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# Document Delivery - The Dawn of a New Era

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## 1. Introduction

Only a few years ago the phrase 'document delivery' was never used in connection with libraries. Instead the term 'inter-library loan' (ILL) was used. The reason for the change is very simple and is due entirely to photocopying machines. Before these existed it was a very cumbersome, slow and expensive operation to make copies of individual documents from bound books and journals. Photocopying machines allowed the quick and cheap duplication of documents: these copies could be supplied far more cheaply and efficiently than the loan of an item. A second cause was the development of online bibliographic databases which give access to items quickly and easily at the article level. This has allowed the requesting of articles rather than whole volumes. Indeed, many database hosts now offer document ordering systems as part of their services. So, in the last 25 years a whole industry has grown up in document supply. Up to now the process of document supply has largely followed that of inter-library loan, that is essentially a manual operation using conventional postal means for communication of both requests and documents. As the title of this paper suggests we are now on the verge of a new era in document delivery. Again, the changes are caused by technology. This time it is not one single piece of technology but a combination of several developments. The most important of these has been the introduction of the personal computer; other developments include the use of high-capacity optical storage devices, improved telecommunications and the development of facsimile transmission.

The implementation and integration of these technologies does not in itself mean that document delivery systems will develop on their own. There are still many problems to be overcome. This paper, after examining the current status of developments, goes on to examine some of the outstanding problems and what their implications may be in the future.

## 2. The current position

Recently, there has been an upsurge of interest in document supply. This has been caused not only by an awakening amongst librarians to the possible use

of technology in document supply and inter-library loan but, more importantly, by the increasing financial constraints that all libraries are now facing. In most libraries, the cost of acquisition is the largest element of the non-staff budget and so it is the one which has to take the lion's share of any cuts. ILL and document supply are one of the few options available to a library to counter the effects of acquisition cuts.[1]

But it is the changes that technology can bring about which are concentrated on in this paper. Not in technical detail, these are available elsewhere, but to give a broad overview of how the whole picture of ILL and document supply may change over the next few years. As the tremendous technological advances of the last few years have occurred so has the price of all the components fallen, not slightly but by orders of magnitude that are almost incomprehensible.

There are three quite separate operations involved in the process of document supply, and there have been major advances in all three areas in the past two or three years. The areas are (i) the transmission of request between the requester and the supplying library, (ii) the internal processes within the supplying library, comprising the method of storage of material and the processing of requests, and (iii) the transmission of the requested document back to the customer.

There are savings in both cost and time in all three areas. In the first and third areas, where the postal service is the traditional mode of communication, the savings in time can range from one to many days. The cost savings are, at present, more problematic but, as shown later, in future the potential for cost saving seems good. In the internal processes of supply centres, the potential for both time and cost savings is dependent on the efficiency of the manual systems. For example, the swift turnaround that the British Library Document Supply Centre (BLDSC) provides for photocopies is very cost effective, and most automated systems prove to be more expensive.

## 2.1  *Requesting*

This is the element that has had most attention to date. It began simply with the use of a Telex machine to transmit requests instead of posting them. As far as BLDSC is concerned, it has expanded, with the addition of more channels of communication, until at present over 40% of requests are transmitted to Boston Spa in electronic format. But the method of processing electronically-transmitted requests has remained a manual one: for example, at BLDSC electronic requests are processed by an expensive computer which is used simply to transcribe requests onto forms which are processed by exactly the same method as that used for postal requests. This is about to change: from the summer of 1989 advantage will be taken of the fact that these requests are in electronic format.

The first stage will be the transmission of reply messages by the same route as that used by the customer to send the request to BLDSC. This should reduce the turnaround time for those customers who take advantage of the mailbox system of replies by many days. Take the case where a request is transmitted

to Boston Spa first thing in the morning. It could be processed by 12 noon. Suppose that there was insufficient bibliographic detail on the form and it had to be returned to the requester. The reply message could be placed in the electronic mailbox at 12.30 and accessed by the customer at 13.00. The request could be checked and returned to BLDSC in time for the 14.00 visit to the shelves. Assuming that the item could now be correctly identified it could be processed and despatched the same day. At present the procedure outlined above takes a minimum of 5 days within the UK and a great deal longer for other countries.

At the requesters' end of the system there have also been advances in the last few years. Several companies now offer, on a commercial basis, microcomputer-based packages for the management of ILL and document supply activities.[2] These packages not only manage the whole process of requesting and receipt of items but also handle telecommunications between the requester and the supply centre. There are also co-operative systems. The largest of these is the OCLC ILL sub-system[3] but there are others, e.g. the DOCLINE system operated by Chalmers University in Goteborg.[4] In the UK an interesting development is the VISCOUNT project run by LASER.[5] This is a good example of how a manual union catalogue has been automated, first by making a machine-readable catalogue and then by providing a simple electronic means of access. This is now about to be developed on to an international scale. (Look Costers spoke about this during the conference at which this paper was presented.) Also, many organizations have developed their own in-house systems.

## 2.2 *Document storage*

The major item of interest to date has been the ADONIS project, which involves the storage of the full text of some 200 biomedical journals in electronic format. BLDSC has been closely involved in the ADONIS project for over 10 years. Its history is well documented elsewhere[6] and I do not propose to repeat it now. To bring the story up to date, BLDSC has been using the system, along with a further 12 document supply centres throughout the world, for over 12 months, for all requests for items stored on the system that could be satisfied by provision of a photocopy of an article. In that time over 15 000 articles have been produced from the system and over 80 CD-ROMs are used. Recently, BLDSC took delivery of a CD-ROM jukebox, one of the first in the world, for use with the ADONIS workstation: this jukebox may have an effect on the viability of the future of such a project. In its current state the capacity of the jukebox is 240 CD-ROMs but this can be extended. A new version is about to be tested that will allow multiple use of the whole CD-ROM database. Also it will be possible to store other types of media in the jukebox, WORM disks and also magnetic disks.

In the terms of the experiment ADONIS has been a success. It has given us much valuable experience in the use of high-volume storage devices for document delivery purposes. The processing of requests is much quicker than the manual method, although, because the sample is so small, less than 1% of

total demand on BLDSC, operational problems more than negate the time saved at present. The cost of the operation is difficult to determine. A straight comparison of the method of operation again is in favour of the ADONIS method. But this ignores various thorny problems such as the cost of acquisition of both the traditional journals and the electronic version and the imposition of any royalty payments that may be a condition of use of the electronic system. Royalty payments for copies were the original reason for the ADONIS system.

At the present time the future of ADONIS is uncertain. The original trial which involves items published in 1987/88 is due to end at the end of 1989. The publishers have, as yet, made no statement about their plans for the future. They realize, like us, that the trial has provided more questions than anwsers. Meanwhile, University Microfilms have introduced a very similar service to ADONIS: they have captured electronically about 300 business journals as part of ABI/Inform. This service is available commercially. The cost in the United States is $20 000 per year for the discs and the equipment plus a 10 cents per page charge. They are also currently experimenting with IEEE publications using INSPEC as the index. This is interesting as IEEE are looking at the practicalities of publishing only in electronic format.

There are also nowadays many in-house systems of electronic storage of documents. At present, in the view of BLDSC, none of them is cost-effective compared with the storage of hard copy originals. This position may change as further technological advances take place.

## 2.3   *Document transmission*

More has been written about facsimile transmission than any other element of the document supply chain.[7] Now that facsimile transmission has more or less become established as a normal means of communication, the spate of articles will probably abate. BLDSC has experimented with facsimile transmission for many years but it was not until 1982 that it was used commercially. This was a 3-month trial with Chalmers University of Technology. The result of this trial was encouraging and so a commercial service was offered. At that time it was fairly unreliable and breakdowns were common. Over the intervening period, machine and line reliability has improved enormously but the standard that is currently most used, the CCITT group 3 standard, is not particularly suitable for document delivery purposes. It is adequate for items required in a hurry — in fact BLDSC now despatches some 10 articles every day — but it is far from satisfactory. The reason for this is the nature of the pages to be transmitted. Compared with normal inter-office items, pages from learned journals have far more text on them. They also often contain complex diagrams, tables and pictures. The group 3 standard is not very good with this type of material: in particular it breaks down with some of the smaller point sizes that are often found in subscripts and superscripts in chemical and mathematical formulae.

Again, technology has provided the answer: this time in the format of the next generation of facsimile machines, the CCITT group 4 standard. This overcomes all of the problems of the group 3 standard: the resolution is much

clearer, pages are transmitted much faster (15 seconds instead of 2 minutes), the machines use plain, uncoated paper and there is full error correction built in. As with all good things in life, there are disadvantages. In the case of group 4, as well as the much higher cost of machines, almost a factor of 10 higher, they cannot use the normal telephone network that group 3 machines use. Instead they require the use of a digital, rather than analogue, network. At present this is a major drawback to their widespread use, as the necessary digital telephone networks are not yet operational. At BLDSC we have carried sporadic trials with University College in London (UCL) since September 1986. The results, when the system is operational are excellent, and the quality of the transmitted copy is as good as that from a photocopying machine. During 1989 it is hoped to extend the use of group 4 transmission within the UK as fast as the digital network will allow.

There are other ways to provide the necessary digital transmission link and for some years we have looked at the possibility of using satellite transmission. To date this has proved to be a fruitless task, with the exception of two tests in 1986. The reason is that satellite transmission is very expensive. One attempt to reduce the cost, the APOLLO project,[8] a joint European Commission/European Space Agency project, ended up being more expensive because the special equipment, which was designed to reduce the cost, actually increased it! The current large-scale introduction of direct broadcast television may offer a cheaper means of providing the space link. Certainly, the necessary equipment required by the receiving end will be far cheaper than that envisaged for the APOLLO project.

## 3.   Integration

At the beginning of this paper it was mentioned that the real possibilities become evident when the three elements are combined. At BLDSC we are close to achieving this, albeit on a very small scale. As part of the Adonis project, BLDSC has received a grant from the CEC to investigate the matching of electronic requests against the Adonis database of articles. The work has been undertaken by the University of Bradford and is operational in prototype form. Requests are matched against the index of the Adonis system and positive matches are transferred automatically into the workstation for processing. In practice, because the Adonis database is so small and the DOC-MATCH system (the name of the project) requires the full article title, the system is not used operationally.

It is also possible, however, to match at a journal title level. For instance at BLDSC the possibility of matching all electronic requests against the Centre's holdings automatically, is being investigated. This, combined with improvements in the way that electronic requests are initially received, should mean that requests are in the correct picking order for the storage areas in a matter of minutes of receipt at BLDSC.

In further work being undertaken at UCL the Adonis system is being linked to a facsimile machine. This will allow transmission to any facsimile machine

instead of local printing. Whilst simple in concept, it has proved remarkably difficult to achieve this link. Again the development is working in a demonstrable form and so the automatic reception, selection, and transmission of articles is available already. Obviously, it will be some time before this is operational on a commercial basis but all the necessary parts have been demonstrated.

## 4.  Barriers to be overcome

The first problem that has to be overcome is one of cost. Many of the trials that have taken place at BLDSC have been subsidized in some form or another. The real cost of, say, the Adonis system, would be too expensive for even the high volume of demand that BLDSC places on the system. Unless more cost-effective methods are found then the advances that have been outlined will remain as experimental projects. By tradition, libraries are not rich institutions. Reference has been made above to the need that libraries have for cutting acquisition budgets. To provide suitable alternatives they must make some investment in technology or else the service they can offer will deteriorate badly.

The nature of the material that is being dealt with is the next problem. There is a very high volume of material compared with a relatively low use. A study at the University of Loughborough showed that even for the highest-use journals there was on average only one request per article per year. Use-figures from the Adonis project have shown similar results. Figures like this make it very difficult to develop cost-effective solutions.

The copyright issue is a further problem. It was an attempt to solve this problem that led the publishers, over 10 years ago, to begin work on the Adonis project: they also attempted to change the copyright law. In the USA they succeeded but in the UK they did not. This has led to a great deal of confusion and a situation that is not ideal from anybody's point of view. At the present time there seems to be no easy solution to this problem.

Because of the decentralization of document supply activities it is extremely difficult to take any executive action so that progress may be made. Many countries do have document supply centres but they are subject to a variety of national pressures and few of them make a business out of document supply in the same way that BLDSC does. This means that national needs often come before any thought of international co-operation. But this international co-operation is becoming of increasing importance since, with increasing costs, even national centres cannot afford fully comprehensive collections. Without some form of international co-operation it is unlikely that any real progress will be made.

## 5.  Conclusions

There has been a dramatic increase in document supply activity over the last few years. Advances in technology should ensure that the increase continues for some time to come. There are other forces that may come to play an increasing role.

The first is the effect that the falling number of subscriptions will have on publishers. It seems possible that the increasing number of titles published will counteract this. Also, there is an increasing number of articles published in journals. Because of the increasing number of titles and articles there is an increasing tendency for readers to request individual articles and not subscribe to journals. They find that this is far more cost effective. Publishers will try to counter these moves and Adonis was an attempt to do this. But to do this effectively publishers need to co-operate with each other. Adonis is one of the few examples to date of co-operation between publishers who are traditionally in competition. It remains to be seen if they can co-operate for a full-scale commercial operation rather than an experimental one.

There are many other possibilities of what may happen in future. Maurice Line's paper explores some of them in more detail. One thing that is certain is that, because of increasing costs, no progress will be made unless libraries co-operate not only with each other but with everybody else in the document supply chain.

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