



*Economies of the Commons 2,
 'Paying the cost of making things free',
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 Session
 Materiality and sustainability of digital culture)*

The material shadow of digital culture

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I feel a bit like a party pooper, today. Because my story is about complications, obstacles to the free flow of digital culture, very material obstacles, especially in the long term. It is not the most inspiring of subjects, I am afraid, but someone has to do the job, because the obstacles are very real and often overlooked.



<http://visitsteve.com/work/arrow-sign-in-los-angeles/>

To my mind there is something decisively odd about the notion of a Digital Information Commons. The term 'commons' carries connotations of things that have been around for ever and ever, and the creation of which never involved human endeavour. Fisheries grounds, common pastures, a natural abundance which could easily be shared by many without running the risk of depletion – that is, until recently. The picture of the 'commons' that emerges has a paradise-like quality which is very tempting, and I can see how social scientists, impressed with the potential of the internet, would draw the comparison between the internet and

the commons, including the undertone of optimism and maybe idealism.

For it is true that a digital object, once created, can be shared by ten, a thousand, or a million users without losing any of its value, and without traditional distribution costs, such as printing a book and shipping it to the reader. And I can even appreciate that the intangible, immaterial nature of digital culture would add to the perception that this type of resource could be shared by many and enrich the world



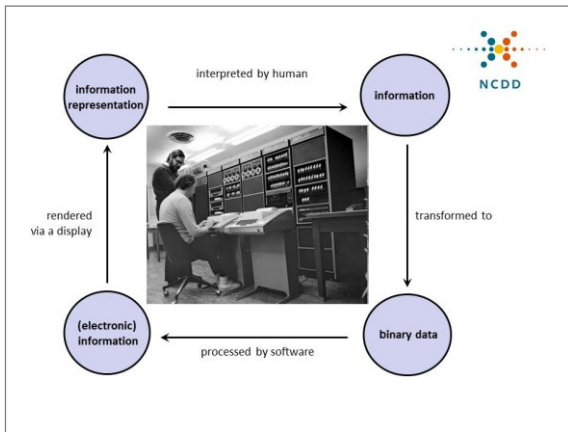
... if only we did not have private interests to spoil the party: notions such as ownership, copyright, licenses, privacy regulations.

But things are not quite as simple as that.

First of all, the digital cultural "commons" does not come about without human endeavour, and thus from its very creation costs and ownership issues are very real parts of the equation that cannot be disregarded.

But there is more. The notion that digital information, immaterial and intangible as it is, is basically "free" from the point of creation on, is a very serious

misconception. There are, of course, no traditional distribution costs such as printing and shipping. But there are very real other costs.

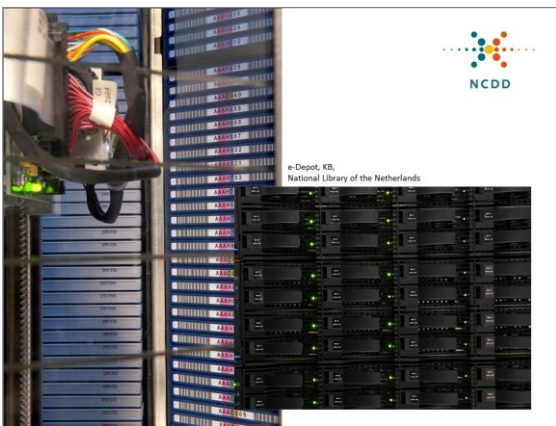


Digital information, *in and of itself*, is nothing more than a row of ones and zero's, or, more precisely, on and off switches. On the internet you can find lots of neatly photoshopped creative representations of this binary code, perhaps giving you the sense that digital information has a life and a color of its own, but in fact digital code has absolutely no meaning to the human brain. We cannot hear it or see it or feel it or smell it.

That was quite different in the analogue era, when information was written on a piece of paper and anyone with basic language skills was able to make use of it.

Not so in the digital age. In order to be able to harness the power of computers, we have to transform language or music or images in binary code, and we use hardware and software to do that. The binary code is then processed by software, once again in binary code, and this then has to be rendered on some type of display for us humans to be able to understand any of it.

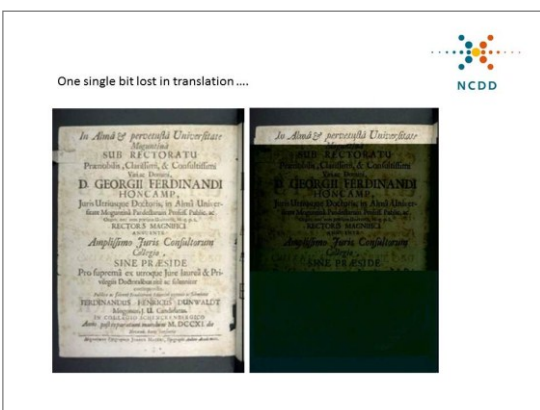
The trouble, of course, is that hardware and software change all the time. So if we want to keep using the digital information for any length of time, someone has to take care of the information through all these hardware and software changes.



And that is very *material* work. It requires storage, for one. You may not think much of this, with 1 Terabyte hard disks available from your local computer store for less than €100, but when you talk in terms of petabytes and more, and you use sensible back-up strategies for all your material, plus you invest in types of storage that do not have to be renewed every couple of years, costs do run up quickly, especially in the audio-visual domain where files are huge. And do not forget the electricity bill. The British Library runs up an annual power bill of M GBP 3,5 million; a medium-sized data centre will easily spend K50 on electricity each month.

As impressive as these numbers may be, storage is not the most important cost factor. No, the most important cost factor is human labour. Digital information has the reputation of being a free-flowing commodity easily transcending frontiers between countries and institutions, but technically, there are a lot of challenges, especially in the long term.

Every software programme generates its own file format, and there are thousands of file formats around that all behave differently. Moreover, file formats change all the time, creating new compatibility problems. I am sure most of you have run into these at some time or another.



In this slide, the difference between the image on the left and the image on the right is only 1 bit – one zero which was lost during migration from one system to another. And you can see the catastrophic results. That is how fragile digital data are.

Digital preservation, or, more appropriately termed, long-term management of digital resources is about managing the compatibility problems between systems, between file formats, and even between different versions of one file format. Keeping digital

data from becoming useless in no time at all.

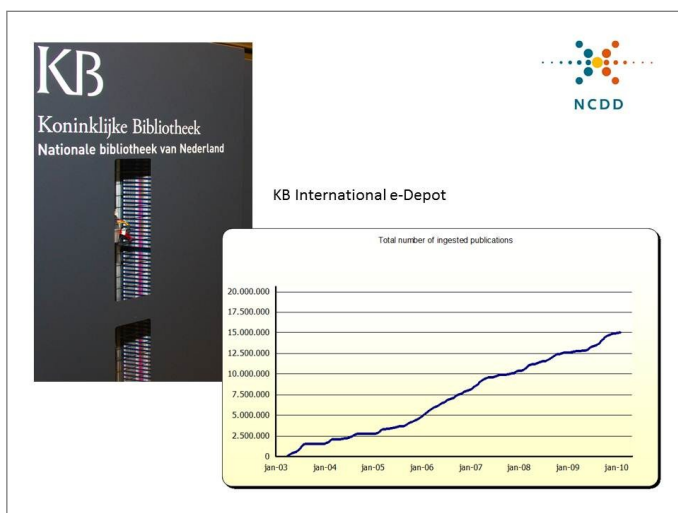
Just a few weeks ago, I heard the director of digital archive complain: 'Every time we think we have our ingest procedure just the way we want it, something changes in the system of the information producers, and we must go back to the drawing board to fix it.'

Technology is constantly evolving, it is a moving wall environment, and digital repositories have to keep up with those developments. That is expensive. Just look at these figures from the Dutch National Library. The KB was the first national library to establish a digital repository in 2003, and thus they have some experience at the game. The KB is now in the process of building its second digital preservation system. Estimated development cost: €M3,5. Annual operating costs: €M6. Another example, from the Dutch archival sector, which signed an agreement last June to develop a national shared services organisation for digital archiving at all government levels: national, regional and local. Estimated development costs: some 20 million euro's. I am sure that Hans Westerhof will tell you more about what Sound and Vision is spending on digital archiving.

Let me just say this: next time you get something from the internet for free, especially something that is older than a few years, just remember that somebody somewhere is putting in a lot of effort to keep the information alive and available for you to use. Most of the time, of course, you will not have a clue who this is, nor will you care.

At the other end of the line, however, people *do* care. Because they are the ones who are putting in the work and putting up the money. Libraries, archives, who have to prove their worth to society or they lose their funding. Proving your worth to the community has become more difficult in the digital age. When you manage a common pasture in your village, it is relatively easy to identify who is doing the work and who is benefiting, and to strike a balance between them. When you publish digital information on the Internet, your users may be anyone anywhere, and it is much more difficult to strike a balance between investments and profits. And this is a real danger to sustainability of digital resources.

The private sector is not helping much either. When an NCDD research team spoke to five large companies in the Netherlands last year in the context of a national digital preservation survey, their message was quite clear: we are not interested in keeping digital information any longer than we have to by law. The long tail does not interest us, it costs much more than it brings in.



What about Google, you may say. Well, Google is investing in digitising library collections, but Google gives no long-term guarantees. It is the libraries who are doing long-term maintenance work.

Publishers are a case in point here, too. Scientific publishers put millions of articles on the internet, but they rely on national libraries and library cooperatives to ensure long-term availability of this information. The Dutch KB, for instance: since 2003 the KB has concluded archiving agreements with 14 major international publishers, and it now secures long-term availability of over 15 million scientific and scholarly articles produced by large international publishers from all over the world.

Eelco Ferwerda, who spoke earlier, also depends on the KB infrastructure to provide long-term care for the publications of Amsterdam University Press and OAPEN.

And the bill is being paid by the tax payer. That in itself is not surprising, at least not in Europe. The public sector has always assumed responsibility for long-term preservation of cultural heritage, analogue or digital. Museums,

libraries, archives all depend largely on public funding. But as you all know, money is tight in the public sector, there are cutbacks all over the place. That does not make life easier.

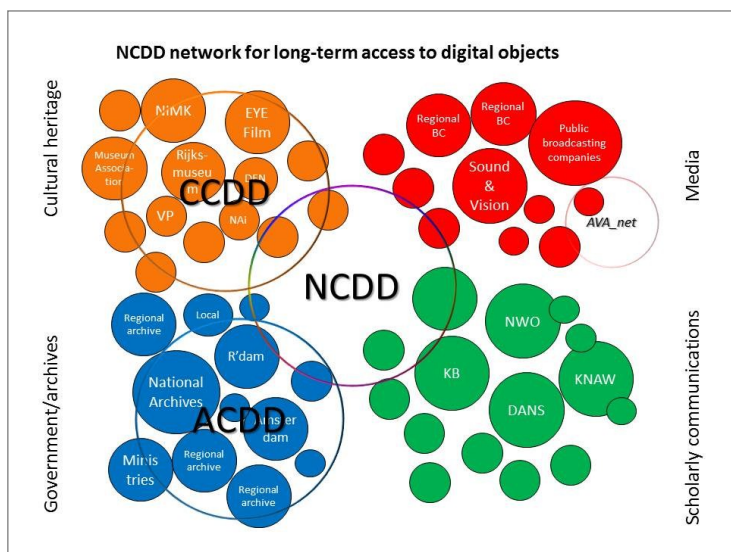
The lack of interest from the commercial sector has another consequence: because the private sector is not interested in long-term archiving, systems and tools for long-term digital preservation are not being mass-produced. No turn-key installations available here, so cultural heritage institutions themselves have to get heavily involved in systems development, which is not their core business.



So how do we deal with these issues? In the Netherlands we have decided that public-public collaboration is the best way to move ahead and in that spirit the the Netherlands Coalition for Digital Preservation was established, the NCDD, by a number of large custodians of digital data, the National Library, the National Archives, Sound and Vision, and a few major scientific organisations. All of them have missions for long-term custodianship and they all wish to make content available as freely as possible - but they are also acutely aware of what it takes to bring that about.

The NCDD has a very bold mission: to establish an infrastructure for digital preservation throughout the public sector. This is by far the most ambitious mission of any of the existing digital preservation coalitions, most of whom set their goals more modestly on raising awareness and sharing knowledge. The infrastructure the NCDD is building is to include not only facilities, and tools, but also funding, organisational alignment, knowledge and expertise.

The idea is that we will work together to bring about the most sensible division of labour when it comes to assuring long-term access to digital resources. Share storage facilities, share networks, organise a joint national lobby with the government for funding. Discuss issues such as selection of material to be preserved, and who is going to preserve all sorts of categories of information which did not exist in the analogue era – as discussed by Charlotte Hess yesterday. Think about funding and business models. Find digital-age solutions for digital-age challenges with organisations that basically are still very much organised in an analogue way.



We have identified four domains with distinct dynamics in their information life cycle. Some solutions to the challenges must be developed within those domains, as they are very specific to the information life cycle. In two domains sub-coalitions have been formed. In the slide you see the cultural heritage coalition in orange, and the archives coalition, in blue. You may remember the earlier slide about the archives' plan for a national shared services organisation. That is the work of the Archival Coalition. The NCDD is the national, cross-sector coordinator. At the NCDD the network leaders from the different domains come together to discuss collaboration at the national level.

(Of course there are many international connections as well, they are very important to us. They are just not in this picture, it would get too complicated.)



In conclusion, I hope you go away with a sense of how *material* digital culture really is. That no image or sound can exist without very material carriers, hardware and software, that digital objects require very labour-intensive care from the moment of production until the end of the information lifecycle. In the Netherlands we have decided that we must collaborate on a large scale to secure proper management of digital data. And we must collaborate to secure sustainability in the long term. That collaborative concept has now been accepted by many institutions as well as by the Dutch government.



Collaboration is not always easy, we all know that, there are lots of organisational and cultural differences to be bridged. That takes time and hard work. But in the end, we at the NCDD are convinced that we will all benefit.