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eBooks on Demand (EOD). A European Digitisation Service

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Abstract

Within the framework of the EU Commission funded project Digitisation on Demand (2006-2008), the eBooks on Demand service (EOD) was developed by 13 libraries in 8 European countries. EOD enables interested users to order specific books as PDF eBooks. The requested books are digitised, delivered as an eBook and saved long-term in a digital library. Not only does the individual researcher receive his book in a digital format within a few days, but the library and the public also profit in the end from the online availability of the document in the digital library. The EOD service is implemented within the framework of a network. The individual library is responsible for the processing of the order and the digitisation. The ordering of eBooks, delivery to the customer, electronic payment and automatic text recognition even for old and black letter texts are carried out however through a central database with web access. The basic advantages of the network lie on the one hand in the reduced workload of individual libraries and on the other hand in the recognition value of the EOD service for the user and the public. EOD should – so the operators hope – develop into a brand in the library industry in the next few years representing all types of on-demand services.

Background

According to experts' estimates, around 1 million book titles were produced in Europe between 1500 and 1800, 5 million titles between 1800 and 1900 and in the 20th century the number multiplied with around 20 million titles being published.¹ It does not require clairvoyant ability to reach the conclusion that one day all of these approx. 25 million books will be digitised and available online. However, the factor of time cannot be underestimated, because even if several thousand books are digitised every day, it will take 20 years or more until said target is reached.

¹ These figures are the result of a study within the framework of a contracted research project in 2007 by the ULB (University and State Library) Tyrol, which has not yet been released.

As pleasing as these developments are in view of individual researchers, the question in everyday library practice is raised: how does a researcher or historian locate a specific book that has not yet been recorded by one of the countless mass digitisation programs? The situation seems completely disillusioning: far from the brave new world of global digitisation projects, often the individual researcher has only traditional options at his disposal, often he/she cannot avoid a trip to the library in the case of older books from before 1800.

General Description of the EOD Service

In view of the difficulties experienced by a researcher when searching for a very specific work published between 1500 and 1900, the idea came to develop a Digitisation on Demand service. Some libraries already offer similar services within the context of reprography departments and digitalise individual book pages on request.

The EOD service, however, wanted to go one step further. The target was to develop a comprehensive standardised procedure for ordering books and for delivering digitised books. Furthermore, the target solution was to be implemented within the framework of a network of libraries, reducing the workload of individual libraries and guaranteeing the user a dependable ordering system as well as consistent delivery quality. Also, the service was not only to be generally offered on the library's website, but to be equally integrated next to interlending and other services directly in the libraries' respective catalogues.

For this reason, 13 libraries under the leadership of the University and State Library of Tyrol presented and approved a project entitled "Digitisation on Demand" in the eTEN programme of the European Commission. The consortium includes the following libraries: The Bavarian State Library, National Library of Estonia, Royal Danish Library, National Library of Portugal, University and National Library of Slovenia, University Library of Bratislava, University Library of Graz, University Library of Greifswald, Humboldt University Library of Berlin, University Library of Innsbruck, University Library of Regensburg, University Library of Vienna and the National Library of Hungary. The project began in October 2006 and will end in June 2008. The service will continue to be provided from July 1, 2008 by the partners as the EOD Network. Over the coming years, the network will continue to be expanded with new partners and new on demand services being added.

From a technical standpoint, the goal of creating a network through the development of a central web-based database, the Order Data Manager (ODM), has been achieved. Every order in the EOD library network is collected there and processed. The staff of the individual libraries is notified of orders received by e-mail and receive online access to their respective orders. In this way, direct orders as well as price enquiries can be handled. As soon as an order is made, the book is pulled from the respective library and digitised following internal procedures. The respective image files are placed via FTP on the central EOD server and processed there by means of a further central service. Then it is a matter of the Digital Object Generator (DOG), a web service which in addition to the image files automatically generates full text by means of OCR (Optical Character Recognition). Finally, a single PDF file, the eBook, is created, which also includes a cover and explanatory text on the EOD service. As soon as this process is completed, and the library has arranged the final release, the customer receives an automated e-mail with the link to his customer page. From there the customer can make the on-line payment by credit card and then directly access the eBook and load it on his computer.

Books are ordered directly from the online catalogue of the respective library. The intention, therefore, was to draw the user's attention to the service where he can also find the metadata on the desired book. The following screenshot shows the EOD order button of the National Library of Estonia in the Estonian network catalogue²:

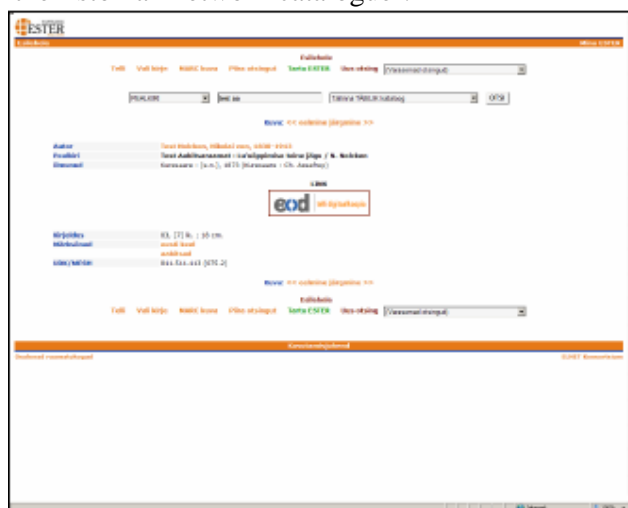


Figure 1: EOD button in the Estonian network catalogue

The eBook PDF contains the page image (the electronic facsimile) as well as automatically recognised text, which in older books, however, has shown a substantial error rate. The user is able therefore to browse the entire book, magnify or insert notes as well as print original pages or search the full text of the book. The results are then highlighted directly on the original image of the page. One special advantage of eBooks also lies in the fact that colour pictures, like for example those included in older hand-coloured works, are reproduced again in colour; therefore, the user receives an absolutely authentic impression of the original.

The price of an eBook is set by the respective library and is mostly based on the number of the pages and a base price. The following consideration is the basis of the calculation: the user should not pay the actual total cost of the digitisation, after all, the master files remain with the library and the public also later receives free access to the digitised works. What should be calculated is the additional cost occurring through the on-demand service. Underlying is the consideration that a customer-oriented service leads to a considerably higher cost than mass digitisation, which can be completed more rationally and cost-effectively.³ The specific price that a user now pays for an EOD eBook, for a book with 250 pages, ranges between €30 and €130. In view of this price range, a certain degree of harmonisation is certainly required here.

First Experiences in 2008

Even if the numbers of the first complete quarter of 2008 must be interpreted with great caution and therefore cannot be shown in this report in detail, it can be said that expectations have been reached and in many cases even exceeded.

² <http://ester.nlib.ee>

³ Experience in the Digitisation and Electronic Archiving Department at the University and State Library of Tyrol shows that a factor of 2-3, and in some cases even 10-15, is to be added when one compares the cost of the digitisation of an individual book compared to the cost with mass digitisation.

Thirteen libraries initially offered the EOD service in the first quarter of 2008. As a rule, every book published between 1500 and 1900 was offered as an eBook through the EOD service.

If you look at the number of orders placed, it can now be said that larger libraries, which can index all their historical books in the online catalogue, process one order per workday. It is projected for the whole year 2008 that possibly nearly 2000 orders can be processed and a comparable number of eBooks can be delivered. The average price per order is a little more than €50.00, allowing a turnover of approximately €100,000 to be calculated for the first year. If the numbers for digitised books are looked at, the way they were raised within the framework of the TEL+ project⁴, then it clearly shows that the EOD can make a more significant and long-term contribution to the development of a European digital library that is focussed on the needs of the user.

There are considerable differences in the number of orders among the libraries. Which individual factors play a role in this needs to be studied in detail. What is key is how fully the historical inventory of a library is listed in the catalogue and how much the items in the catalogue are used by users outside of this library. A third factor must be added, which is completely surprising, that is whether the catalogue files are indexed by search engines such as Google. If an enquiry on a book title leads the user directly to the catalogue and the user sees the possibility of ordering the book in digital form, then it is especially interesting to those people who are not part of the library's core customers. Of course, the cost factor also plays an important, though evidently not a decisive role.

EOD Customers

Every library that has implemented the EOD service has reported a very positive customer reaction. Representative of many others, is this e-mail from an EOD user. It is from an Austrian researcher who works in London and ordered a book through EOD:

I just wanted to tell you that I am very pleased with the [...] EOD service and that I will certainly use this service again as well as recommend it. "EOD" in my view is the right step into the future that will bring new life to old and valuable library holdings. [...] Books no longer have to be sent and the user no longer has to go to the library. And the "cherry on top" is the electronic text recognition!

In order to receive objective data, a systematic survey on customer satisfaction has been carried out within the framework of the project. 188 customers have been surveyed by telephone following the completion of their order using a standardised questionnaire. The data collected confirm initial impressions: just under 90% of customers stated that they were "very satisfied" with the service! They were especially satisfied with the fact that the service was offered at all, the point of lowest satisfaction was with the eBook's functionality, although this question usually could not be answered at all. It is possible that the fact that not all eBooks were delivered standard with full text or that significant quality loss in text recognition, as was the case in older works, could have played a role. It will be vital in the future to provide comprehensive explanatory texts on this point.

⁴ Cf. the presentation by Hans Petschar on the status of digitisation in Europe's national libraries.
<http://www.libereurope.eu/node/264>

When asked why they selected the EOD service, almost half of those surveyed answered that the book would otherwise have been “impossible or difficult to access”. This proves that EOD has in fact achieved its goal of creating an additional alternative in accessing books.

Statements regarding the cost were also illuminating. The majority of customers paid between €20 and €49 per book. Still though, around 20% paid more than €50, and a few more than €100 per eBook. The average price for all books was €3. 30% of customers rated the price of the EOD service as “very high” or “high”. When asked how they rated the price-performance ratio, however, more than 95% of customers answered that it was “very good” or “good”. Quite obviously, the cost arising from the digitisation of the book is realistically estimated by customers, however, they would still desire lower prices. Nevertheless, 75% of customers stated that they paid for the eBook themselves, while a quarter accessed other budgets (institutes, faculties, companies).

It is not very surprising that the overwhelming majority of customers are either researchers or require eBooks for “professional or scientific use” (over 60%). In second place (at 16%) are book collectors and people who could be said to count among special interest groups such as amateur historians, for example.

A completely unexpected picture is given by the age range of the customers: there are no trends here; the customers are evenly spread over all age groups. The division according to sex, however, shows that much fewer women order eBooks than men. The vast majority of customers are from the same country as the library they are ordering from. A further share is divided among the countries of Europe and a small proportion is from overseas.

Of especial interest to us is the survey carried out within the participating EOD libraries and the goal they set themselves of assessing the costs of digitisation. It appears that only half the work time is used for scanning and postprocessing the images while related administrative tasks such as pulling the books, checking the archives, creating full text and returning the books, make up the other half. Naturally, there are also significant differences from library to library and a lot depends on how effectively the respective business processes within the library are organised. Within the area of digitisation itself, it can be expected that in the next few years a better economy of scale can be achieved through the use of book robots⁵.

Market Research

A special focus of the project was dedicated to market research and surveys of library users. The goal was to survey the general need for the EOD service. The study was run parallel to a German representative sample of over 1000 subjects as well as a sample of 2200 users of the respective EOD libraries.

The expectations of library users in relation to product quality, the price of eBooks and the delivery time were surveyed together with the Institut für Marketing - Strategieberatung GmbH (Innsbruck, Austria). Moreover, the conjoint analysis process⁶ was partly used where the various attributes of a product or service, such as quality, cost, delivery time, etc., are combined and the subjects are given the choice of these packages. Based on a mathematical

⁵ There are currently four companies on the market that offer book robots: i2s (France), Kirtas Technology (USA), Qidenus (Austria) and Treventus (Austria).

⁶ Approx. 1800 people from the pool of 2200 survey participants also participated in the conjoint survey.

method, it can be calculated with distinctly higher probability compared to traditional methods, which product features have especially lasting influence on the purchasing decision.

The following chart contrasts price and delivery time in the fictitious case of a 250-page book that has been requested for digitisation.

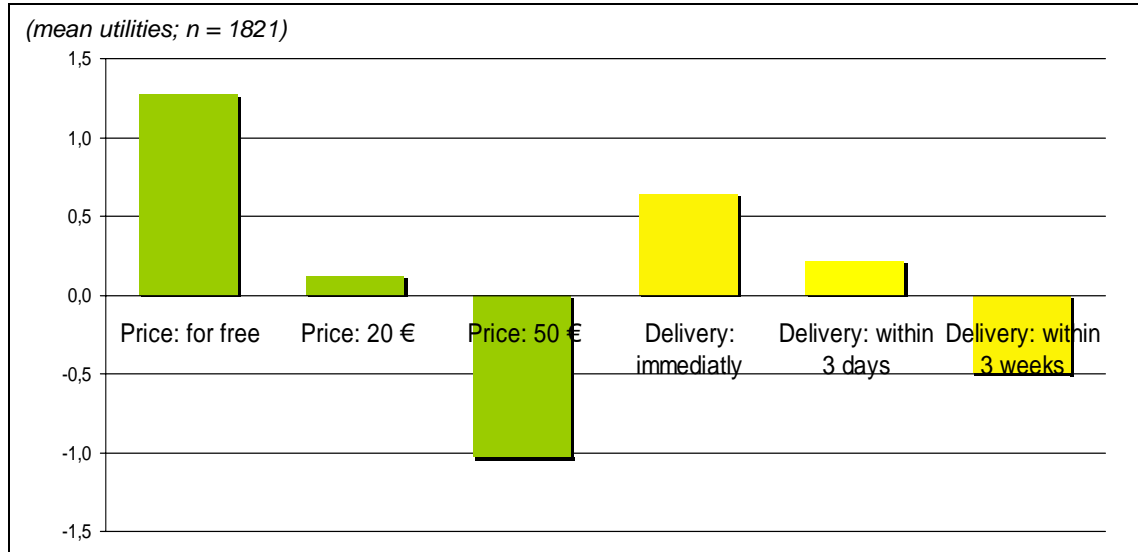


Figure 2: Benefits of different attribute levels of price and delivery time

It shows that, naturally, freely accessible eBooks have the highest benefit for the user. However, a price of €20, around the same price as for a book, is still associated with a positive effect for the user. At €50 per eBook, the situation clearly changes. Very similar is the user attitude regarding delivery time. A delivery time of three days is still seen as positive, while a delivery time of three weeks receives an overwhelmingly negative evaluation.

This survey opens up, from our point of view, another interesting perspective for public customers of digitisation projects. If you want to make the EOD service more attractive to users, then you can consider assuming a percentage of the costs for each project. In this way, it is guaranteed the service will continue to be directed at individual customers and that the interests of the customer are also covered, in that a reduction in prices could be granted only to a specific region (“Austriaca”), a specific topic (“travel literature”) or a specific group (“people affiliated with a university”).

A further question was regarding the type of book those in the survey preferred. The alternatives offered were (1) a PDF file with full text search, (2) a PDF with only scanned images, (3) a database with online access and no PDF download possibility, (4) possession of original book, (5) borrowing the original book from a library or (6) reading the original in a library. It again must be stressed that these alternative offers were not simply listed, but always surveyed in the context of “packages” so that their quality rating in relation to each other could be determined exactly.

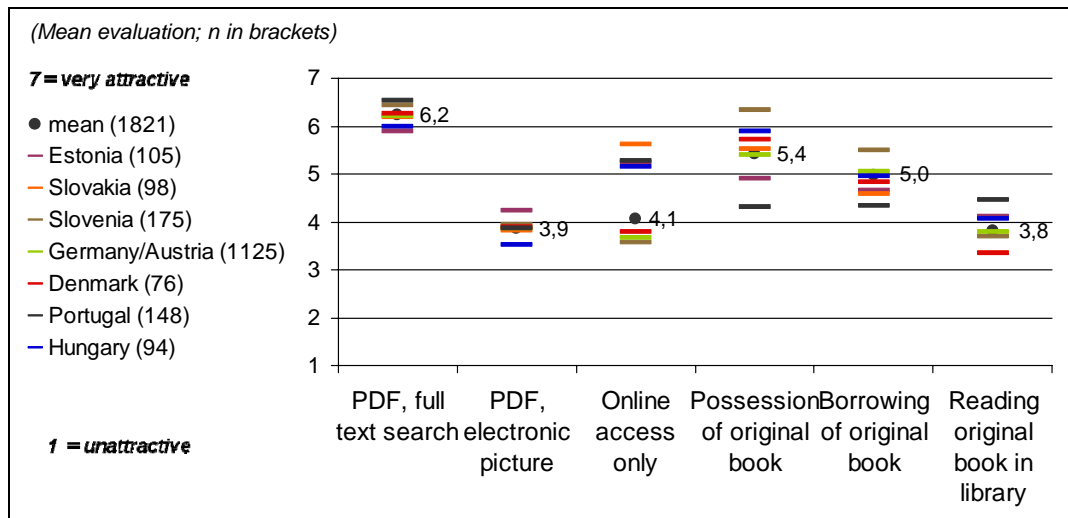


Figure 3: Attractiveness of different product types

This shows that the PDF with full text search is still the most attractive format for use of historical books, followed by the possession of the original book. Even in most of the country summaries, the PDF with full text search was preferred by those surveyed clearly ahead of possessing the original works.

What is especially illuminating from the viewpoint of the libraries is that the option of reading the book in a reading room loses out compared to the other forms of use. However, just as interesting is that the pure electronic images without text recognition and possible online databases without PDF download also count among the least interesting alternatives. The top ranking of a book that you own yourself shows that the second-hand bookshop as an alternative to the library obviously becomes increasingly attractive. Finally, second-hand bookshops have also been networked together internationally for a few years and can deliver older books at a limited cost and often at a relatively low price.

Very similar results are shown in the following chart in which the positive or negative characteristics of the product are listed. The PDF with full text and the ownership of the book are by far the highest ranking options among all the other alternatives.

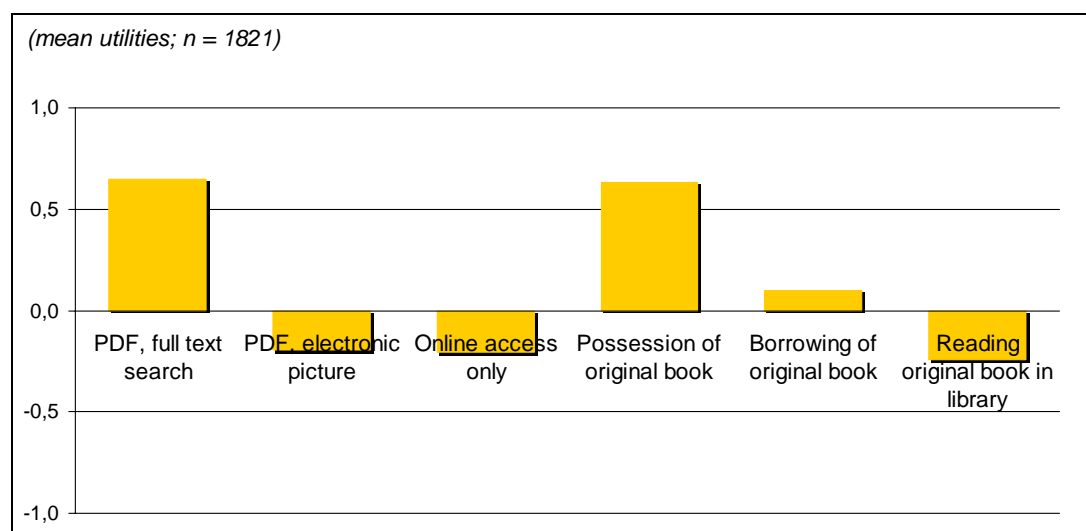


Figure 4: Benefits of different attribute-levels of product type

All of these numbers are unusually well secured and, surprisingly, the results of the survey of the general public give the same picture. Here too, the PDF with full text and possessing the original book are at the top of the list, above all the other alternatives.

This impression is strengthened through an analysis of the alternatives to the EOD service itself. Searching the internet for digitised versions of books was rated as the most important alternative by 40% of the people questioned, followed by a distinct margin at 25% for reading in the library. Interlending and buying the book in a second-hand bookshop possess the same desirability for the user in this survey.

In summary, it could be said that libraries that continue to offer their users only the traditional alternatives – lending, reading on site and interlending – actually no longer offer their users really attractive options. In fact, users expect to find older books either digitally or they turn to a second-hand bookshop to find a copy themselves.

Basic Principles of the EOD Network

From July 1, 2008, the EOD network will stand on its own feet and be carried on by the participating libraries with the support of the EU Commission. The network's goal is to attract as many libraries in Europe as possible as members in the next few years. In a few years, the original vision of the EOD network could become reality in that every single work published in Europe between 1500 and 1900 could be delivered worldwide within a few days as an eBook.

For organisational and legal purposes, the following structure has been selected for the EOD network: the hitherto coordinator of the project, the University and State Library of Tyrol, assumes responsibility for the operation, maintenance and further expansion of the central database with the services connected to that following the phase-out of EU support. Every

library participating in the network is connected to each other through a cooperative agreement. The members of the networks are entitled to vote, the coordinator must therefore bring about a majority vote in the case of important decisions. In addition to the founding members, newly added libraries will be brought into the network as “associated members”.

As a representation allowance, the participating libraries pay the coordinator an annual fee and a specified percentage of usage fees for each eBook delivered over the network. These fees are very low, but should ensure continuous operation in the medium term. According to internal calculations, it is assumed that the network can support itself with a minimum of around 50 libraries.

Further EOD Libraries

The future of the EOD network will depend in no small part on the willingness of European libraries connecting themselves to the network and providing the service. What reasons should a library have for joining the EOD network? The following considerations seem to us to be important here:

1. **Expansion of the service portfolio**
As seen in the customer survey and market research, users have reacted very positively to the service. A library that belongs to the EOD library shows that it reacts to the expectations of users and is anxious to meet the requirements of modern, internet-based services. The EOD service should therefore be seen as an extension of a library’s traditional service offer ranking with traditional services such as building a collection, lending, interlending or reproduction services.
2. **Support from a central infrastructure**
The implementation of the EOD service is associated with low costs. The individual libraries neither have to install any software nor develop a working routine for the processing of orders. They can instead access the central infrastructure. The websites and customer texts required for the service just have to be adapted. Also all further central services, such as the creation of eBooks and online payment require no additional costs whatsoever.
3. **Contribution to the development of a digital library**
Due to the fact that the EOD service only provides books which are without copyright restrictions on use, they can also be integrated into the respective digital library after the completion of the order. In this way, the digital library grows in line with the specific interests of users. Most EOD libraries place the works in their digital library within a period of a few months and in this way the general public also gains free access to the digitised works.
4. **Internationalisation**
In the end, the EOD network is one of the few examples of an integration of libraries crossing national borders. The fact that the service is offered from Estonia to Portugal and from Slovenia to the Czech Republic is by no means self-evident and can also serve as an example of how this type of Europe-wide service could look in the future. For individual libraries there is the chance to gain experience and enter into international partnerships, and for the EOD network the wide proliferation in the

countries of the European Union offers the possibility of being successful in further EU calls to tender and therefore of receiving “fresh money” for improvements and expansions.

Three libraries not taking part in the EU project have already implemented the EOD service during the run of the EU project and are offering their books for digitisation: the Moravian Library in Brno (Czech Republic), the Saxon Regional Library - State and University Library of Dresden (Germany) as well as the Bibliothèque Interuniversitaire de Médecine et d'Ontologie in Paris (France). The EOD coordinator is currently in discussions with a further seven libraries from four countries. Among these are well-known libraries in Estonia, the Czech Republic, Poland and Hungary.

Expansion and Outlook

The experience of the first months shows that the EOD network is fundamentally on the right path. The idea of concentrating on on-demand services and implementing them by means of modern web technology can be seen as trendsetting. An infrastructure has also been created with the international network that will enable EOD to be equipped with new services and products.

From market surveys, it can be proven that in the relevant target group, i.e. scientists and book collectors, there exists a high readiness to use the service. However, far too few of these potential customers are aware that they can access the EOD service in their search for a specific book. The awareness level must therefore be increased and, alongside general marketing measures, this should be achieved above all through an increased EOD presence in international catalogues and indexes as well as through a central enquiry database. The OCLC-run WorldCat or the TEL portal, which is a central search site for Europe's national libraries and is supported by the EU Commission, are of great interest in this connection. In the medium term, the EOD service is also to be directly integrated into these catalogues so that all users receive immediate notification, in the case of books published before 1900, that digital ordering as an eBook is also possible.

The idea of a central EOD search engine goes a vital step further. This is to be “fed” by EOD members' catalogue data and save the user from searching in individual local or national catalogues. An initial prototype of such a search engine is currently being developed in cooperation with the Institute of Technology at the University of Innsbruck. Moreover, the index of this search engine should also allow indexing by further search engines such as Google. In this way users, especially those who find themselves searching for rare books, are led to the EOD search site directly.

EOD's current standard product is delivered in a PDF eBook format, which contains an electronic copy (“page image”) of the pages of the book as well as the automatic creation of full text. This, though, is just the beginning as digitisation allows new products to be created, e.g. higher-quality full text and print-on-demand editions. All of these products build on the original library files and are to be centrally organised. In other words, no further procedures are required for the individual EOD library; instead, the new products will be centrally developed and stored in the EOD product catalogue from the outset.

Especially interesting in this connection is the introduction of a print-on-demand service. Over 30% of customers surveyed stated they would print the complete PDF eBook. It is therefore suggested to give these customers the option of directly ordering a reprint of the book along with the eBook from the outset. The actual challenge of this service has less to do with the printing of the PDF file, which many local suppliers can also do relatively cheaply, but instead in the development of a robust business procedure as well as worldwide delivery and online payment. A prototype is currently being tested that has been implemented in cooperation with the American company Booksurge⁷, a subsidiary of Amazon. As soon as a user wants a reprint in addition to the PDF eBook, the images are centrally prepared and transmitted to Booksurge with the metadata and an ISBN number, the book is printed there and sent directly to the respective customer. The customer pays for the production and shipping costs of the reprint on top of the price of the eBook. The chief advantage to the customer is that he only has to place a single order and the book can actually be delivered to him anywhere in the world. Following this first order, the book is also stored at Amazon.com and can continue to be ordered there as a reprint.

A further product is in the form of high-quality full text. This is especially necessary for those scientists who want to work very intensively and long-term with an historical work and therefore rely on a correct full text as well as the structuring of the text. However, the growing group of technologically interested readers who want to read their books “on the go” and therefore use eBook readers could also be addressed with this. Conversion invites cooperation with a whole series of service providers who have specialised in the processing and creation of full text. The difficulty here, though, is in the diverse requirements and the lack of common standards. Furthermore it is very difficult from the start to estimate and above all generalise the costs of processing the books into TEL, docBook or MobiPocket and other eBook reader formats. We are, however, optimistic that in the course of 2008 a basic solution can be found and this product can be offered in 2009.

Eventually the EOD network would also like to develop a special service for the blind and visually impaired. On the basis of copyright agreements⁸, it should be possible in many countries in the European Union to allow the blind and visually impaired access to all books in a library. EOD, in cooperation with organisations and libraries for the blind, could expand the EOD service portfolio with an Access on Demand service. The DAISY format would also provide an internationally accepted document format for the blind and visually impaired. However, here too there are several problems that need to be solved. Among these is the detailed review of copyrights and the authentication of a blind or visually impaired person and the allocation of costs, which should be charged either not at all or only minimally to the disabled person. The EOD network will strive in the near future to clarify the situation within the framework of a further EU project and develop a test application.

⁷ <http://www.booksurge.com>

⁸ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32001L0029:EN:HTML>