Digital cultural heritage in the Netherlands: collecting statistics on production, investments, and use

Trilce Navarrete Hernandez &
Frank Huysmans
Cultural Information Science Program
Department of Media Studies
University of Amsterdam
T.NavarreteHernandez@uva.nl, huysmans@uva.nl

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Abstract

In recent years, the amount of digitized and digital-born cultural heritage content made accessible by Dutch libraries, archives and museums has grown considerably. In this paper, the main findings from the first nationwide survey on digitization activities in museums, libraries and archives The digital facts, conducted by Digital Heritage Netherlands (DEN) are presented. Data was collected from 128 organizations who reported an average of 26% of their collections being digitized and an average of over 100,000 euros digitization cost in the year 2007.

These data on the supply side of digital cultural heritage are complemented with data from various surveys on what is known about the use of digital heritage as well as physical visits to these institutions by Dutch citizens. The paper concludes with an evaluation of the state of digital cultural heritage in the Netherlands.

Key words: Digital cultural heritage, Netherlands, production, economy, use

1. Introduction

Since a number of years, cultural heritage institutions in various countries all over the world have been working on the digitization of their collections and inventories. Considering both the effort and the government subsidies invested in these tasks, the need for an overall quantitative picture of what has been achieved to date has arisen. The NUMERIC research project (2007-2009) aimed at providing such a picture for several European countries. The Netherlands was one of the participants in this project to measure the digitization activities and for digitization investment. This resulted in the first nation-wide exercise in documenting the production and costs

related to digital activities. In this paper, we present an overview of the findings in the Netherlands for both heritage objects ('digitally represented') and metadata ('digitally described') collected in the so-called Digital Facts project. Furthermore, to give some insight into the extent to which this material is actually used by the Dutch, we provide some preliminary findings from a recent (March 2009) population survey on the participation in and use of information and communication technologies (ICTs) for cultural purposes. The paper concludes with a summation of the state of the production, costs and use of digitized cultural heritage in the Netherlands.

2. Data and method

Production and investment data was gathered through the Digital Facts Project (*Digitale Feiten Project*), coordinated by the DEN Foundation and implemented in liaison with the Numeric project. The Numeric project was coordinated by the British Institute for Public Finance (IPF) and was designed in accordance with the European Commissions resolutions and recommendations found in the Digital Libraries Initiative[1].

The Numeric project was well-timed in the Netherlands because the country is in the process of developing a national system for the collection of data that would reflect the production of digital heritage[2]. The Ministry of Education, Cultural Affairs and Science therefore assigned the DEN Foundation the task of coordinating the collection and analysis of data. This kind of national strategy for the collection of data represented a national exercise unprecedented in its kind.

The DEN Foundation worked mirroring the Numeric approach. The following graph shows its various phases: (1) desk research, (2) test survey, (3) revised survey to larger population, and (4) analysis and report of data.

Numeric	May 2007		→	April 2009
Project approach	Desk research	Test survey	Revised survey	Analysis and reporting of data
Project goals	To provide statistic information from the 27 member states that would: - better identify the total European digitization effort and progress; - make international comparisons, between countries in the EU and EFTA, the United States of America, Canada, Australia, China and India; - stimulate further digitization by demonstrating current progress; - better inform stakeholders interested in or directly involved in digitization policies and funding (governments, statistical agencies, cultural institutions, academic and scientific institutions, publishers, industry).			
Digital Facts	February 2008		→	December 2008

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[1] See the Commission's recommendations at http://ec.europa.eu/information_society/activities/digital_libraries/cultural/comm_recomm/index_en.htm.

[2] Background of Digital Facts Project description at the DEN website at http://www.den.nl/docs/20080319160505/.

Project approach	Desk research	Test survey	Revised survey	Analysis and reporting of data
	Inventory of known data and current data gathering efforts.	First survey, 20 responses.	Revised survey, 108 responses.	Data reported to Numeric and to Ministry.
Project goals	- to develop a system that could be implemented for the structural gathering of digital heritage data (its production output and costs); - to gather statistical data that would give policy makers an insight into the currently available digital heritage and the investment that has taken place.			

In the Netherlands, a team at the DEN Foundation comprised the director, two project coordinators and the office manager, with support from an advisory committee, an external research institute, and the Ministry of Education, Cultural Affairs and Science. Close communication was maintained throughout the project with the Numeric team and a number of heritage institutions were solicited for advice on various occasions.

Because of its relatively early start on the project both in relation to Numeric and compared to other member states, the Netherlands were able to participate more actively in the methodological discussions at a European level. It also developed a few of its own characteristics as a result of its national process and its particular discussions, which were all part of the learning exercise the project represented (i.e. the survey used is a variant of the Numeric survey).

The desk research phase provided previously collected data on the digital activities and served to inventory the current data gathering efforts. This resulted in an overview of the known digital activities[3]. The desk research made it clear that several ongoing efforts are already gathering digital activities data. The majority of these have general information about digital production and even more general information on costs. Of significant importance are (1) the Yearbook of Monuments, Archeology and Cultural landscape, (2) the bi-annual Bench marking for university libraries, (3) the ICT Use in Museums survey, (4) the yearly ICT Archives Monitor, and (5) the DEN Foundation Project Bank. With a bit of luck, these established projects could adapt the task of gathering and reporting digital activities data. However, the desk research found only a few organizations reporting the production and costs of digital activities in their annual reports.

During the second phase, an online survey was designed to gather data on digital activities per institution, focusing on costs and production[4]. This survey was first translated from the Numeric online survey but later expanded to reflect specific national interests. With regards to the concept of digitization, the Netherlands found it essential to report two categories of digitization: digital representations, or 'digitally reproduced', as well as digital identification records, or 'digitally described'. Documenting both categories was found to be an important instrument to measure

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[3] Results of the desk research can be seen at http://www.den.nl/docs/20090326032601.

[4] The online survey was designed and conducted by the Institute for Research on Public Expenditure (IOO).

the dimension of the physical collections. These terms offered the best option to harmonize the work of libraries, archives and museums. The test survey was sent to a small group of institutions before being distributed nationwide. Those 20 responses informed a revision of the definitive survey.

The revised survey was sent to all institutions considered relevant, generally speaking all heritage institutions that have participated in the project bank coordinated by the DEN Foundation. Survey revisions included a further development of the definitions (digitally reproduced and digitally described), and the exclusion of a number of formal questions to shorten the survey. The online survey included a downloadable Excel component to report activities per type of object. A total of 108 institutions responded to one or the other part of this survey.

In the final phase, all gathered data was analyzed and reported[5]. The comprehensiveness of the questions on production and costs of digital activities proved to be challenging to the participating institutions. Depending on the organizational structure, the requested data could be managed in several departments. Few organizations appeared to have an institutional overview of their digital activities.

A total of 128 institutions participated in the Digital Facts project. However, because not all institutions completed the online survey, the project's final research report states only 119 participations. Data from the returned 102 spreadsheets was included in the analysis and indeed reported to Numeric but was discounted unless there was a matching online survey entry[6].

The country's participation in the European project was considered satisfactory as it resulted in the identification of approximately 100 'relevant' heritage institutions. "Relevant institutions are considered to be those where digitization of collections will significantly enhance access to the nation's cultural heritage." Based on a formula established by Numeric, the Netherlands identified 33 relevant archives of a total of 329, 2 audiovisual institutions of 3, 22 libraries of 699, and 43 museums of 703. The returned surveys proved the self-marginalization of those institutions that believed to have too little data to report and thus decided not to participate. Furthermore, the results from the library sector exclude all public library responses,. The libraries here reported represent the national library, scientific libraries as well as a number of special libraries linked to the Dutch Art History Libraries Society (OKBN).

The heritage institutions participating in the survey represent 38 archives, 49 museums, 21 libraries, and 11 combined institutions. The wide budgetary range of the respondent institutions displays the diversity of availability of resources in which the digitization process takes place.

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[5] The Dutch version of the final report can be downloaded at
http://www.den.nl/docs/20090326122902.

[6] See annex for entire List of Dutch institutions participating in the Numeric project.

Table 1 Yearly budget 2007

Year budget in euro	Number respondents	Percentage responses
Less than 50,000 euro	4	3%
50,000 to 100,000 euro	4	3%
100,000 to 200,000 euro	7	6%
200,000 to 500,000 euro	17	14%
500,000 to 1,000,000 euro	8	7%
1 million to 5 million euro	34	29%
5 million to 10 million euro	20	17%
10 million or more	9	8%
Does not know	16	13%

Source: De Digitale Feiten 2009.

Surprisingly, 16 respondents could not report on their institutional budget. Not having an overview of the total budget can occur when the respondent is part of the municipality or when the respondent has no access to data from the parent institution.

3. Production of digitized collections

Institutions were asked to report on the estimated percentage of the collection that needed to be digitized in relation to both the parts already digitized and those that do not need to be digitized. Data from the participating institutions revealed that 'desired' digitization might also include the collections already digitized. These results had to be read in comparison with the percentage of collections already digitized. One in four institutions reported wanting to digitize its entire collection while also one in four reported that 80% of the collections did not require digitization.

Table 2 Digital reproduction from the total collection

Sector	Does not have to be digitized	Is already digitized	Still has to be digitized	Number responses
Archives	56%	15%	29%	31
Libraries	36%	29%	35%	15
Museums	12%	32%	57%	28
Total	**36%**	**23%**	**41%**	**80**

Source: De Digitale Feiten 2009.

Most institutions reported having experience with digitization, as can be seen by the 23% of reported digitization being higher in museums and lower in archives. The digitization effort is experienced differently per type institution, as the reported 41% of collections that still have to be digitized is higher in museums and lower again in archives. The concept of digitization as image representation may be the reason why archives reported a lower need to digitize. Is there, however, a non-perceived digitization need? An increase in the perceived need for the digital reproduction of collections may be linked to the perceived complexity of the task, and therefore the possibility for realistic implementation.

Because the concept of digitization is not homogenized across the Netherlands, the percentages above represent differing perspectives on the part of participating

heritage institutions. What is clear, however, is that there is much work to be done with regard to the digitization of heritage collections.

More than half of the institutions (60%) started the digital identification of collections before the year 2000 (e.g. computerized information systems) while more than half (70%) started reproducing their collections digitally only after that same year (e.g. digital photo or scan of object). 57% of institutions administering these collections reported having an information plan, reflecting the adoption of digitization in the policy of the organization. Since 2006, Dutch heritage institutions can apply for a specific subsidy for designing an information plan (how does digitization fit within the institution), a digitization plan (how will the digital activities be carried out), and for the digital activities themselves (i.e. digitization of collections).

Heritage institutions reported digitizing their collections mostly to give access to the public (26%), for conservation (23%), for research (18%), for education (16%), and for communication (14%). However, not all digitized collections are available for public use. Table 3 represents the availability of digitized collections per sector on-line and on-site.

It is noticeable that all institutions report a higher percentage of on-site availability of digitized collections (i.e. images) compared to the on-line accessibility. This is arguably related to copyright restrictions, where clearing rights for the presentation of images can be prohibitively expensive for institutions.

Looking at collection databases, archives provide the greatest access to their collection on-line, followed by libraries, while museums offer the highest percentage of their catalogued collections on-site. Of all collections available on-line, archives represent comparatively the strongest presence.

Table 3 Availability of digitized collections on-line and on-site

Sector	Digital record On-line	Digital record On-site	Digital reproduction On-line	Digital reproduction On-site
Archives	70%	57%	55%	60%
Libraries	63%	72%	33%	47%
Museums	31%	81%	35%	68%
Total	**52%**	**70%**	**41%**	**61%**
	N=92	N=93	N=93	N=91

Source: De Digitale Feiten 2009.

Archives report a higher use of digitized collections for the interaction with the public even though archives reported a lower expectation for the digital representation of their collections. Museums exhibit the highest on-site communication of digitized collection but the lowest on-line communication while manifesting a higher expectation for the digitization of their objects. Availability of images on-line may be linked to issues of intellectual property and the perceived cost related to reproduction rights clearance more than to the interest of giving access to collections.

Of the collections available on-line, institutions reported allowing full access free of charge (68%), free access after registration (7%), access after payment (5%), and in other combinations (18%). Respondents reported a price discrimination system based on the user, where professionals and printers were required to pay for

information use while students and educators were given access free of charge. Other price discrimination was based on the product, where the use of a higher resolution TIFF image was charged while a low resolution JPEG image was not.

When respondents were asked to report on their collections per type of object, the categories used by Numeric resulted challenging. Not all institutions follow the same break up per object type and not all institutions measure their collections with the same unit. Further, the results reflected a lack of tradition in reporting the levels of digitization in general. The reported size of collections per object and their digitized counterparts is only an indication of the estimated relationship between analogue collections and their digitized records and reproductions.

The archival collection was reported per unit, per register and per meter. The Netherlands chose to provide a unit measure option, anticipating a different practice in the field. This allowed institutions that could not estimate the entire size of their collections to report the registers digitized (14 institutions). This approach differs from the Numeric survey that requested archives in meters and kilometers as unit of measure. The Netherlands chose to report all data in meters, translating data gathered in units using the calculation developed by the Amsterdam City Archive[7].

Table 4 breaks away from sector divisions and instead provides a general view of the digital production of heritage materials in the country. As the estimates show, the digitized collections still represent a rather small fraction of the national collection. A recent report on the level of digitization in the museum sector reports that 57% of the collections have a digital record, while 37% have a digital image (digital reproduction)[8]. Another report estimates digitization to cover somewhere between 17% and 37% of museum collections[9]. The Digital Facts results argue for more conservative estimates.

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[7] Stadsarchief Amsterdam measures about 7 thousand unit scans per meter of archive. For entire report see Holtman, M. *Digitalisering vereenvoudigd. Grootschalig digitaliseren ten behoeve van archiefonderzoek* (version 1.1). Amsterdam, Stadarchief Amsterdam 2008.

[8] Museumvereniging and DEN, *ICT-gebruik in musea*. Groningen/Almere: Reekx Advies, 2008.

[9] Veeger, *De Collectiebalans, Een onderzoek naar het wel en wee van museumcollecties in Nederland.* Amsterdam:ICN, 2008.

Table 4 Reported digital production of per type object

Type heritage material	Unit:	Analogue collections	Digital record	Digital reproductions	Responses
Archive material					
Collections	Meter	223,871	68%	0.4%	39
Objects	Number	-	1,390,225	43,859	14
Text					
Rare books (before 1850)	Volume	1,051,219	-	0.3%	51
Other books	Volume	6,489,020	-	0.02%	63
Magazines	Volume	1,329,401	23%	0.2%	37
Microfiche/ microfilm	Frame	958,349	43%	3%	24
Sheet music	Number	100,072	90%	-	10
Other printed material	Number	6,698,867	-	5%	24
Images					
Maps	Number	607,688	-	4%	47
Photos without negative	Number	6,730,317	-	17%	63
Negatives	Number	10,174,666	12%	7%	36
Prints	Number	892,994	67%	21%	49
Drawings	Number	378,262	71%	32%	40
Posters	Number	310,537	76%	63%	38
Letters	Number	203,946	54%	42%	29
Paintings	Number	48,904	96%	65%	46
Other 2 dimensional object	Number	1,011,041	8%	6%	30
Objects					
Natural world specimens	Number	15,063,787	-	0.06%	9
3 dimensional works of art	Number	272,179	97%	50%	35
Other objects in collections	Number	1,899,141	75%	36%	47
Multimedia					
Film	Hour	103,879	35%	17%	35
Video recordings	Hour	221,776	14%	13%	35
Audio (music and other recorded sound)	Hour	561,451	9%	6%	32
Other multimedia items	Number	2,219	27%	18%	15

Source: De Digitale Feiten 2009.

Art collections including images and objects appear to be more often digitized (having a digital image) than text materials. Of the multimedia collections, audio is the largest identified group with the lowest percentage of digital counterpart. The difference in unit of measure reflects the individual requirements for digitization posed by the characteristics of the objects, where an hour of digitized material is different than that of a three-dimensional object or of a meter of archived materials.

The total digitization activities of the collections through the year 2008 are reported to be conducted by the institution self (57%), by external commercial contractors (41%), through collaboration with other heritage institutions (7%) and by other means (1%).

Table 5 Organization of digitization activities

Sector	Self	Contracted	Collaboration	Other	Responses
Archives	32%	64%	4%	0%	33
Libraries	54%	36%	10%	0%	13
Museums	75%	20%	5%	1%	30
Total	**52%**	**41%**	**7%**	**1%**	**83**

Source: De Digitale Feiten 2009.

The reported digitization performed in-house and contracted out demonstrates a difference in the type of material being digitized. This could result from the required staff specialization or from the facility or difficulty to mobilize the materials for digitization. Museums are the sector reporting the highest production in house while archives represent the sector with the highest percentage of contracted digitization services. Due to the nature of collections, archives are more likely to send their collection to be digitized by a third party while museums generally prefer to hire specialists to work in situ.

It is not surprising to see a slightly higher collaboration among libraries since most of those in the sample are part of the Scientific University Library Network or part of the Dutch History Art Libraries Society (OKBN). A 10% collaboration among libraries remains low nonetheless, given that a number of objects in the collections are presumably common among members. Results from 2007 serve as a start point for future comparison and to define possible production trends.

Table 6 Organization of digitization activities in 2007

Sector	Self	Contracted	Collaboration	Other	Responses
Archives	39%	59%	2%	0%	29
Libraries	56%	37%	7%	0%	11
Museums	81%	16%	2%	1%	23
Total	**56%**	**37%**	**4%**	**3%**	**70**

Source: De Digitale Feiten 2009.

Looking specifically at the last year of production, the results reflect a slight shift toward performing digitization in house. The institutions that reported a slight decrease in the digitization by external commercial contractors are those that began digitization activities before 2001. This might reflect a higher familiarity with the technology and work process required for digitization.

4. Costs on digitized collections

Participating institutions confirming regular reports on their costs and production of digital activities were often able to give only a partial account of their costs for this survey. Costs were requested in two different formats, as percentage estimates of the total expenditure and as budget posts. Almost half of the respondents (51%) reported having a budget line specific for digital activities. Archives reported having the highest percentage of funds from their institution's budget, representing 72%. Archives receive the highest percentage of funds from subsidies directed at project-based activities, compared with libraries and museums. Libraries score the highest as donation recipients. Museums were the only institution reporting in-kind funds. The

high structural spending reported by archives represents a relative maturity in the adoption of digitization in the institution's core activities.

Table 7 Source of funds directed to digital activities

Sector	Structural funds	Project based funds	Donation funds	In-kind funds	Responses
Archives	72%	28%	1%	0%	26
Libraries	67%	17%	16%	0%	7
Museums	62%	24%	12%	2%	11
Total	**68%**	**26%**	**6%**	**1%**	**47**

Source: De Digitale Feiten 2009.

Institutions reported a yearly average expenditure of 106,128 euros towards digitization activities, of which close to 25,000 was incurred in material costs. Archives reported the highest digitization expenditure. All institutions reported the greater portion of the expenditure to be directed towards personnel. Other labor costs involved temporary staff and volunteers. Museum expenditure on temporary staff scored comparatively higher, reinforcing the trend of low contracted digitization activities in the other sectors. Under 'other' costs, respondents included activities that could have been reported in the personnel categories (i.e. website construction), material costs (i.e. acquisition of a digital camera) and outsourcing (i.e. digitization by third party). Other costs also include training courses and licensing costs.

Using yearly budget allocation responses to estimate averages in digital activities expenditure, labor costs represent close to 70% of the total digitization budget for archives and libraries while museums spend closer to 90%. Archives report the highest average expenditure for digitization and appoint the highest number of personnel towards digital activities.

Table 8 Digital activities expenditure (in euros)

Sector	Personnel	Other labor	Material Costs	Outsourcing costs	Other	**Total**
Archives (15)	75,467	23,889	36,757	26,308	6,200	**143,712**
Libraries (5)	32,000	6,000	14,960	4,000	20,000	**54,960**
Museums (9)	44,479	2,550	9,247	15,000	13,100	**43,513**

Source: De Digitale Feiten 2009.

Museums report the most specialized labor in house linked to digital activities in the heritage sector, including the highest number of volunteers and temporary personnel. Museums reported spending an average yearly salary of 55,243 euros per staff involved in digital activities, while libraries reported an average salary of 49,465 euros, and archives reported the lowest yearly remuneration at 24,051 euros. Salary levels demonstrate a division per sector in the production of digitization of collections where archives tend to outsource their digitization activities and therefore report a lower specialization reflected in the salary levels.

Data on costs per unit was requested when the production was outsourced to a commercial party. Respondents reported a great range of prices per type object. The contracted digitization of paintings was about 80 times more expensive than a page of newspapers. Film was the most expensive multimedia item per hour, where in one case the highest cost included the item's digital representation (digitized film) in addition to a full digital record (metadata). Digitization of three-dimensional objects

was priced at up to 9 euros per piece. The digitization of books with OCR cost close to 9 times the price of other OCR text materials.

Cost per unit data gathered through the Digital Facts serves to identify possible pricing models when collections are sent to contractors for digitization but mostly provide a first comparison point for future more comprehensive surveys. The cost per unit when digitization is performed in house was not gathered in the Digital Facts survey.

5. The use of digital cultural heritage

Having sketched out the state of affairs in the digitization of cultural heritage in the Netherlands, it is interesting to see to what extent digital cultural heritage objects and information are actually used by the Dutch population. A recent survey provides insight into this usage. A sample of 1,736 respondents, recruited from a pool of respondents in an earlier nationwide survey conducted in the fall of 2007, answered a series of questions about the use of all sorts of digitized cultural content in March 2009. Cultural heritage content was included in the questionnaire, albeit not always specifically tied to the actual institutions providing it – due to the mixed provenance of this content (web sites like *The Memory of the Netherlands* aim at transcending the boundaries of heritage institutions in providing digital content to the end users). After weighting, the sample can be considered representative for the Dutch population aged 17 and over by gender, age, marital status, region, possession of a personal computer, and availability of an Internet connection in the household.

To first give an impression of the accessibility of digitized cultural heritage in Dutch households, table 10 shows percentages of Dutch citizens having at least one Internet connection available in the household in which they live.[10]

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[10] Which is not the same as the percentages of Dutch households having a connection. In comparing figures across countries, it is important to distinguish person- and household-based Internet penetration rates.

Table 9 Having Internet access in the household, by gender and age group, Dutch population aged 17 and over, March 2009 (percentages)

	Internet connection
All	87
Female	83
Male	91
17-34 years	97
35-49 years	97
50-64 years	90
65 years and over	52

Source: Netherlands Institute for Social research | SCP (AVO ICT & Culture 2009)

Of every eight Dutch citizens, seven have Internet access in their own household. By European standards, this stands out as high. Together with the Scandinavian countries, the Netherlands rank among the frontrunners in Europe. As in other countries, women are somewhat behind men, and the elderly behind the younger groups. Up to the age of 50, practically all have an Internet connection at home, but even among the 50-64-year-olds only one in ten does not have home access. The difference with the older group is considerable. Following the growth of access and use among the elderly, however, it can safely be asserted that the older part of the population does lag behind indeed, but also that generational mechanisms will largely close the gap in the years to come. [11] But for the time being, it is clear that these social differences in Internet access at home will most probably be reflected in the use of digital cultural heritage (tables 11-14). First, we turn our attention to the use of public library web sites (table 11).

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[11] See Erik van Ingen, Jos de Haan & Marion Duimel (2008), *Achterstand en afstand. Digitale vaardigheden van lager opgeleiden, ouderen, allochtonen en inactieven* (Disadvantage and distance. Digital skills of the low-educated, the elderly, ethnic minorities and the economically inactive). The Hague: Netherlands Institute for Social research | SCP (http://www.scp.nl/publicaties/boeken/9789037703160.shtml).

Table 10 Visiting web sites of public libraries in last 12 months, by gender and age group, Dutch population aged 17 and over, March 2009 (percentages).

	Visited	Web site of local library	National portal for libraries
All	29	27	4
Female	33	32	3
Male	25	21	4
17-34 years	33	31	2
35-49 years	37	34	4
50-64 years	30	28	6
65 years and over	9	9	1

Note: due to visiting both local and national sites, added percentages in the third and fourth column can exceed those in the second column.

Source: Netherlands Institute for Social research | SCP (AVO ICT & Culture 2009)

In the year 2005, public libraries attracted 18 percent of the adult population in the Netherlands. While the figure might appear low to some outside observers, it should be kept in mind that unlike in other countries, Dutch public libraries in most municipalities charge an annual fee ranging between 25-50 euros. As elsewhere, they can of course be visited free of charge, as can their web sites. Twenty-nine per cent of the population said they had visited a public library web site in the 12 months before. Apart from the nationwide portal site bibliotheek.nl, each public library organisation (there are currently about 200 of these in 441 municipalities) has its own web site. The latter appear to be serving many more users than the former, probably in conjunction with the possibility to access the catalogue, make reservations and loan extensions. More women visit these sites than men, reflecting the gender difference in reading books, whereas the national portal seems to attract somewhat more men. No sharp differences come to the fore in the age groups up to 65, but it seems that the (low) number of users of the national portal climbs with age. The 65 and overs do lag behind the younger groups however.

Table 11 Looking at cultural heritage objects and searching for cultural heritage information on the Internet, by gender, age group and having visited 'physical' cultural heritage objects in last 12 months, Dutch population aged 17 and over, March 2009 (percentages)

	Look at cultural heritage objects on the Internet	Search for info about cultural heritage on the Internet
All	19	19
Female	14	15
Male	24	23
17-34 years	27	24
35-49 years	21	22
50-64 years	17	19
65 years and over	7	7
Visited cultural heritage	43	44
Not visited	10	8

Source: Netherlands Institute for Social research | SCP (AVO ICT & Culture 2009)

In the Numeric/Digital Facts project described above, a distinction was made between the digitized cultural heritage objects themselves and the digital accessibility of metadata and other information about these objects. The same distinction was made in the usage survey. As becomes clear from table 12, the percentages of the Dutch accessing these two distinct forms of digitized cultural heritage do not differ much (or even not at all). Approximately one in five citizens either looks at cultural heritage objects, like documents in archives or digital images of paintings, or accesses information about these objects from the Net. As another analysis shows, both forms of digital heritage attract by and large the same group of users.[12] Men's position as frontrunners is expressed in their larger share digital cultural heritage use. The user percentages drop as age levels go up, indicating that especially the younger segment of the adult population can be reached with digitization efforts. Furthermore, as could be expected, those who 'physically' visit cultural heritage objects or sites are much more likely to also 'virtually' visit them. About one in 10 or 12 of those who had not visited any heritage object or site in the foregoing 12 months, however, appeared to have virtually accessed cultural heritage, a share that should not be overlooked.

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[12] Phi statistic = .77, Pearson chi-square = 1,030.0, df = 1, p = .000.

Table 12 Looking at visual art and searching for information about the visual arts on the Internet , by gender, age group and having visited museums or galleries in last 12 months, Dutch population aged 17 and over, March 2009 (percentages)

	Look at visual art on the Internet	Search for info about visual arts on the Internet
All	18	19
Female	16	19
Male	19	19
17-34 years	23	20
35-49 years	20	24
50-64 years	19	23
65 years and over	5	6
Visited museums/galleries	40	44
Not visited	7	7

Source: Netherlands Institute for Social research | SCP (AVO ICT & Culture 2009)

For visiting the visual arts, which is partly considered to be (digital) cultural heritage as well, almost the same conclusions can be drawn (cf. table 13 with table 12). The audience shares are about as high – one in five – for the population as a whole. The gender difference is nevertheless much less pronounced for the visual arts than they are for cultural heritage in general. Virtually accessing the museums and objects themselves goes hand in hand with digital access to information about these.[13]

The 'one-in-five-rule' for both cultural heritage and visual arts begs the question if we are talking about the same persons accessing both. A considerable 'audience duplication' can indeed be found. This should not obscure the fact, however, that there are substantial groups of 'lovers' of the two distinct genres as well, as a further analysis shows.

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[13] Phi statistic = .71, Pearson chi-square = 879.5, df=1, p=.000.

Table 13 Visiting national portal sites for cultural heritage, by gender and age group, Dutch population aged 17 and over, March 2009 (percentages)

	Bibliotheek.nl (public libraries)	CDR/Muziekweb.nl (public libraries, music portal)	Monumenten.nl (monuments)	Archieven.nl (archives)	Memory of the Netherlands (combined)
All	23	4	11	10	2
Female	25	3	10	7	1
Male	22	5	13	13	4
17-34 yrs	21	5	5	5	3
35-49 yrs	29	3	14	11	2
50-64 yrs	30	4	18	14	3
65+ yrs	9	2	8	8	2

Source: Netherlands Institute for Social research | SCP (AVO ICT & Culture 2009)

To conclude, table 14 sheds some light on the shares of the (adult) Dutch citizens visiting national cultural heritage portal sites. Most striking is that the combined Memory of the Netherlands portal, which provides information from libraries, archives and museums/monumental sites alike, receives much less attention than the portals for the specific institutions. With the exception of the public library portal[14], more men are inclined to visit portals than women. Age differences are not great, except (again) for the 65+ group.

6. Conclusions

This paper has attempted to document the production, costs and use of digital cultural heritage in the Netherlands. As will have become clear to the reader, most findings are of the preliminary kind. It is important to keep in mind that there is no previous history of specific production and cost survey of digital activities in the heritage sector. The process has been complex, involving arduous discussions to define terminology as well as the scope of the data to be reported. This experience has represented most of all a national progress in the support of access to heritage information through a better management of resources[15].

It is encouraging to see a number of changes in the field regarding documentation and reporting of digital activities – even if limited to production and not as yet to costs. The DEN Foundation has a primordial role in this, not only reporting[16] but also stimulating growth.

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[14] The large difference between the percentage found here and the one in table 11 can be accounted for by the difference in question wording. In table 11, it is asked whether one has visited the portal in the last 12 months, whereas in table 14, the question is whether one has ever visited the portal at all.

[15] The results gathered by Numeric from the 27 member states are expected in the Spring 2009.

[16] The DEN Foundation began reporting the documented growth of the national digital collection in its Data Bank at http://www.den.nl/docs/20080715171731.

The results of the population survey in the second part of the paper show that the digitization efforts have not been in vain. Considerable shares of the population appear to consult web sites from libraries, archives, monuments and museums every once in a while, both virtually visiting the institutions and objects themselves and consulting digital information and metadata.

The agenda for future work on the area could include the following points:

- Further research on the cost of digital activities (per budget line) (per type object) (per unit) in house as well as when contracted to third parties.

- Identification of costs related to the sustainability of the digitized collections, both as digital representations and as identification records.

- Reporting on the correlation between production activities and expenditure.

- Reporting on the total yearly budget (and total number of FTE's) in relation to digitization budget per sector (and FTE's related to digitization).

- Inclusion of a larger sample that would reflect not only 'relevant' institutions but all other heritage collectors.

- Inclusion of public libraries.

- Further research on the use of digital heritage content per sector.

The results presented in this paper reflect the innovative nature of digital activities in the heritage sector. An improved system for the documentation of production and costs activities supports knowledgeable management who can ultimately improve access to the national collections. We find that digital access to heritage still falls short when compared to the physical world, as data available in 2009 has shown. However, we believe that, as stated in the recommendations of the European Commission for the Digital Library Initiative, a digitized national heritage potentially increases the use of collections; on-line access maximizes the benefits for citizens, researchers, and companies; and the preservation and storage of the digitized material ensures that future generations can access the digital material by presenting and preserving the content that makes our cultural heritage.

Acknowledgments

List of Dutch institutions participating in Numeric

The total Dutch participation in the Numeric project involves the following 131 institutions covering three surveys:

- Preparatory survey conducted by Numeric in October 2007 (N=3).

- DDF first phase conducted from April through July 2008 (N=20).

- DDF second phase conducted from September through December 2008 (N=108).

	Name participating institution	Type collection
1	Africa Centrum	Museum
2	Allard Pierson Museum	Museum
3	Amsterdams Historisch Museum Bibliotheek	Specialized Library
4	Archief Almelo	Archive
5	Avans Hogeschool/AKV / St. Joost	Specialized Library
6	Aviodrome	Archive
7	BHIC Brabants Historisch Informatie Centrum	Archive
8	Bonnefantenmuseum	Museum
9	Centraal Museum	Museum
10	Centre Ceramique	Archive
11	Cultuur Onder Dak Apeldoorn	Archive
12	DOK - Openbare Mediatheek Delft	Archive
13	ECMD, Stichting European Centre for Mobillity Documentation	Archive
14	Filmmuseum	AV
15	Fotomuseum	Museum
16	Geld en Bank museum	Museum
17	Gelders Archief	Archive
18	Gemeentearchief Ede	Archive
19	Gemeentearchief Roermond	Archive
20	Gemeentearchief Rotterdam	Archive
21	Gemeentearchief Waalwijk	Archive
22	Gemeentearchief Zaanstad	Archive
23	Groenehart Archieven	Archive
24	Groninger Museum, Bibliotheek	Specialized Library
25	Haags Gemeentearchief	Archive
26	Historisch Museum Rotterdam	Museum
27	Hoogheemraadschap van Delfland	Archive
28	Huis Doorn	Museum
29	Huygensinstituut	Specialized Library
30	IISG - Internationale Instituut voor Sociale Geschiedenis	Archive
31	Industrion	Museum
32	Instituut Collectie Nederland	Museum
33	Instituut voor Beeld en Geluid	AV
34	Jan van Eyck Academie Bibliotheek	Specialized Library
35	Katholiek Documentatie Centrum	Archive
36	Koninklijke Bibliotheek	Library
37	Koninklijke Instituut voor de Tropen - Tropenmuseum	Museum
38	Legermuseum Delft	Museum
39	Mauritshuis, Bibliotheek	Specialized Library
40	Meertens Instituut	AV
41	Museon	Museum
42	Museum Boerhaave	Museum
43	Museum Catharijne Convent	Museum
44	Museum het Admiraliteitshuis	Museum
45	Museum Spaans Gouvernement	Museum
46	Museum van Bommel en Dam	Museum

47	Museum van het Nederlands Uurwerk	Museum
48	Museum voor Moderne Kunst Arnhem	Museum
49	Nationaal Archief	Archive
50	Nationaal Natuurhistorisch Museum Naturalis	Museum
51	Natuurmuseum Nijmegen en omstreken	Specialized Library
52	Nederlands Archief Grafische Ontwerpers	Archive
53	Nederlands Architectuur Instituut	Museum
54	Nederlands Bakkerijmuseum ""Het Warme Land""	Specialized Library
55	Nederlands centrum voor Autohistorische Documentatie	Archive
56	Nederlands Filmmuseum, Bibliotheek	Specialized Library
57	Nederlands Instituut voor Mediakunst	AV
58	Nederlands Letterkundig Museum	Museum
59	Nederlands Muziek Instituut	AV
60	Nederlands Openluchtmuseum	Museum
61	Nederlands Politiemuseum	Museum
62	Nederlands Scheepvaartmuseum	Museum
63	Nederlands Tegelmuseum	Museum
64	Noordbrabants Museum	Museum
65	Panorama Mesdag	Museum
66	RACM	Archeology
67	Regionaal Archief Alkmaar	Archive
68	Regionaal Archief Leiden	Archive
69	Regionaal Archief Rivierenland	Archive
70	Regionaal Archief West-Brabant	Archive
71	Regionaal Historisch Centrum Delft	Archive
72	RHC Rijnstreek en Lopikerwaard	Archive
73	Rijksakademie van Beeldende Kunsten, Bibliotheek	University Library
74	Rijksmuseum Amsterdam	Museum
75	Rijksmuseum het Zuiderzeemuseum	Museum
76	Rijksmuseum Muiderslot	Museum
77	Rijksmuseum Twente	Museum
78	Rijksmuseum voor Oudheden	Museum
79	Rijksmuseum voor Volkenkunde	Museum
80	Sculptuurinstituut / Museum Beelden aan Zee Bibliotheek	Specialized Library
81	Slot Loevestein Museum	Museum
82	St. Klooster Sint Aegten	Archive
83	St. Papua Cultureel Erfgoed (PACE)	Archive
84	Stadarchief Heerlen	Archive
85	Stadsarchief `s-Hertogenbosch	Archive
86	Stadsarchief Almere	Archive
87	Stadsarchief Amsterdam	Archive
88	Stadsarchief Amsterdam, Bibliotheek	Specialized Library
89	Stadsarchief Breda	Archive
90	Stadsarchief en Atheneum Bibliotheek Deventer	Archive
91	Stadsarchief Sittard-Geleen	Archive
92	Stadsarchief Vlaardingen	Archive
93	Stadsmuseum Doetinchem	Museum
94	Stedelijk Museum 's-Hertogenbosch	Museum
95	Stedelijk Museum De Lakenhal	Museum
96	Stedelijk Museum Zwolle	Museum
97	Stichting Centraal Bureau voor Genealogie	Archive
98	Stichting Digitaal Archief Leeuwarden	Archive
99	Stichting Keesings Historisch Archief	Archive
100	Stichting Kerkelijk Kunstbezit in Nederland	Archive
101	Stichting Museum Martena	Museum
102	Stichting Museum voor Communicatie	Museum
103	Stichting Rijksmuseum Twenthe, Bibliotheek	Specialized Library
104	Streekarchief Goeree-Overflakkee	Archive

105	Streekarchief het Gooi en de Vechtstreek	Archive
106	Streekarchief land van Heusden en Altena	Archive
107	Streekarchivariaat Regio Achterhoek	Archive
108	Streekmuseum Krimpenerwaard	Museum
109	Streekmuseum Tiel	Museum
110	Technische Universiteit Delft, Biliotheek	University Library
111	Textielmuseum Tilburg	Museum
112	Teylers Museum	Museum
113	Tresoar, Frysk Histoarysk en Letterkundich Sintrum	Archive
114	TUE, Universiteit Bibliotheek Eindhoven	University Library
115	Universiteit Leiden, Biliotheek	University Library
116	Universiteit Maastricht, Bibliotheek	University Library
117	Universiteit Tilburg Bibliotheek	University Library
118	Universiteit Twente, Bibliotheek en Archief	University Library
119	Universiteit Utrecht, Letterenbibliotheek	University Library
120	Universiteit van Tilburg Bibliotheek	University Library
121	University Library Maastricht	University Library
122	Utrecht University Library	University Library
123	Van Abbemuseum, Bibliotheek en Archief	Museum
124	Veenkoloniaal Museum	Museum
125	Vereniging De Hollandsche Molen	Museum
126	Verzetsmuseum Friesland	Museum
127	Vlaardings Archeologisch Kantoor	Specialized Library
128	Wageningen Universiteit & Research Centrum	Specialized Library
129	Waterlands Archief	Archive
130	Wereldmuseum Rotterdam	Museum
131	Zeeuws Archief	Archive