multidisciplinary approach and focusing on interventions in scientific research in the country. The institutional role of the Library is the participation in any programmes aimed at utilising national bibliographical resources to promote research.

The direct result has been the intensive development of research and study in the field of scientific research, through links with associations and international professional organizations for an intensive exchange of information and participation in European Community programmes and activities.

On the national level, the Library is the key factor in the management of the scientific data network, with concrete cooperation for sharing resources, both internally (CNR Research Department Libraries) and externally (National Library, Universities and Scientific Bodies).

With this aim, the Library has undertaken cooperation with other research bodies (ENEA, ISS, ASI), with Universities (Parma, Sassari, Bari, Tor Vergata), organisations working in the field of librarianship (National Directorate of Libraries, ICCU, Chamber of Deputies Library) and with research consortium organizations.

In 1991 the European Community Commission declared the Library to be a "European Community Depositary Library". The CNR is currently setting up a network for the CNR libraries, consisting of the Central Library, research sector libraries and libraries of the research departments (161 institutes and 114 centres) located throughout the

country.

The CNR research sector libraries mainly have the aim of providing consultancy and documentation centres for:

- CNR researchers;
- The scientific community;
- Local public bodies and industry.

With these aims, the libraries are intermediaries between local scientific communities and national scientific documentation centres, mainly the CNR Central Library.

While each library maintains its own operational independence, the whole CNR library and documentation service network is closely coordinated, with joint units providing standardised cataloguing and bibliographical and library services.

The sector libraries have become an interface between the research departments, the Central Library and the international documentation network. This enables the system to provide top quality services such as the transmission of the full text to the user within 24 hours of the request.

The users, generally research personnel, universities professors and students, specialists in the sector, professionals, firms, and civil servants request highly

selective scientific information and data, updated in a very short time.

The main concern of the Central Library for satisfying these requirements is to use techniques which are as simple and fast as possible, and with the user needing only minimum computer skills.

With regard to the selective supply of information, the Library has taken into account the requirements of scientific users and has drawn up data bases mainly for its own stocks in order to make user research as easy and fast as possible.

The creation of three data bases has proved important:

1) Data bases for cataloguing scientific publications;
2) Data bases on the behavioural and social sciences;
3) Grey literature data bases.

The first type of data base contains articles which can be consulted at the Central Library and locally available through various access keys: author, title, subject, classification, number of records, etc.

The second type of data base contains about 4000 references for the library's humanities section, with local

access only.

Finally, the grey literature data base contains documents (non-conventional reports and publications) on pure and applied science and on technology.

The Library's grey literature cataloguing programme has two aspects, one European (SIGLE EAGLE) and the other international (NTIS) with separate tasks and characteristics.

Since the Central Library has been formally appointed as the Italian Centre of Reference for grey literature, it is responsible for immediately obtaining and making available any document from the major computerised archives.

With its participation in the SIGLE programme, and as the reference centre, it organizes and coordinates the centres producing "grey literature" with regard to collecting and retrieving documents and sending the related data to the SIGLE data base within the EAGLE-SIGLE Community Programme.

With regard to the NTIS grey literature data bases, the Library only supplies coordination within the CNR, systematically collecting the scientific production of its own researchers with a CNR data base.

The system used by the Central Library for loading data

and handling bibliographical data bases is a department-based computerised system (2 mini computers and 25 local terminals) on a GARR network, functioning as a bibliographical data base.

All the data bases are constantly updated, and the information retrieval service is made available to remote scientific users through the GARR (Gruppo Armonizzazione Reti Ricerca - Research Network Coordination Group) network through the DECNET node. The remote user not connected with this network can gain access by line switching.

Users may directly consult publications and reviews through the lending service, the bibliographical research service and photocopy service for remote national and foreign users, as well as the data base consultation service.

Documents are transmitted via fax, electronic mail and ordinary mail.

Bibliographical research is carried out by electronic and conventional catalogues with about 1,250 on-line data bases and over 60 data bases on CD-ROM.

In order to cover most of the grey literature area, which scientific research needs and which the Library, though well equipped, is not able to handle, the Central Library as the national Library of Science and

Technology has been appointed as the body taking part in the system on the basis of an agreement between the President of the CNR and the National Technical Information Service (NTIS) of the United States Department of Commerce.

This system, utilising modern microfiche technology, is designed to provide photocopies from microfilms and microfiches of all the documentation filed there. The National Technical Information Service (NTIS) of the United States Department of Commerce is an agency dealing with the distribution of all the documents produced by government agencies and other bodies (including foreign ones), made available to the public and publicised in several periodical bibliographies, including the Government Reports Announcements (GRA). It should be pointed out that although the NTIS is a tool for access to this literature, it does not receive the documentation by law but only on a voluntary basis. As a result, the agency has to make more efforts in order to achieve efficient bibliographical monitoring.

The problem is now the quality rather than the possibility of retrieval from the viewpoint of costs and the operational time required. The problems of the techniques and time required are crucial. There are three time levels: normal, urgent and very urgent; three techniques: mail,

telex, on-line; three cost levels: normal, telex cost and high cost.

The first rule is to be familiar with the characteristics of the users, who can generally be classified into groups with their own specific information requirements and role influencing these information needs. One of the most important methods of information transmission is personal communication. The user also has an incomplete knowledge of the existence of and/or way to use information sources, and the amount of information requested varies considerably from user to user. Short-term information requests may occur and some decisions may have to be taken even when there is no information available. Ease of access is therefore a key factor in determining the use of a source of information.

A fast, sophisticated service obviously costs more.

The specialised librarian of the information service understands the importance of both the demand and its specific contents.

There are three main types of demand:

- Location of the service (site and service required);
- Identification of the research path for titles of documents necessary to satisfy user

requirements;

- Thematic demand, i.e. request and search for specific information.

The response to these situations determines the type of intervention which the librarian makes, and corresponds to the type of user involved.

In a general type of library, demand is considered to be a single type, and little distinction is made between the users.

In a specialised, scientific library, the user is defined by the category of interest:

- Specific information requests for bibliographical data (subject already selected);
- Requests for bibliographical research on specific subjects, in order to narrow the field of interest;
- Requests regarding the contents of a document required because it is not physically available or not considered immediately necessary for current research.

As already mentioned, the type of user and thus the assessment of the intervention and documentation required for a positive result of the research all depend on the contents of the information.

Since 1989, the Central Library, as the Italian

only the acquisition of Italian technical information by the NTIS, but above all the circulation and distribution of information by both parties, with the exchange of technology. Requests are concentrated on subjects regarding: communications, computers, energy, the environment, materials and transportation.

The CNR Central Library is both the producer and distributor of the NTIS data base.

The recent starting up of this data base began with very few resources: a personal computer, a printer and a rather simple, "home-made" programme.

The fields of bibliographical reference include: the number of the report; the number of the record corresponding to the location of the report; the name of the author followed by the original title, the title in English, and bibliographical references; the availability, and finally the abstract in English.

Automatic search provides for access to bibliographical data through various access keys: author, title, number of records, etc.

The system began with a CD-ROM data base and then became an on-line system. It must, of course, be constantly improved, so as to enable faster and better data selection which, given the specialised nature of the material, can lead to an international exchange of research and

discoveries.

In order to make this data search efficient and economically feasible, familiarity with indexing techniques, inquiry languages and information retrieval problems is required, and specialised training is therefore required.

As we have seen, the CNR Central Library, and therefore the NTIS, can be consulted through the GARR network, promoted by the Ministry for the University and Scientific and Technological Research.

The GARR network is in turn connected with the main international research networks (EARN/BITNET, INTERNET, HEPNET, ...).

The Central Library is equipped with terminals connected to computers on these networks (VAX on DECNET) and can obtain easy access to the service.

The high-speed network infrastructure has been chosen mainly because of traffic requirements.

The primary centres of the network are currently located in Milan, Bologna, Pisa, Rome, Frascati and Bari.

When the GARR network was designed, the main goal was to enable the integration of the various networks of different research bodies, starting from the lowest levels of communications architecture to gradually achieve higher

levels.

Because of the national importance of the NTIS Reference Centre, and because of the demand from both producers of scientific information and the bodies taking part in the system, paper transcriptions have been made of the bibliographical references acquired up to now, with regular updating, in order to make circulation and consultation easier for the users involved.

The success of this service and the advantages for researchers reporting their scientific output, with the resulting fruitful exchange of knowledge, have spurred the Italian NTIS agency to maintain and systematically improve the data bases.

The problems of recording a quantitative social science grey literature collection for both internal and external audiences; Research Resources Unit at the British Household Panel Study, University of Essex.

Hilary Doughty MA ALA, Information Manager, and Judi Egerton BA ALA, Systems Librarian

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Abstract

The documentation and availability of grey literature still causes a major concern both nationally and internationally. Although some of this material may be considered to have short term value a large proportion of material should be preserved. In this paper the need to record and document quantitative social science grey literature to support the research of the ESRC Research Centre on Micro-social Change in Britain is discussed. The main focus of the paper concentrates on the problems of acquiring and recording the grey literature for both internal and external audiences. The Centre's own survey documentation is used to illustrate the problems. The paper shows how the adaptation and the modification of the TinLib catalogue has addressed some of these difficulties.

1. INTRODUCTION

This paper discusses some problems in the recording of a quantitative social science grey literature collection which has been set up primarily for use by the Centre's staff, visiting students and post doctoral fellows, and the staff and students from within the University of Essex. The particular context in which we have had to deal with these problems is the library of a national social science research centre, the ESRC Research Centre on Micro-social Change in Britain. Grey literature produces numerous problems which are widely discussed in the literature. In particular, Auger usefully explains the nature of grey literature and raises some of the problems similar to those that have arisen from our work (Auger, 1989). The particular problems with which we are concerned are: poor dissemination by the organisations responsible for producing the documents; low print runs which are aimed at a particular group of people or locality; poor technical quality of grey literature i.e. the lack of standard cataloguing elements; poor bibliographic control and the need for original cataloguing for most documents; the adaptation and modification of the computer catalogue designed for the

recording of more 'traditional' documents to cope both with grey literature and to accommodate the conflicting needs of the Centre and the wider audience. We shall illustrate these problems through examining the documentation of social surveys using the British Household Panel Survey (BHPS) as an example. We begin by briefly describing the ESRC Research Centre on Micro-social Change and its library in order to place our paper in context.

2. THE ESRC RESEARCH CENTRE ON MICRO-SOCIAL CHANGE IN BRITAIN.

The ESRC Research Centre on Micro-social Change in Britain was established in 1989 with funding from the Economic and Social Research Council and the University of Essex and is more widely known as the British Household Panel Study (BHPS). The main focus of the Centre's research is to study the way individuals and households react to change and adapt to change over time, thereby creating a picture of the micro-dynamics of British society. In order to study these changes the Centre conducts the BHPS survey which is the main instrument by which the Centre collects its data. This is a representative sample of (initially) 5,500 households and 10,300 individuals who thereby constitute the panel. Panel interviewees are followed and interviewed each year. The broad aim of the Centre is to produce high quality quantitative social science research which is principally based on the panel survey data.

In order to carry out this research the Centre employs researchers from the main social science disciplines: sociology, political science and economics as well as statisticians and researchers with specific expertise in survey methodology. Because such a large panel study as this is unique in Britain the Centre has had to acquire specialist knowledge and expertise through establishing links with other European Household Panel Studies and with the US Panel Study of Income Dynamics and the Survey of Income and Program Participation. Links have also been established with a number of institutions in order to further research methods and to develop new techniques.

3. THE RESEARCH RESOURCES UNIT

The Research Resources Unit is so named because it serves as a central resource for the Centre. The RRU's major resource is the library collection of quantitative social science material gathered from outside the Centre, but the RRU also stores and records all the Centre's publications. To ensure that the latest reports, research papers, conference papers and questionnaires are acquired, the librarians liaise directly with other Panel Studies and Social Science Institutions to obtain the publications and negotiate exchange arrangements. The newsletters from the Institutions provide useful current information on recent material produced by them and other organisations. In fact most of the material received is 'grey literature' which is usefully described by Chillag as "literature which is not readily available

through bookselling channels" (Chillag,1985).

3.1 TINLIB CATALOGUE

The RRU uses IME's TinLib library automation system. An advantage of TinLib is the 'browse and navigate' facility which allows for progressive searching from one field to another thereby allowing an in depth search. For example it is possible to start with a search on a known author, retrieve the record, and proceed directly to a subject search without returning to the main menu simply by highlighting a key term listed. The system is locally networked on a Unix machine and has a client server architecture available via any networked pcs around the Centre as well as an in-house guest account facility which enables access from a small group of departments within the University of Essex. Although primarily intended for more 'conventional' documentation, some fields have been modified by the Librarians to accommodate grey literature.

4. PROBLEMS OF DOCUMENTING SURVEY DOCUMENTATION.

One of the major problems in recording the survey documentation gathered from the European and US Panel Studies is that, in common with other grey literature, it is not subject to any bibliographic control and therefore does not conform to any particular standard. Of course, Panel Studies by their design will continue to produce a questionnaire on a regular basis. However, the accompanying documentation eg Interviewer Instructions; Coding and Editing Files; Flow Charts; Show cards and Technical Reports, not only vary between the surveys but also from one wave to another within the same survey. Furthermore, some of these items may be included within the Questionnaire whereas at other times they are separately produced. Also, while some studies produce sizeable User Guides others produce short guides or none at all. A further problem for the RRU staff is keeping a check on the comprehensiveness of any one set of Survey Documentation as the Institutions do not usually provide a checklist of their documentation.

Cataloguing survey documentation and associated documents (in common with other categories of poorly documented grey literature) is time consuming because it is not possible to download records from cooperative cataloguing projects, for example, and to edit them locally. Most of the documents received therefore need original cataloguing.

Some of the major problems encountered in the cataloguing process are: establishing the title of the survey with adequate added entries; setting up authority files for originators/publishers of documents ; the adaptation of the classification field to accommodate the survey number; and handling the survey documentation. The AACR2 rules for corporate bodies can and do apply, but often establishing the name of the organisation raises problems particularly as research organisations expand and contract, merge and adopt new names as the nature of the organization changes. Table 1 shows the layout adopted for a typical survey entry.

Table 1. Catalogued Survey Entry.

Main Title : (Survey Name)	British Household Panel Survey: wave 1, 1991
Alternative Title:	Living in Britain: wave 1, 1991
Alternative Title:	BHPS: wave 1, 1991
Corporate Body:	ESRC Research Centre on Micro-social Change
Classification:	SN 2960
Publication Type:	Grey Literature Survey: Brochure Survey: Coding/Editing Notes Survey: Letters Survey: Questionnaire Survey: Reports Survey: Respondent Documentation Survey: Show Cards/separate Survey: Show Cards/within questionnaire Survey: Technical Report Survey: User Handbook

4.1 TITLE ENTRY

As shown in Table 1, the Survey can be identified in varying forms. This variation is deliberate as a different title is used for different audiences so, for example, the title "British Household Panel Survey" is used on the user documentation, and the title, "Living In Britain" on the Questionnaire itself and the respondent documentation. The AACR2 rules for "Title Proper" can be followed and TinLib has provision for multiple alternative titles which usefully

can accommodate the translated titles of surveys from the European Household Panel Studies.

4.2 CORPORATE BODY

The RRU has developed a detailed Authority File which makes provision for preferred and non-preferred forms to prevent anomalies, so that if, for example, the Corporate Body/Originator of a Survey is known by the official name, a more commonly known name or an acronym, the researcher on accessing the catalogue using any of these forms will be guided to the work. The former name is accommodated in the "Related to" field. For cataloguing purposes the librarians will use the preferred form. The asterisk indicates a non-preferred form in the authority file.

Table 2. Corporate Body template

Name (Official/Preferred form)	ESRC Research Centre on Micro-social Change
Non-preferred form ('Common' name)	British Household Panel Study *
Non-preferred form (Acronym)	BHPS *
Career summary	formerly CARE
Related to	CARE

4.3 PUBLISHER

Unfortunately TinLib makes no provision for the non-preferred form of publisher. Yet, in the case of grey literature, the corporate body/originator of the document is often the publisher as well and therefore needs a similar authority file to the Corporate Body file above (see Table 2). Recommendations have been made to IME to upgrade their publisher file, but in the interim added entries have been created to direct users to the preferred form:

Table 3. Publisher listing

Publisher	**Social Science Information and Documentation Centre USE SWIDOC

Rosa Fernández López

University of Salamanca,

Faculty of Translation and Documentation

SPAIN

STATISTICAL RESEARCH ABOUT THESES PRODUCTION: VIABILITY TO EUROPEAN NORMALIZATION

The definition a thesis, according to the British Standards Institution in " The presentation of an investigation or research, disclosing the author's theories and any final conclusions with the view to supporting his candidature to a higher status, profesional qualification or other nomination".

The fact that the presentation of an investigation exists as an inherent characteristic of any thesis, automatically asociates this to Grey Literature .

In continuation, other principle characteristics that definitively make up the category of Grey Literature are:

The presentation of conclusions

The submition of the work to a reviewing board

The unpublishment of the documents, except for in very exceptional cases. That is they do not appear in conventional marketing channels and such are not abailable in bookshops or publishing houses.

It itself posesses other characteristics, at times aparently unjustifiable, concerning problems of identifying and obtaining works, problems that are frecuently mentioned in relation to reports for example.

In generally there exists an excessively conservative policy concerning the provision of copies of theses on that on the other hand is logical considering the fact that the majority do not possess any form of registered copyright and theses are susceptible to plagiasion and publication by other authors completely or in parts changing them in form of articles or similars.

In Spain, until only very recently, theses could not be borrowed.

Today the norms are the follows:

1.- At least one copy of each thesis must be deposited in the University Library.

2.- With the permission of the author, theses may be borrowed and photocopied.

3.- The authors must, at the moment of submitting the thesis, give written permission regarding the exact conditions under which such works may be used as reference.

The constant production and remarkable working of the production of thesis means a live critic to their under-value.

Theses are an important joint in cuality and cuantity. It's a scientific valuable material that must be made public and accesible because of their investigations contents.

There are several reasons that have this situation bring up:

The lack of bibliographic control makes that nobody knows about theses, even into the scientific comunity.

Desagreement between diferent Universities about the fact of supply brings demand or demands bring supply.

The limited support University gives to investigators after their effort, nobody help them to promote their jobs. The lack of divulging and knoledgment obstructs the development of Spanish investigation.

And finally the fact, signed before, that people dont'n know anything about value of theses.

Moreover, the needs of academic and other researchers are constantly changing being affected as it were by the introduction of new courses in University curricula and the wide range of elective courses being offered in particular faculties as well as new research opportunities that offer themselves as a result of the introduction of these new courses and research areas.

Lecturers in Universities in developing countries especially in Africa have a particular need to use grey literature materials if they want to make the courses they teach more relevant to local needs and conditions for which there are no written textbooks that are relevant. By and large, textbooks used in Universities in developing countries are written in Europe or America and therefore have bias towards those countries.

Case study examples which quote Europe or America are therefore not very helpful to the student in a developing country. It is therefore incumbent upon the lecturer to prepare examples that are relevant from Africa or other developing regions. This requires a great deal of locally produced materials which are not published. Obtaining such relevant information for academic research brings into focus the important role of collecting grey literature sources which are generated within the regions or continent.

What is grey literature

There is generally no accepted standard definition for grey literature. For the purposes of this paper, grey literature embraces such things as non-conventional literature, archival material, fugitive material, non-book material and unpublished documents. Indeed, the simplest definitions that have been put forward for grey literature materials are not definitions at all but merely alternative names.

A study undertaken by the Devsis team in 1976 divided information resources into two major categories namely the visible and the invisible information resources (1) Visible here refers to the published materials (books and serial) and invisible refers to the unpublished materials. The team further said that out of the world's information resources, 40% was published and constituted the visible literature while 60% was not published and constituted the unpublished information resources which were:

> less accessible, grey, fugitive [and comprising of] unpublished working papers, feasibility studies,consultancy reports, theses, research reports, government documents and documents of international organisations which are not widely disseminated (2).

Other people have tried to define grey literature as embracing the idea that it consists of small items produced in limited quantities to such an extend that it would be difficult for academic libraries to collect these materials for research purposes.

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Check one of the boxes below for the method of payment:

[ ] Remitted to TransAtlantic for **GL'93**| ABN-AMRO Bank N° 54.86.83.557 in Amsterdam, The Netherlands. With mention of the customer's name.

[ ] Remitted to D.J. Farace for **GL'93**| PostBank Giro N° 5192147 in Amsterdam, The Netherlands. With mention of the customer's name.

[ ] Bank check/draft enclosed and payable to TransAtlantic. With reference to **GL'93** and the customer's name.

[ ] MasterCard/Eurocard, VisaCard, American Express, Diners Club Credit card N° _____. Expiration date: _____. If the name on the credit card is not that of the participant/delegate, print the name that appears on the card, here _____.

Note: *All additional bank, currency, and conversion charges not covered by the amount of the check or the bank transaction will be billed to the customer.*

Signature: _____ **Date:** _____.

Correspondence should be mailed or faxed to GL'93| TransAtlantic, Koninginneweg 201-1, NL 1075 CR Amsterdam FAX (31)-0(20)6711818