

NATIONAL WEB ARCHIVES THE LAND OF PROMISE FOR RESEARCHERS

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This article is based on the keynote "National web archives — the land of promise for researchers", presented at the conference "Saving the Web: the Promise of a Belgian web archive", KBR, the Royal Library of Belgium, Brussels, 18 October 2019.

■ This article outlines some of the major topics of interest related to national web archives and their potential use by researchers. In the first main section the major differences between the US and Europe are briefly outlined, followed by an identification of some of the issues that are relevant when discussing web archives in Europe; this is done by focusing on which countries do have one, more or no web archives, which strategies can be used, and what characterises the access conditions. In the next main section the potential impact of the characteristics of web archives on transnational European history writing is debated, and to that end a case study of the Danish web domain is used. Finally, in the last main section, the possible future of the situation in Belgium is briefly discussed.

■ Cet article présente certains des principaux sujets d'intérêt liés aux archives nationales du web et à leur utilisation potentielle par les chercheurs. Dans la première grande section, les principales différences entre les États-Unis et l'Europe sont brièvement exposées, suivies d'une identification de certains des problèmes pertinents lors de la discussion sur les archives du web en Europe ; cela est fait en se concentrant sur les pays qui ont une, plusieurs ou pas d'archives du web, les stratégies qui peuvent être utilisées, et ce qui caractérise les conditions d'accès. Dans la grande section suivante, l'impact potentiel des caractéristiques des archives du web sur l'écriture de l'histoire européenne transnationale est débattu, et à cette fin, une étude de cas du domaine web danois est utilisée. Enfin, dans la dernière grande section, l'avenir possible de la situation en Belgique est brièvement abordé.

■ In dit artikel wordt dieper ingegaan op een aantal belangrijke aandachtspunten in verband met nationale internetarchieven en het potentiële gebruik ervan door onderzoekers. In de eerste hoofdparagraaf worden de voornaamste verschillen tussen de VS en Europa beknopt toegelicht. Daarna volgt een identificatie van een aantal problemen die relevant zijn als het over internetarchieven in Europa gaat. Dit gebeurt door te focussen op welke landen een, meerdere of geen internetarchieven hebben, welke strategieën er kunnen worden gebruikt, en wat de toegangsvoorwaarden inhouden. In de volgende hoofdparagraaf wordt de potentiële impact besproken van de kenmerken van internetarchieven op de transnationale Europese geschiedschrijving. Hiertoe wordt een case study van het Deense internetdomein gebruikt. In de laatste hoofdparagraaf wordt kort ingegaan op de mogelijke toekomstige situatie in België.

Why national web archives matter — a personal story

I am very fond of beers, Belgian beers in particular. My interest in Belgian beers started in the early 1990ies when together with a colleague I went to Belgium to sign the contract for the edited volume Lyotard, *les déplacements philosophiques* (co-edited with F. Frandsen and D. Pirotte) that was published in 1993 by De Boeck-Wesmael in Brussels. We had been driving for an entire day and were very thirsty when arriving, so we immediately went to a small bar, and here the exciting world of Belgian beers opened up. When back in Denmark I wanted to pursue this new interest, but since beers from Belgium were by no means available in Denmark at the time, I had to limit my interest to reading about them. Therefore, I joined the national Belgian beer consumers association, "De Objectieve Bierproevers — Les Taste-Bière objectifs" that was later renamed "Zythos" (in 2002). Although I did not understand all the words of the association's magazine *Den Bierproever* it still gave me the feeling of being part of this new and exciting world (years later I have had many opportunities to take revenge and not only read about Belgian beers).

When preparing the keynote on which this article is based this early encounter with a cornerstone in Belgian culture immediately came to my mind, and since I had now moved my academic interests from contemporary French philosophy to web history I asked myself, if it would be possible to study the history of the website of "De Objectieve Bierproevers" from the early web until the association became "Zythos", that is the period 1994-2002. But I got disappointed, because at the time of writing there exists no national Belgian web archive. I had to rely on the American Internet Archive where I found many copies of "De Objectieve Bierproevers'" website from 2000-01¹. This small example of web historiography shows that if a researcher wants to study any part of the Belgian web that has been online in the past, this researcher has to use whatever has been archived of the Belgian web by a US-based institution. The first 25 years of the Belgian online cultural heritage is either lost,² or has to be found outside of Belgium, with an organisation where no Belgian cultural heritage institution has had any say about curatorial choices, where no quality control is ensured, and where there exist no assurance of the long term preservation of the Belgian web. Undoubtedly, the Internet Archive is doing a remarkable job, and has been doing this

for almost 25 years, but it is not within their remit to archive national web domains, and therefore one cannot rely on that what is present in the Internet Archive is complete. That national web domains are not archived in any comprehensive manner by the Internet Archive is clearly indicated in a study of the presence of the Danish web in the national Danish web archive Netarkivet compared to what can be found in the Internet Archive. Netarkivet's archiving of the Danish web domain is based on the authoritative list of domain names on the top-level domain .dk, and only a fraction of these were found in the Internet Archive in the years 2006, 2009, and 2012.³

Within recent years there has been a growing national and international interest in using the archived web as a historical source because it constitutes one of the main entry points to our contemporary societies. As explained but by the UK Professor of History Jane Winters: *"the web already constitutes an unprecedentedly rich primary source, combining information from personal blogs, to formal reportage, to the communications of local and national government. It is where we socialise, learn, campaign and shop."*⁴ Also, a number of methodological and theoretical texts have been published, and the literature of empirical studies based on the holdings of web archives continue to grow.⁵ Thus, no doubt that all nations need one or more web archive, for the very same reasons that they have already established libraries and archives: the cultural heritage has to be collected and preserved to be made available to researchers and society at large, no matter in which form it presents itself.⁶

In the remainder of this article I shall outline some of the major topics of interest related to national web archives and their potential use by researchers. In the first main section the major differences between the US and Europe are briefly outlined, followed by an identification of some of the issues that are relevant when discussing web archives in Europe; this is done by focusing on which countries do have one, more or no web archives, which strategies can be used, and what characterises the access conditions. In the next main section the potential impact of the characteristics of web archives on transnational European history writing is debated, and to that end a case study of the Danish web domain is used. Finally, in the last main section, the possible future of the situation in Belgium is briefly discussed.

Mapping different web archiving forms

In this section I shall outline some of the main topics that are relevant to have in mind when debating

national web archives and their differences and similarities.

The US vs. Europe

There exists a divide in the ways that web archiving has been approached in the US and in Europe, the major difference being that in the US web archives are not based on a legal deposit law which they are in many European countries (exceptions are Portugal, and the Netherlands, where web archives exist that are not based on legal deposit). This implies that in contrast to Europe the web archiving initiatives in the US are either bigger or smaller than the national territory. On the one hand, there exists one supranational player, the Internet Archive, that is not entitled to archive "the US web", but rather acts as an independent player that aims at archiving the web as such, without any focus on national borders. On the other hand, a large number of smaller thematic collections of archived web have been established at universities, museums, and the like.⁷ In between these two levels one finds the Library of Congress which is the closest one gets to an institution with the aim of preserving "the US web", but since the collection is focusing only on topics of interest to US culture and politics it is not intended to be comprehensive in the sense that it covers the US web space.

Mapping trends in Europe

When looking at the differences within Europe it is striking that not all countries do have a national web archive, and that some countries have more than one. If we first look at the "have" and the "have-nots" some countries do not have a national web archive (e.g. Poland and Italy), whereas in a few countries national web archives are in the making, for instance pilot projects have been established in Hungary and in Belgium.⁸ But in the vast majority of European countries national web archives have been established. It is also worth mentioning the specific challenge of transnational web domains such as the .eu. The .eu web domain was composed of almost four million websites as of 2016,⁹ but this large portion of the web, including all EU-funded projects with a web presence on .eu, is not preserved by any national web archive.¹⁰ If we then look at the "have" and the "have-too-many" some countries have more than one national web archive. Notable examples are the UK where one finds the UK Web Archive at the British Library as well as the UK Government Web Archive, and the UK Parliament Web Archive; and France where there exists two national web archives, one at the Bibliothèque nationale de France that aims at archiving the entire French web space, and one at the Institut National de l'Audiovisuel, with a

focus on preserving websites related to the audio and visual cultural heritage.

If we then look at the different archiving strategies that are used to preserve as much of the national web as the national web archive is entitled to there also exist a great variety. In some countries the national web archives are established to archive an entire national web domain based on an existing list with all the web domain names that are present on the national web domain, as is the case in the UK Web Archive where the .uk web domain has been collected since 2013; this archiving strategy where the archiving institution receives a list of domain names from the national registrar of country code top-level domain names is in some cases supplemented with manual tracking of material of national interest sitting on web domains outside the national web domain, such as material on .com, .org and similar, as is the case in the Danish national web archive Netarkivet. Another strategy that is often used aims at archiving a selection of the national web domain, and what is deemed relevant to be selected varies from archive to archive; it can be specific types of websites, certain time frames, valuable cultural heritage, etc. (as is the case with the national Dutch web archive). And differences may even exist within the same national web archive, either in the form of a combination of two or more strategies, as is seen in the Danish case where three different strategies have been used since the beginning of the archiving activities (the entire national domain as well as a selection of rapidly changing websites, and websites in relation to selected events are archived); or the combination of different strategies may be the result of changes over time, for instance between 2005 and 2013 the UK Web Archive used a selective strategy, focusing on websites of historical, social and cultural significance whereas from 2013 the entire .uk web domain is archived.

Finally, when looking at the access conditions the European web archives are also very different. First, legal frameworks are not the same which is why some national web archives have free online access for everyone, e.g. *Arquivo.pt* in Portugal, or the Icelandic Web Archive, whereas others are open for researchers only, and even within this group differences apply. Some countries have onsite access only (e.g. the Netherlands), others have onsite access, but distributed, either to other national libraries like in the UK, or to regional libraries like in France, and yet others have online access (like Netarkivet in Denmark). National web archives with no access also exist, such as the Norwegian web archive, and the web collection at the National Library of Ireland. Second, different technical access forms are in place. Most national web archives offer something like the Wayback view

that is familiar to users of the Internet Archive, that is a way of presenting the web page as close as possible to what it looked like when it was online in the past. But other technical forms of accessing the archived web content are also available, some countries offer an open API access (e.g. the Portuguese *Arquivo.pt*), others make prepared datasets ready for download (e.g. the "JISC UK Web Domain Dataset (1996–2013)" in the UK), and extraction has even been made possible in Denmark where researchers can now have subsets of the national web archive extracted and shipped to a secure computer environment at their academic institution.

In summary, one can observe that national web archives are unevenly distributed in the different European countries, some have a web archive whereas other do not, and some even have more than one, a great variety of archiving strategies are used, in several cases even within the same web archive, and access conditions are very different. The question then is how to make transnational European historical studies based on web archives.

Impact on transnational history writing — the case of national webs

It is by no means unusual that national collections, be that in libraries or archives, have not been established in the same ways when comparing them across borders. Nevertheless the differences between different national web archives are in many ways more fundamental than in other cultural heritage institutions, and they may therefore have a great impact on future studies, in particular cross-national studies. In the following I shall discuss a case where an entire national web domain has been studied, namely the historical development of the Danish web, and the question is to what an extent it would be possible to replicate such a study in another national setting, thus enabling comparisons with other national web domains.

Studying a national web

In the Danish research project *Probing a nation's web domain* the overall aim was to study how an entire national web domain had developed. This was done by using selected material from the Danish web archive Netarkivet, as it had been archived from 2006 to 2015, and by asking broad and explorative research questions such as: What is the size of the Danish web? How much written text and how many images are there on the Danish web? Which are the most popular social media on the Danish web? Figures 1-4 show some of the first results, where focus is on the size of websites, the hyperlinks to

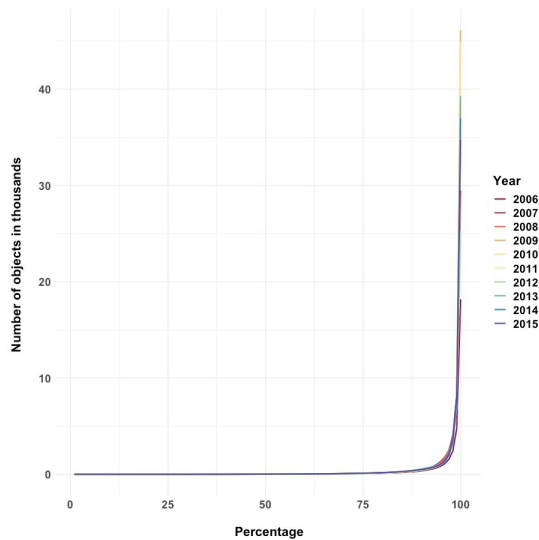


Fig. 1: Size of websites

other top-level domains (generic and countries), and to social media.¹¹

Figure 1 shows the size of websites, and the figure should be read like this: the X-axis indicates how big a percentage of the websites on the Danish web has the size that is seen on the Y-axis (measured in number of files in thousands). As can be seen the vast majority of the websites on the Danish web are very small, and only a small fraction are very big, which gives the Danish web the shape of a long tail. And what is striking is that this shape has not changed during the ten years that were investigated.

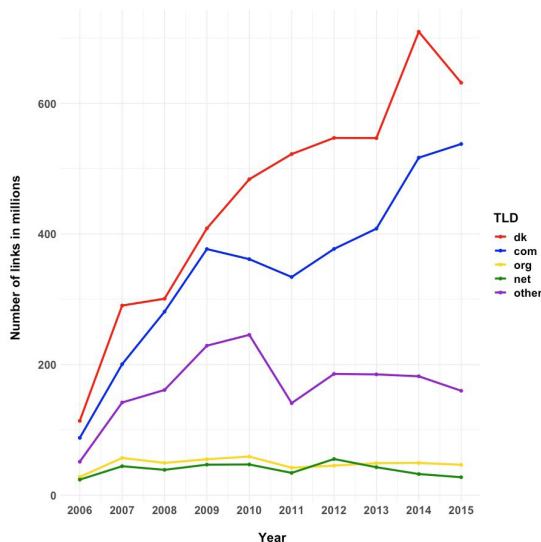


Fig. 2: Number of links from the Danish web to top-level domains

Figures 2-4 are all based on a study of all outgoing hyperlinks from all web pages on the Danish web, approximately 3 billion hyperlinks in 2006, increasing to app. 10 billion in 2010 at which level the number stays each of the following years. Figure 2 looks

at the top-level web domains to which most links from the Danish web point, and as can be seen the Danish web links very much to itself (that is: to .dk), but there are also a large number of links pointing to .com. However, when looking more in detail at the numbers on which the figure is made a very large portion of the links to .com are either to web infrastructure websites, such as websites that help run websites on the Danish Web (like mysql.com, phpbb.com, blogspot.com, adobe.com, or addthis.com, in particular between 2006 and 2010), or to social media, where it is difficult to determine whether the links point to Danish pages on these social media sites or not. (in particular after 2010).

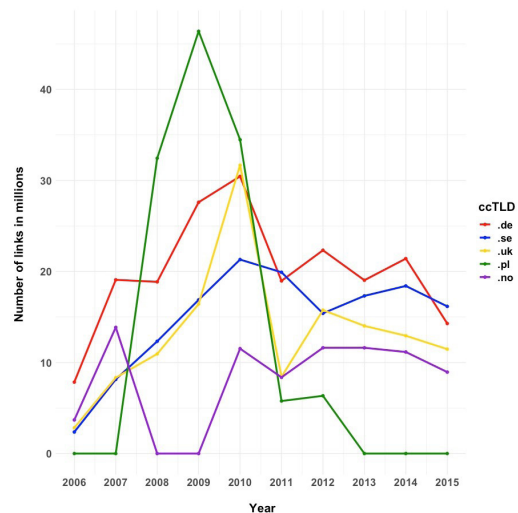


Fig. 3 : Number of links from the Danish web to other country-code top-level domains

Figure 3 depicts the country code top-level domain names to which the Danish web links, and not surprisingly the Danish web links most to its nearest neighbouring countries (Norway, Sweden, Germany, and the UK). However, in the years 2008-10 Poland is an outlier (as for now we have no good explanation to why these many hyperlinks to Poland are there in this interval).

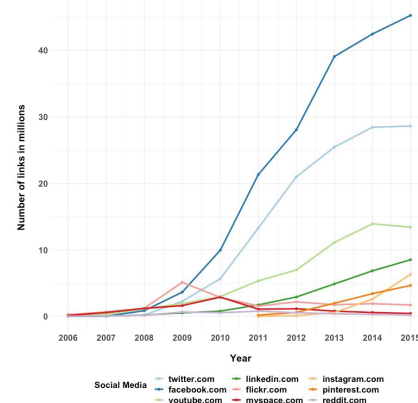


Fig. 4 : Number of links from the Danish web to social media.

Finally, Figure 4 shows the development of the links from the entire Danish web to social media. The overall trend is that in the beginning of the period there were a lot of links to *myspace.com* and *flickr.com*, but from 2010 *Facebook*, *Twitter*, and *YouTube* have been the most predominant, with *pinterest.com* and *instagram.com* as the two newcomers (the former dominates first, the latter later).

Transnational web studies of national web domains

Let us now have a closer look at the challenges of remaking this study in another European nation state, with a view to making transnational web studies of national web domains.

First, regarding the "have", the "have-nots", and the "have-too-many". If a country does not have a national web archive the study has to be based on what may be available in a transnational web archive such as the Internet Archive, with the limitations that this gives, because one is then delimited by this archive's collection strategy and coverage (cf. above about the completeness of the Internet Archive when it comes to national web domains). However, if a country has more than one national web archive this may give other challenges, because the study then has to combine the content from different web archives, potentially archived with different software, different strategies, etc. which is by no means not trivial.

Second, different archiving strategies may have been applied, including different technical settings. In cases where an entire national web domain has been archived we may have the needed data, but in cases where only a selection of the national web domain has been archived a lot will be missing, and comparisons will be made difficult – we may have to supplement with material from the Internet Archive or another national web archive with the challenges that this poses for our study. And in cases where an entire domain and a selection were archived by the same web archive we also have to combine two different collections.

Third, different access conditions may apply. One challenge is to get access to the web archive's holdings, which may or may not be possible if the researcher comes from another country. Maybe only onsite access is possible, and the researcher then has to travel to the web archive, but the web archive may even not provide the data in a form that is ready for analysis, which is very likely to be the case. For instance, the above mentioned project *Probing a nation's web domain* relied heavily on the availability of the web data in a form that the researchers could study. Having the data in the right form will often

imply that the web data are extracted in exactly the form the researcher wants to, which is only the case in one national web archive (at least for now), at least if the data is not made available via an API.

As this case analysis clearly shows the great varieties among web archives in different national settings challenge transnational studies across web archives. Because of the size and complexity the study of the development of the Danish web domain is indeed an extreme case, but nevertheless all the identified challenges also apply even at a smaller scale. However, it is possible to mitigate or minimize these challenges. Most importantly researchers need to voice their demands and to do this in a coordinated, transnational manner. Since 2012 the research network *RESAW (A Research Infrastructure for the Study of Archived Web Materials)* has offered an open and welcoming forum where researchers from a great variety of academic disciplines who all study the archived web can formulate and discuss the limitations and the possibilities related to doing national as well as transnational web archive based studies.¹² And recently the international researcher network *WARCnet*, funded by the Independent Research Fund Denmark | Humanities, has continued this work.¹³ On the web archive side the International Internet Preservation Consortium (IIPC) provides a home for discussions among web archives of any kind, national as well as more topic based. Fortunately, these three organisations have reached out to each other for years. *RESAW* and *WARCnet* invite web archives as members of the network, and the IIPC have opened up for presentations from researchers at their annual meeting. In summary, international organisational structures are in place to promote the fruitful use of web archives and for addressing the challenges related to studies of web archives. Also, on a national level, close collaborations exist in many countries between web archiving institutions and research communities, as is for instance seen in France, Luxembourg, the UK, Portugal, and Denmark.

Belgium — the land of PROMISE

Belgium is one of the few European countries that does not have a national web archive yet which has the consequences identified above, as also pointed out by Chambers, Mechant and Geeraert: "*the Belgian web is not systematically archived. Without a Belgian web archive there is a significant risk that essential born digital resources for contemporary and future historians will not be preserved and a significant portion of Belgian history will be lost forever.*"¹⁴ But the project *PROMISE*, which ran for two years in 2017-19, has paved the way for the establishing of a national Belgian web archiving service.¹⁵

However, that Belgium does not yet have a national web archive does not mean that no web archiving initiatives have been launched. Belgium is a federated country, and therefore the existing initiatives have to be understood in this context. Chambers, Mechant and Geeraert identify the following initiatives: "Felix Archive (FelixArchief, n.d.) and the ADVN, archives and research centre on the Flemish movement (ADVN, n.d.) in Antwerp, KADOC, documentation and research centre on religion, culture, and society (KADOC, n.d.), as well as the AMSAB Institute of Social History (AMSAB, n.d.) in Ghent that have been archiving websites as part of their archival responsibilities. Furthermore, Ghent University Library has been archiving websites as part of its long-term digital preservation activities since 2007 (Archive-It, n.d.)."¹⁶ And in 2019-20 AMSAB-ISG and Liberas/Liberal Archive have conducted the project *Catching the Digital Heritage* about the best way to archive websites within the framework of the two organisations. Also, studies of geographical Belgian entities on the web exist, most notably a study of the generic top-level domain .brussels by Waty et al.¹⁷ In summary, despite the ongoing initiatives very large portions of the first 25 years of the national Belgian web have already been lost because of the scattered and fragmented nature of web archiving in Belgium.

It is interesting to observe that when it comes to the fragmented underwood of local and/or topic oriented web archives the situation in Belgium somewhat resembles the case of the US, but in contrast to the US neither a supra-national nor a national web archiving initiative exist. However, if – or hopefully when – Belgium establishes a national web archiving service it is important to keep intact the already existing smaller collection initiatives. The reason for this is that although an institution may be established with the remit of collecting and preserving the national web domain like .be it is not possible to do this in a fine grained manner, because none of the prevailing archiving strategies enables this. If an entire web domain is archived this takes approximately 2-3 months (as is the case in the Danish Netarkivet), and in this period a lot of the web

material that was archived earlier in the archiving process is probably updated and therefore the new versions are not archived. If a more time sensitive strategy is used then the scale of what is archived cannot be very big, simply because it takes time to archive websites in-depth, and this is not possible to do in a time sensitive way with millions of websites. Thus, national web archives are trapped between the Scylla of big scale archiving and the Charybdis of archiving everything "now", between the constraints imposed by space and by time. Therefore, it can be considered a strength that a national web archive can act "on top" of more focused, but smaller web collections. However, it should not be neglected that smaller web archiving initiatives are challenged by providing the resources to sustain their web archiving activities over time, including keeping up with the most recent technological innovation on the online web as well as regarding web archiving software. One way of countering this challenge is to have the national web archive offer the technical solutions of archiving and preserving of the web, but leaving the curation to the smaller web archive collections and handing them a copy of the material that was curated by their institution so that they can make it available as they please.¹⁸ In the Belgian case this could be termed a "federated web curation" in tandem with a national web archiving service. All in all, that Belgium has not yet established a national web archive opens up new opportunities of taking stock of all existing national web archive initiatives – take the best and make the best – and with its underwood of smaller web archiving initiatives and with a national web archive in the making Belgium can be considered the land of *PROMISE*.

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Notes

1. The Internet Archive is a non-profit web archive that aims at archiving the entire web, and has been doing so since 1996, cf. Brügger, 2018, p. 92-93. The Internet Archive's collections are freely available online at archive.org.
2. The lifetime of web content is probably around two months; about this issue, see Brügger, 2018, p. 75-77.
3. Brügger, Laursen, Nielsen, 2017, p. 72.76.
4. Winters, 2017, p. 173.
5. The following publications constitute relevant places to start when wanting to explore the literature related to web archives and researcher use of web archives: Brügger, 2018; Brügger, Milligan, 2018; Brügger, Schroeder, 2017; Brügger, Laursen, 2019; Brügger, 2017; Milligan, 2019.
6. For overviews of existing web archiving initiatives see Vlassenroot et al, 2019; Schroeder, Brügger, 2017; Laursen, Møldrup-Dalum, 2017; Webster, 2017.
7. See Brügger, 2018, p. 93-98.

8. In Belgium, the project *PROMISE (PReserving Online Multiple Information: towards a Belgian StratEgy)*, read more at <<https://promise.hypotheses.org>>.
9. Hockx-Yu, Laursen, Gomes, 2019, p. 65.
10. A pilot project was run by *Arquivo.pt*, the Portuguese Web Archive. About the challenges related to the archiving of the .eu web domain see Hockx-Yu, Laursen, Gomes, 2019.
11. The project as well as the results are described in more detail in Brügger, Nielsen, Laursen, 2020.
12. Read more about RESAW on <<http://resaw.eu>>.
13. Read more about WARCnet on <<http://warcnet.eu>>.
14. Chambers, Mechant, Geeraert, 2019, p. 30.
15. *PROMISE (PReserving Online Multiple Information: towards a Belgian StratEgy)* was funded by the Belgian Science Policy Office (BELSPO), and the aim was to investigate the feasibility of establishing a web archive in Belgium, cf. Chambers, Mechant, Geeraert, 2019.
16. Chambers, Mechant, Geeraert, 2019, p. 31.
17. Waty et al., 2018; see also Chambers, Mechant, Geeraert, 2019, p. 30.
18. These ideas of combining national web archiving initiatives with local web archives, with local curation, but national operation are expounded in Brügger, 2014.