

1 **This is the future: a reconstruction of the UK business**  
2 **web space (1996-2001)**

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8 **INTRODUCTION**

9

10 The Internet developed as a commercial space thanks especially to the World Wide  
11 Web, which has rapidly and dramatically changed the way in which companies  
12 operate, sell, communicate. While the Internet was widely perceived as a tool for  
13 scientific research and for education, the introduction of the World Wide Web  
14 promoted the interest on part of companies and the fast development of a commercial  
15 web space.<sup>i</sup> Already in 1996, two years after the introduction of the web, the Financial  
16 Times wrote that the Internet was being transformed from “an academic and computer  
17 hobbyist's plaything” to a “new communications and distribution medium, an online  
18 shopping mall”;<sup>ii</sup> many business management studies of the time stressed that  
19 companies had to go online.<sup>iii</sup>

20 This paper aims to reconstruct the web space created by British companies (defined  
21 as companies registered in the United Kingdom, with the exclusion of international  
22 companies' subsidiaries) between 1996 and 2001, a time framework in which the  
23 digital world started to spread, but it was not as common and as pervasive as it would  
24 be in the following decade. Through a quantitative as well as qualitative analysis of

25 web archives, this research will collect data on how many UK companies first opened  
26 a website or online presence, which business sectors were the most receptive, and what  
27 was the rationale for British companies to open a web presence in the mid-Nineties.  
28 By doing so, the paper will provide a first look into how the business world perceived  
29 the arrival of the World Wide Web as a new tool for communication and for  
30 interaction, notably in its “geographically unconstrained” characteristics. In particular,  
31 the paper will analyse the usage of web directories both as a tool for companies to be  
32 visible online in the pre-Google era of the web, and as a methodological means to  
33 reconstruct a particular web space in its historical dimension. The dispersed and  
34 ephemeral nature of the web makes it very hard to reconstruct its size and structure,  
35 especially in the past; however, thanks to web archives it is possible to carry out at  
36 least a partial reconstruction of the historical web and of its specific sub-spaces.

37 In the first section, the research will map the UK business space as preserved by  
38 the Internet Archive. In the second section, a quantitative analysis of the dataset will  
39 show which businesses seem to have been the most proactive on the web, and the  
40 relation between a company’s online presence and its geographical base. The third  
41 section will describe the context and rationale in which the web space identified by the  
42 dataset was created. In all three sections, archived web directories have been a  
43 fundamental resource both for the quantitative and qualitative aspects of this research.

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45

## 46 **1. RECONSTRUCTING THE UK COMPANIES’ WEB SPACE IN THE 1990S**

47

48 Drawing a complete image of the World Wide Web in its first decade of existence is  
49 an arduous task. According to the British Internet services company Netcraft, the

50 number of websites (as in unique domain hosts) existing in 1996 was about 257,000;  
51 by 2001 the size had grown to more than 29 million<sup>iv</sup> [Figure 1].

52 How much of this space was produced by British companies, and which companies  
53 contributed to it? In order to provide an answer to this question, we discuss an  
54 approach based on connecting data openly available on the web. In particular, we  
55 worked on three sources: Companies House's list of registered businesses in the UK;  
56 WHOIS records; the Internet Archive<sup>v</sup>.

57 Companies House is the United Kingdom's registrar of companies, a government  
58 agency. Its database is available online for download.<sup>vi</sup> In March 2015, the dataset  
59 contained 3,556,639 companies; filtering down to companies that were active between  
60 1996 and 2001, we can find details of 655,645 companies and their registration  
61 information, such as address, phone number and business sector [Annex III].

62 In theory, a comparison between the list of UK companies active between 1996 and  
63 2001 and the historical WHOIS records from the same period would allow us to map  
64 which companies opened their websites (or at least registered their domains) in the  
65 timeframe taken into consideration, as well as gathering their domain name.  
66 Unfortunately, the WHOIS protocol does not hold historical records and provides  
67 current registration information only. Furthermore, just like the Internet Archive, it  
68 only allows queries by domain name: it is not possible to search using ownership  
69 details in place of a domain. This means that domain registration information are only  
70 accessible from a website address, not from a company's details. Therefore, going in a  
71 circle, in order to investigate WHOIS records and the Internet Archive and find British  
72 companies' websites from the 1990s, it is necessary to first compile a list of web  
73 addresses from the 1996-2001 period that belonged to UK businesses. This was

74 possible thanks to one the most important tools to navigate the World Wide Web in  
75 the pre-Google era: web directories<sup>vii</sup>.

76

## 77 **1.1 THE USAGE OF ARCHIVED WEB DIRECTORIES**

78

79 In 1996, 1998 and 1999, a series of studies on the use of the World Wide Web on part  
80 of British companies were published on the “International Journal of Information  
81 Management”. The studies were conducted by the Department of Information Studies  
82 at the University of Sheffield. In 1996, the first study claimed that the total number of  
83 companies’ websites on the World Wide Web was 20,000.<sup>viii</sup> In August 1998 this  
84 figure was 364,000<sup>ix</sup> and the last study reported half a million companies’ websites in  
85 March 1999 – of which about 14,000 created by UK businesses<sup>x</sup>. These studies were  
86 based on the information given by the business directories available online,  
87 particularly the “Yahoo! Business directory” and the “Yahoo! Regional Business  
88 directory”.

89 Before search engines, aggregators and social media became the entry door for  
90 information seeking activities, web directories were the common way to explore and  
91 browse information on the web. Curated directories as well as user-contributed  
92 directories created a taxonomy of links from the most varied classifications. In this  
93 study, the directories preserved in the Internet Archives were used as the entry door to  
94 the archived web in the same way in which directories were the entry doors to the live  
95 web in the period analysed.

96 Firstly, the Internet Archive was accessed through two search engines devised by  
97 the UK British Library, in collaboration with the Big UK Domain Data for the Arts  
98 and Humanities project<sup>xi</sup>: The AADDA<sup>xii</sup> and Shine Application - Version 1.0<sup>xiii</sup> allow

99 to research the “.uk” domains originally archived on the Internet Archive’s Wayback  
100 Machine, and acquired by the British Library for its UK Web Archives. While the  
101 Wayback Machine only allows research through a specific domain,<sup>xiv</sup> with AADDA  
102 and Shine it is possible to run a research through keywords. Thanks to this tool, a  
103 keyword research was conducted in order to retrieve as many UK business directories  
104 as possible. Word combinations such as “UK companies websites”, “UK Business  
105 directory/ies” and “UK company/ies list” were used.<sup>xv</sup> Directories used in the literature  
106 of the time, such as “Askalex”, “Kelly’s Web” and “ThomWeb” were also searched.<sup>xvi</sup>  
107 Many of these directories are still present in the archives; some of them were part of  
108 international search engines, such as “Yahoo.com”, or “Yell.co.uk”, the online version  
109 of the Yellow Pages. Other directories were category-specific, such as the one  
110 provided by ABPI, the Association of British Pharmaceutical Industry,<sup>xvii</sup> or the list of  
111 barristers and solicitors’ websites provided by the personal website of Delia Venables,  
112 a computer consultant for lawyers.<sup>xviii</sup> The most cited British directory at the time  
113 seems to be “The UK directory”, a list of 8600 URLs that claimed to collect “all the  
114 WWW sites in the UK”<sup>xix</sup> divided by category. Other directories were created as part  
115 of the services offered to its users by a specific website. For example, the largest  
116 directory found was created by “Waternet”, a company specialised in delivering water  
117 supplies to offices. In 1999, they published a list of 15,834 URLs which they claimed  
118 to be the complete list of UK companies’ websites with a “.co.uk” domain.<sup>xx</sup>  
119 Interestingly, one of the aforementioned studies reports that in August 1998 the  
120 “Yahoo! Regional Business Directory”, the most complete directory available,  
121 comprised about 14,000 companies.<sup>xxi</sup>

122 Not all directories retrieved were useful for the purpose of this study.<sup>xxii</sup> Many  
123 simply provided a list of companies registered in the UK, without any reference to

124 possible online presence. Others were displayed as search engines, without the  
125 possibility to access the list of links that composed the database; as archived web  
126 pages, the search engine is no longer operative and therefore useless for the purpose of  
127 this study [see Picture 1]. Of the directories whose database was accessible and that  
128 listed actual companies' websites, a selection of four was made, based on their size  
129 and on the number of crawled instances within the Wayback Machine. The analysed  
130 directories were the aforementioned "Waternet", "The UK Directory" and "Yell", plus  
131 "DMOZ", a user-edited directory project [see Picture 2]. The directories appeared on  
132 the Internet Archive between 1996 and 1999 [see Figure 2].

133 The content and structure of the directories were collected into a database through a  
134 process of web scraping. Thanks to this collection, it was possible to enquire WHOIS  
135 current data and the Internet Archive, thus creating a dataset of information associated  
136 to each link. This system, though not as exhaustive as if it were possible to access  
137 historical data on domain registration, still allowed to analyse the links to actual  
138 archived websites, reconstructing the UK companies' web space as it was organised at  
139 the time by the directories taken into account.

140 Two different scraping processes were implemented. The first step used a Google  
141 Chrome plugin simply called "Web Scraper":<sup>xxiii</sup> a custom profile was created for each  
142 of the directories, matching the specific hypertext structure. The plugin crawled each  
143 of the directories collecting category information as well as links, titles and  
144 descriptions as and where available. The data were then exported into CSV files and  
145 cleaned in a spreadsheet programme. Through this system, a total of 23,739 individual  
146 links were collected; a number that is coherent with the figures on the size of the UK  
147 business companies given by the aforementioned studies.<sup>xxiv</sup>

148 After mapping the directories, the second step was to gather information on how the  
149 unique links collected by the directories were archived by the Wayback Machine. A  
150 custom script was written in Javascript and executed in Node.js in order to read the  
151 collected CSV data and run queries to the Wayback Machine. The script is available  
152 under an open source licence on Github.<sup>xxv</sup> The script retrieved the URL to the  
153 Wayback Machine instance as well as the date of the first and latest crawl and the total  
154 number of scans occurred.

155 Finally, the same script was used to gather current WHOIS data for the domains.  
156 WHOIS data is openly available, however in order to limit abuse most servers  
157 providing WHOIS databases for free restrict the number of requests that can be run by  
158 the same computer in a specified time. To circumvent this limitation, an inexpensive  
159 bulk research service was purchased;<sup>xxvi</sup> this service was provided though an API  
160 (Application Programming Interface). With this method, for each link gathered it was  
161 possible to retrieve the date of registration, the date of the last update, information on  
162 the registrar and registrant (name, address, contacts, website),<sup>xxvii</sup> and the current date  
163 of contract expiration.<sup>xxviii</sup> Three types of data were gathered for each of the 23,739  
164 links:

165

166 1. Information on the business as recorded by the directory

167 - business category

168 - business name

169 - business description

170 - original URL

171

172 2. Information on the presence of the link on the Internet Archive

- 173 - archived URL
- 174 - first crawl
- 175 - last crawl
- 176 - number of instances available

177

### 178 3. Information on the current WHOIS registration

- 179 - WHOIS registration date
- 180 - WHOIS last update
- 181 - WHOIS expiration date
- 182 - WHOIS registrar information
- 183 - WHOIS registrant information

184

185 The combination of these data allows for interesting analyses; however, it is important  
186 to state beforehand that the dataset created incurred important limitations.

187

### 188 **1.2 LIMITATIONS OF THE METHOD**

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190 The dataset acquired [Annex 2] is an excellent starting point to analyse the UK  
191 business web space as it was in the Nineties. However, a series of important  
192 limitations must be kept in mind when working with the data.

193 First of all, because it was beyond the scope of this paper to manually check the  
194 almost 24,000 links that compose the dataset, and because a domain present in a  
195 directory has not necessarily been crawled by the Internet Archive, it was necessary to  
196 work with the information on the websites provided by the directories. However, this  
197 information is prone to errors and not homogeneous. Different directories gave

198 different data and each of them was organised according to its own guidelines. For  
199 example, some companies could be listed as UK companies even though they were not  
200 based in Britain; other directories could have listed domains that were not companies'  
201 websites, but websites offering services to companies, such as chamber of commerce,  
202 universities, etc. It is important to keep in mind that these collections were the results  
203 of a selection made by the curators, sometimes with a contribution on part of the users.  
204 Furthermore, the data are skewed by the way in which the Internet Archive and the  
205 directories operate.

206 These limitations particularly affect the two most interesting data available: the  
207 business category and the creation date. As neither the directories nor the Companies  
208 House dataset provide information on the companies' size, understanding which types  
209 of businesses went online in the Nineties can be only attempted through information  
210 regarding the business category; this will be analysed in the next session.

211 The creation date would theoretically allow to understand the evolution of the UK  
212 business web space over time and which type of companies created this space, but it is  
213 an extremely problematic datum. First of all, knowing exactly when a website was put  
214 online is next to impossible; WHOIS provides the year of the domain registration, the  
215 Internet Archive the year of the first crawl [Figure 3]. The data tell us that the largest  
216 amount of companies' domains was registered in 1996, with a second smaller peak in  
217 1999. These data go against the general trend of companies' websites as given by the  
218 literature, which show a large constant increase between 1996 and 1999 (from 20,000  
219 to 364,000 to 500,000 websites).<sup>xxix</sup> This could mean that most of UK companies  
220 registered their domain very early, in 1996; however, there is no evidence to support  
221 this possibility. The data could show a gap in the dataset, further complexity in what  
222 WHOIS records as "registration date", or a combination of the two. Furthermore,

223 almost 20% of the domains appear to have been registered after the website was first  
224 listed in the directory. All websites analysed should have been registered no later than  
225 February 2001, the date of the most recent directory instance analysed. This could  
226 mean a passage of ownership, or the migration to a different server and registrant; in  
227 any case there is no guarantee that the website currently registered on WHOIS is the  
228 same as the one listed by the directories at the time.

229 If the claims made by Waternet were true (with the partial confirmation from the  
230 information we have on the “Yahoo! Regional Business Directory”), we can consider  
231 the dataset an exhaustive, if not complete, list of UK companies’ websites in the  
232 period taken into account. However, it is very difficult to understand how this web  
233 space evolved between 1996 and 2001 in terms of size. The analysis of the business  
234 categories, though also incurring important limitations, gives a better picture of which  
235 type of companies created this web space, and why.

236

237

## 238 **2. SURFING THE WEB: A STUDY ON BUSINESS CATEGORIES**

239

240 This session provides an examination of the dataset based on the information  
241 regarding business categories. At first, a comparison between the registered businesses  
242 and relative websites divided by category was attempted, in order to give a glimpse of  
243 the relations between the number of companies registered in the UK and the number of  
244 companies’ websites created in the 1996-2001 period.

245 In second instance, and more successfully, the analysis has focussed on the  
246 categorisation provided by the directories for the web space. This not only helps to  
247 understand which businesses were more attracted by the Internet, but it also allows to

248 reflect on the taxonomies created by the directories, and therefore on the ways in  
249 which users searched for companies' websites.

250

## 251 **2.1 COMPARING COMPANIES HOUSE AND THE DOMAINS DATASET**

252

253 The first step in the analysis of the domain dataset was a comparison with the list of  
254 UK registered companies provided by Companies House [Annex III]. If there were  
255 23,739 UK business web domains and 655,645 British companies active between 1996  
256 and 2001, this means that the percentage of UK companies that opened a website in  
257 this timeframe is around 3.62%.

258 Unfortunately, a further comparison between the websites' categories (as indexed  
259 by the directories) and the overall number of companies per category (as indexed by  
260 Companies House) was largely inconclusive. The lack of standardisation provided by  
261 each dataset made the data completely aleatory and useless to compare. To begin with,  
262 DMOZ listed more than 300 categories, the UK Directory only 7. Waternet, the largest  
263 directory available, did not provide a description, a category, or even the name of a  
264 company: the links were simply listed in alphabetical order, without any detail. Yell,  
265 the online version of the Yellow Pages, listed the websites both by company's name,  
266 in alphabetical version, and by category. For what concerns the categories, the web  
267 pages were organised with 25 links on each page. The Wayback Machine only crawled  
268 the first page for each category, and therefore each category appears to have 25 links.  
269 This is the reason why the Yell directory as it was retrieved is only composed of 475  
270 websites: 25 links times 19 categories.

271 Furthermore, the data are not uniform between the different categories, WHOIS and  
272 Companies' House. WHOIS does not provide information on the business category;

273 Companies' House utilised the United Kingdom Standard Industrial Classification of  
274 Economic Activities (UKSIC), introduced in 1948 to classify business establishment  
275 for administrative purpose. The directories used completely different approaches; their  
276 objective was not to frame or contextualize a certain company, but to provide useful  
277 information to their users. It must also be stressed that business categorization is an  
278 extremely complex matter: Companies House provides more than a thousand  
279 categories, of which the most popular (after Real Estate, that had 60,000 entries alone)  
280 are "Other professional, scientific and services", "undifferentiated goods" and "none  
281 supplied", for a total of 127,997 entries [see Annex II].

282 A tentative comparison between Companies House and the directories' taxonomies  
283 was attempted anyway, through an aggregation of macro-categories both for  
284 Companies House and for the directories [see Annex II]. Eleven categories that  
285 seemed more uniform were selected and analysed; these were Construction, Food  
286 Manufacturing, Advertising and Marketing, Computer services, Civil Engineering,  
287 Real Estate, Printing, Mining, Financial activities, Legal services and Employment  
288 [see Figure 4]. Most categories showed a percentage between the number of registered  
289 companies and the number of websites around 1%. The four most represented  
290 categories were Employment, with 14% of companies having a website; Legal  
291 activities with 4.03%; Financial Services with 5.08%; and Mining with 2.87%. All  
292 categories represent large sectors, and it is interesting to find not only services, but the  
293 secondary sector as well. In general, large companies seem to have gone online early  
294 irrespective of their sector; in 1999, the first thirty British companies listed on the  
295 London Stock Exchange<sup>xxx</sup> all had full operating websites, that are all preserved in the  
296 Internet Archive.<sup>xxxi</sup> With regards to the primary sector, the UK directory also listed 81  
297 websites as "Agriculture Companies"; the names suggest mostly farms and

298 agricultural service manufacturers and providers. It was not possible to run a  
299 comparison with Companies House’s primary sector companies because they were  
300 categorised in a too scattered manner. The other interesting information obtainable is  
301 the large quantity of Employment-dedicated websites, 488 on a total of 3456  
302 registered companies. In a sector strongly based on the exchange of information  
303 between parties, employers and job seekers, it is not surprising that the migration to  
304 online databases that could be updated and consulted in real time represented a real  
305 game changer for the business.

306 However, this is too little information to come to definite conclusions on what were  
307 the most proactive categories on the web compared to the overall number of  
308 companies for the same sector. The category aggregation and comparison is too vague  
309 and too many categories are left out to be able to reach valuable results. Concentrating  
310 on the categories through which the directories organised the business web space was  
311 more meaningful to have a glimpse of which type of companies were online.

312

## 313 **2.2 CATEGORISING THE BUSINESS WEB SPACE**

314

315 Looking at the 300 categories provided by the three directories taken into  
316 consideration, a clear macro division is immediately apparent between “national”  
317 businesses, in which only the business category is indicated, and “local” businesses, in  
318 which the catchment area of a website is specified alongside (or in the place of) the  
319 type of business. Categories such as “Scotland – Motoring” or “England – East  
320 Sussex” are by far the most popular way of indexing companies’ websites: 2279  
321 companies in total were listed under “England” (1343), “Scotland” (468), “Wales”  
322 (350) and “Northern Ireland” (118).

323 When reading the business description provided by the directories, the companies  
324 defined as “local” seem to be offering mostly business-related or general services, and  
325 many of them are industrial or financial sectors, so not necessarily small businesses;  
326 however, they are qualified *in primis* according to their location. This showed the need  
327 to provide a geographical space to the UK companies that opened a website, like print  
328 directories would do, and before interactive maps allowed for a different type of  
329 territorial research.

330 Leisure activities and services such as restaurants, cinemas, hotels and beauty  
331 centres are mostly missing from the categories list. This could be because the  
332 directories catalogued these companies under “Entertainment” or “Leisure” rather than  
333 “Business”; however, it is probable that most of these business websites were  
334 categorised simply under “Local activities”, meaning that the directories were mostly  
335 concerned in offering to the users a list of the various services offered in the area  
336 rather than then listing the websites/webpages available for a business.

337 On the contrary, “Shopping” escape this “localisation”. The category, one of the  
338 most popular, is mostly composed of shops, with taxonomies such as “Shopping –  
339 clothing” or “Shopping – pets”. It included retail sectors such as music shops and  
340 jewellery, auctions and furniture, items for children and bookshops.<sup>xxxii</sup> A quick look  
341 into the items that are available in the archive shows that large chains such as  
342 Debenhams and Costcutter are represented as much as small local businesses selling  
343 specialised items. In particular, antiques and memorabilia were the most represented  
344 sub-category. It seems clear that the web promoted already in the Nineties the  
345 delocalisation of shopping in favour of one single virtual market, not just for large  
346 retailers but also for the smallest activities.

347 After local businesses, the most represented categories are International Business  
348 and Trade services, Motoring Dealers, Legal and Financial Services, Shopping, Real  
349 Estate, Recruitment. Unsurprisingly, as already mentioned with regards to  
350 Recruitment, business that had the most to gain from faster interaction possibilities  
351 between buyers and sellers seem to have gone online early. For example, from a  
352 sample analysed it seems that many Motoring and Computer websites offered the  
353 possibility to post ads of people selling used items.

354 It is also extremely interesting to notice that one of the most popular category is  
355 “Directory”, and that other categories often have sub-sections like “Shopping –  
356 directory”, “Legal services - directory”, “International Business and Trade –  
357 directory”. Section 2.3 will be dedicated to this particular category of companies’  
358 websites.

359 Finally, the data collected through the methodology outlined were compared with  
360 the information provided by the business literature of the time. C. Greaves et al.  
361 reported in 1999 the companies’ web classification as given by the Yahoo! Business  
362 directory,<sup>xxxiii</sup> comparing UK’s companies websites to the overall number of  
363 companies’ websites [see Figure 5]. According to the “Yahoo! Business Category”,  
364 which is now lost, the most popular UK companies’ websites were Computer-related  
365 businesses (19%), Transport (10%), Entertainment (10%), Engineering (10%),  
366 Financial Services (6.2%) and Real Estate (6.2%). The “Miscellaneous” category was  
367 still the most popular. These data tend to confirm what written with regards to which  
368 business companies took an early interest in the web; the differences in percentages  
369 could be given by the different way of categorising the websites: for example, the lack  
370 of the categories Recruitment/Employment is probably due to the fact that “Yahoo!”

371 put these companies under the specific sector that they served (for example,  
372 Engineering Recruitment under Engineering).

373 The comparison with the general trend of business websites outside Britain, though  
374 referred to the previous year, is also very interesting in showing that UK companies  
375 were following the same trend of other nations (at this stage, namely the U.S.), in  
376 building their web space.

377

### 378 **2.3 THE “DIRECTORY” CATEGORY**

379

380 As explained in section 1.1, this study analysed a sample of directories that were not  
381 category-specific and that allowed to access the list of domains they included. This  
382 analysis suggests that the directories available on the web were many more than the 20  
383 found through the keyword research with AADDA and Shine [see Annex I], and also  
384 that most directories linked not only to unique websites, but to lists of other  
385 directories. In the dataset created from the scraping of the four directories selected,  
386 more than 400 websites were categorised as “Directories”. Of these, 112 were general  
387 directories that offered different types of websites; 177 were business-related  
388 directories, where to find chambers of commerce and trade companies; 72 were  
389 “Property Directories”, search engines to find retail estate managers according to be  
390 type of property sought (for this reason, it would not be wrong to consider them under  
391 the “Real Estate” category, as websites created by real estate companies); 54 were  
392 shopping directories, which listed a mix of online retail and local shops.

393 Here again, a regional dimension to the World Wide Web emerges, because many  
394 directories aimed to collect lists of websites of interest to a local area, from local shops  
395 to restaurant, schools and other services. For example, a directory called “Shop North”

396 listed all the shop websites hosted by “Domain.co.uk” that were based in the North of  
397 England.<sup>xxxiv</sup>

398 Many of these directories were also businesses in themselves, as they made money  
399 through advertising and by having companies paying to have their website listed in the  
400 directory. Some directories also offered a freemium service for more visibility. The  
401 category “Directory” could also help explaining the lack of leisure services as specific  
402 websites: restaurants, cinemas and beauty centres took advantage of these directories  
403 rather than opening their own expensive website. They were effectively specialised  
404 and enhanced phonebooks; sometimes they would simply state the address and phone  
405 number of a business, but often used the freedom in space and multimedia possibilities  
406 provided by the Internet to add more information such as pictures, a list of facilities,  
407 opening times [see Picture 3]. The descriptions were always positive, as the directories  
408 were meant to serve as suggestions even when they were not directly advertising;  
409 while users were welcome to contact the website administrator with suggestions, user-  
410 generated reviews were far from sight.

411 In 1999, a study conducted by the Scottish Business Information Centre evaluated  
412 seven general Business Directories available on the web.<sup>xxxv</sup> Unfortunately, none of  
413 these directories has been preserved on the Internet Archive apart from EYP (the  
414 precursor of Yell) and Kelly’s Web, which were only available as search engines  
415 [Picture 1]. The study was overall negative about web directories compared to print  
416 sources. In particular, the report outlined the lack of recalls in case of spelling  
417 mistakes and the lesser comprehensiveness compared to equivalent printed directories,  
418 “despite the claims of the Web”.<sup>xxxvi</sup> Unfortunately it is not possible to take a deeper  
419 look into how EYP and Kelly’s worked, but it seems that the inability of browsing the

420 full catalogue, especially without a recall for spelling mistakes, was a serious  
421 shortcoming compared to the analogue versions available.

422 Indeed, by the early noughties, most of these directories had been cancelled, or they  
423 were not updated anymore. Sophisticated and automated search engines had changed  
424 by then the way in which people accessed the web, the costs of creating a website had  
425 dropped, and user-generated platforms were about to make service suggestion lists  
426 redundant. In 2001 directories were still indicated as an important digital space for  
427 companies; however, early experts in digital markets warned that “the WWW is the  
428 ultimate self-publishing environment”, and that the most effective way to gain from an  
429 online presence was to open a full corporate website.<sup>xxxvii</sup> Nowadays, directories have  
430 been substituted by independent websites, retrieved through the main search engines,  
431 social networks, interactive maps, globalised user-generated content websites. Of the  
432 general directories analysed that are still available online, Yell and the UK Directory  
433 now offer mostly digital marketing services to companies;<sup>xxxviii</sup> DMOZ still exists as  
434 an ongoing experiment to build a human-edited directory of the web, but it should be  
435 considered an exception.<sup>xxxix</sup>

436 However, in the period analysed these directories were not just a mean to organise  
437 and make accessible the business space, but they were a specific form of uploading  
438 content online – a place for businesses to advertise and promote themselves which  
439 represented an intermediate passage from the traditional printed resources to the more  
440 sophisticated search engines that changed the way in which we retrieve information  
441 online.

442

443

444 **3. THE RATIONALE BEHIND BRITISH COMPANIES’ WEBSITES**

445

446 After the analysis of the dataset, a look at the literature of the time will help to confirm  
447 several of the trends outlined, as well as give some information on the debate over the  
448 usage of the World Wide Web on part of businesses.

449 The user-friendly front-face, the flexibility, and the interactivity of the web  
450 immediately enticed companies towards online advertising and direct sales.<sup>xi</sup> The  
451 number of Internet users in the UK grew exponentially during the Nineties (from  
452 420,000 in 1993 to 7 million in 1998, 10 million in 2000 and 18 million in 2001);<sup>xli</sup>  
453 furthermore, Internet users were strong spenders, with higher incomes than average,  
454 especially in the earliest years (1996-1997).<sup>xlii</sup> In 1996, the business literature agreed  
455 that companies had to go online, though not necessarily open an independent website;  
456 the careful usage of emails and/or webpages on a directory could be enough.<sup>xliii</sup> A full  
457 website was considered, still in 2001, a noticeable investment, but also as the most  
458 important for a company's online presence.<sup>xliv</sup>

459 Apart from business-related press, the guides and services offered by the newly  
460 established Internet services providers were very interesting sources to understand  
461 how companies approached the Internet in the mid-Nineties. In the period under  
462 analysis, opening a website required necessarily the service of professionals. Platforms  
463 to create and self manage websites or blogs, such as "Wix.com" or "Blogspot.co.uk",  
464 all appeared after the period taken into account. In 1996 Abracadabra, a website design  
465 and hosting company based in Birmingham, charged £250<sup>xlv</sup> a year for a 5-page  
466 website. The price included "5 full html pages in colour", the storage on a commercial  
467 World Wide Web server for one year, the indexation on the major internet directories,  
468 copies of the website on floppy disk to be accessed offline, and the e-mailing of  
469 promotional flyers to specialist internet newsgroups, announcing the opening of the

470 new website. The price did not include the creation of animation (£150 each), special  
471 graphics and logos (£50 each), or the on-line research for a hypertext 'links' page (from  
472 £25 per hour). Weekly e-mail promotion of the site started at £75 per year.<sup>xlvi</sup> Global  
473 Internet, an Internet service provider based in London, offered up to 5MB of space on  
474 servers for £99 as annual rental, £79 for each additional 5MB.<sup>xlvii</sup>

475 This quick estimate gives an interesting overview of what Internet services  
476 providers offered to companies. The aforementioned studies conducted in the Nineties  
477 outlined that the reasons for a company to go online were the usage of email, not only  
478 as office tools but to communicate with the clients; collaboration with other companies  
479 or remote offices through shared workstations, research and development through  
480 shared information. However, the web in particular allowed two fundamental  
481 innovations that were indicated as the main reasons for companies to open a website:  
482 universal visibility and online sales.

483

### 484 **3.1 VISIBILITY**

485

486 Like with any other means of communication, companies aimed to use the web for  
487 promoting their services and products. Being linked from other websites and  
488 directories was fundamental to gain online visibility. In fact, it is important to  
489 remember that advertising on the Internet caused several protests. Before the  
490 development of the web, Internet was mostly about chats, newsletters, discussion  
491 groups and emails: private or semi-private means of communication in which  
492 advertisement was perceived as breach of privacy. Furthermore, connections were paid  
493 for by the minute and by the megabyte, a scarcity system in which users were annoyed  
494 by having to waste money and bandwidth with advertisement. Internet services

495 providers discouraged “sending flyers” through the emails if not in very small doses,  
496 and warned about the risks of “spamming”<sup>xlvi</sup> - a term that started to circulate in that  
497 period and that derives from a Monty Python sketch.<sup>xlix</sup>

498 It was specifically the web, not the Internet, that provided terrific opportunities for  
499 companies, especially for smaller businesses. First of all, websites corresponded to  
500 “virtual headquarters” as elegant and as visible as those of a large multinational,  
501 offices that were opened 24 hours a day to provide information to potential customers.<sup>1</sup>  
502 The web flattened the costs of communication, cutting on traditional mailing and  
503 printing methods. Furthermore, it made it possible for even the smallest company to  
504 run competitive tracking, gathering information on what its competitors were doing.<sup>li</sup>

505 Another important piece of advice to companies was that the approach to build  
506 contents on the websites had to be radically different from that for television, flyers  
507 and other media.<sup>lii</sup> The most important difference was that while traditional  
508 advertisement was imposed to potential customers engaged in other activities (from  
509 driving to checking the mail to watching TV), in the digital space the viewers had to  
510 willingly visit a company’s website. A website had to actively try to attract viewers  
511 through an opposite strategy to that of television: rather than focusing on sales  
512 pressure and hype, websites should offer real useful information on the products and  
513 services, content that potential customers would want to access. “Your competitors  
514 may try and sell by giving out the minimum of information but the maximum of sales  
515 pressure. That just won't work on the Internet” warned the Internet guide offered by  
516 the provider U-net.<sup>liii</sup> “In the Web, content really *is* king - wrote in 2001 marketing  
517 expert Steven Armstrong – users have nearly complete control when surfing”.<sup>liv</sup> In  
518 other words, users had to want to visit a website, it could not be imposed on them like  
519 a commercial. For this reason, actual information about the company and product

520 presentations rather than pure advertising were, and still are, two of the main features  
521 of companies' website. More than marketing hype, websites were filled with corporate  
522 material, including annual reports and technical financial details, important for press  
523 offices to communicate with journalists. Furthermore, especially in the case of small  
524 and medium-size enterprises (SMEs), websites were filled with information on the  
525 business sector where the company operated, content that people interested in a  
526 specific business might want to see. For example, a make-up artist from London had a  
527 website full of beauty tips and hair-styling suggestions: content that promoted loyalty  
528 building to the website by providing free information [see Picture 4].<sup>lv</sup>

529 It is interesting to notice that from a small sample of 300 websites analysed, most of  
530 them were organised to mimic either shops or indexes. In the first case, the home page  
531 corresponded to an entrance door, often accompanied by animation and sounds,  
532 followed by an "enter" button that allowed to come into the virtual boutique.  
533 Alternatively, the homepage was composed of a table of content that asked, like a  
534 virtual clerk, which type of information did the customer need. In many cases the  
535 homepage also provided technical information about which software should be used to  
536 better navigate on the website and which type of bandwidth did the website require.  
537 Sometimes viewers could choose between different versions of the website according  
538 to the characteristics of their connection.

539

## 540 **3.2 ONLINE SALES**

541

542 Apart from visibility, the other main reason for companies to go online was,  
543 unsurprisingly, the possibility of online sales. Already in 1994, a study described the  
544 "virtual mall" possibilities given by the multi-media capabilities of the web.<sup>lvi</sup> "A good

545 virtual shop should make the customer feel as if they might actually be out shopping in  
546 the real world<sup>lvii</sup> wrote a study in 1996. In the UK, online sales took off more slowly  
547 than in the United States, mostly because of doubts about the security systems of  
548 online payments.<sup>lviii</sup> However, by October 1999 the Financial Times reported that  
549 shoppers had spent £2 billion in the past twelve months, with a tenfold increase  
550 compared to the previous year.<sup>lix</sup> The UK directory for secure online stores listed 178  
551 stores in February 1999<sup>lx</sup> and already 252 three months later,<sup>lxi</sup> ranging from auctions  
552 to travel agencies to toys and baking services.<sup>lxii</sup> According to the directories analysed,  
553 175 websites provided online sales between 1996 and 2001, together with 54 shopping  
554 directories. In total, 1342 companies were indexed on Companies House as retailers  
555 through e-mail or the web.

556 Tesco and Sainsbury's were the first large retail chains to offer online sales  
557 services.<sup>lxiii</sup> In May 1998, Sainsbury's was offering an online shopping service via  
558 credit card, home delivery included. In order to activate the account it was necessary  
559 to visit a local store and create a personal catalogue of specific brands and goods from  
560 which to choose: not all products were sold online, and not all areas were served.  
561 However, the system allowed to create different shopping lists to order a whole set of  
562 products in one click.<sup>lxiv</sup> Full online shopping without pre-registering in a store seems  
563 to be available from the year 2000.<sup>lxv</sup> In January 1998, Tesco developed a special  
564 software called Tesco Home Shopper, which allowed to browse more than 20,000  
565 products offline, connecting to the Internet only to send orders and check prices  
566 updates. However, only the Greater London area and Leeds were served.<sup>lxvi</sup> Again by  
567 2000, online shopping had become more similar to what it is today, not bounded by  
568 special software or geographical areas.<sup>lxvii</sup>

569 Interestingly, it was not just the largest companies (such as British Airways,  
570 Thomas Cook, Vodafone) that provided functioning online sales at the start of the  
571 millennium. The research found small personal businesses such as Jennifer Granger's,  
572 a self-employed who sold home made house dolls sketches online,<sup>lxviii</sup> or the "Japanese  
573 Centre", a London-based consultancy agency for Japanese students in London.<sup>lxix</sup>

574 In particular, antiques, memorabilia and independent bookstores quickly started to  
575 use the web as a place where to attract clients interested in niche material from  
576 everywhere. Second-hand bookstores were particularly attentive to the new medium,  
577 as the web gave them the possibility to advertise their full catalogues online and to  
578 find potential buyers beyond those who would visit the physical store.<sup>lxx</sup> Bookstores in  
579 general were strongly present online, though often they did not have their own  
580 payment system and referred to Amazon. As a matter of fact, the UK branch of  
581 Amazon was established in 1998 with the acquisition of "Bookpages"  
582 ([www.bookpages.co.uk](http://www.bookpages.co.uk)), one of the largest online British bookstores at the time.<sup>lxxi</sup>

583 For all the smaller retailers, again, directories played an important part in building  
584 "online malls" from which it was possible to access single shops that offered online  
585 sales. Shops were listed both as "local" businesses and as "category businesses".  
586 While the general "online malls" created by directories did not survive the  
587 development of Amazon and other international giants of online general retail, many  
588 shops and smaller businesses continues to sell online; by 2010 Great Britain enjoyed  
589 the largest per capita e-commerce market in the world.<sup>lxxii</sup>

590

591 Overall, it seems that the reasons for companies to open a website could be  
592 summarised as taking advantage of the faster way to transmit information, whether  
593 under form of advertisement or competitive-tracking, and of the distance-free

594 interactions allowed with potential clients, which was particularly important in the  
595 case of niche retailers, such as memorabilia, or in the case of user information-based  
596 businesses like Recruitment. Initially, these functions passed mostly through the  
597 usage of online directories for visibility and of the email for communication; from the  
598 early noughties however, opening an independent website was considered the most  
599 effective investment.

600 The main difference compared to previous available media was in the type of  
601 information provided: not simple blasting, but notions on the products, on the  
602 company, and on anything that would please visitors that wanted more information.

603 Throughout the years, it seems that webpages within specialised directories tended  
604 to diminish in parallel to the expansion of the web, search engines, and the constant  
605 decrease in the costs of opening a full website. At the same time, despite an increase in  
606 multimedia features, the type of content remained centred on giving information on  
607 products and services rather than simple advertisement.

608

609

## 610 CONCLUSIONS

611

612 The creation of companies' websites mark the general evolution of the Internet from a  
613 private or semi-private mean of communication, almost an extension of the telephone  
614 and the fax, to a public space, in which the business sphere had a predominant role. A  
615 comparison between the overall number of websites as reconstructed by Netcraft [see  
616 Figure 1] and the data offered by the aforementioned studies from the Nineties on the  
617 live business web space, shows that companies' websites alone represented 7.78% of  
618 the total web sphere in 1996, 15.1% in 1998 and 15.7% in 1999.<sup>lxxiii</sup> This only

619 included companies' websites, without taking into account the new online businesses  
620 that were created by and for the World Wide Web. With companies' websites, an  
621 important part of the Internet became a virtual reality full of shops, advertising and  
622 showcases, in which every type of business had access to similar spaces, if not to the  
623 same visibility.

624 While a precise definition of the web space is a nearly impossible task, especially  
625 when referred to the past, web archives make it possible to regain access to the lost  
626 world of the web that used to be. The first objective of this paper was illustrating a  
627 methodology to reconstruct quantitatively a precise portion of the early web.  
628 Notwithstanding the limitations outlined in section 1.2, web directories are a  
629 fundamental tool to access the archived web, just as they were to access the live web  
630 of the time. Although it was beyond the scope of this paper to investigate the relations  
631 between archived directories and the rest of the archived web sphere, this research  
632 wanted to focus on the importance of these directories for the new type of historical  
633 research offered by web archives. First of all, they allow the quantitative  
634 reconstruction of specific web spaces that would otherwise be impossible to map, both  
635 because the task of gathering and describing again the domains would be too daunting  
636 and because they conserve the memory of many links that have not been saved by the  
637 Internet Archive, but that existed at the time in which the directory was on the live  
638 web. Secondly, and even more importantly, web directories allow to study the way in  
639 which the past web sphere was organised for the users, the researching modalities and  
640 the type of navigation offered by the early web. Placed in between phonebooks and  
641 Google, directories accompanied the evolution of information retrieval from printed  
642 collections to keyword research. They marked the passage from "human-made" listing  
643 to complex research algorithms that went hand in hand with the development of the

644 web. For companies that wanted to be present online, webpages within larger  
645 directories were an intermediary passage before opening an independent website – an  
646 evolution that seems to have accompanied the development of search engines and the  
647 obsolescence of web directories, and that would require further studies.

648 The second objective of the paper was to compare the quantitative data gathered  
649 with the general context in which companies' websites went online in the UK, in order  
650 to reflect on what drew businesses to the web in its early years of existence. Even  
651 though with severe limitations, the reflections generated by the study of the web space  
652 as mapped through the business directories found confirmation in the studies of the  
653 time and in the reconstruction of the debate around companies and the web. This  
654 analysis gives back a picture of the World Wide Web as an ideal place for businesses  
655 of all sizes, a new medium in which British companies immediately took interest,  
656 attracted by the possibilities for interaction, online sales, network building with their  
657 customers and clients. In particular, businesses could retain their geographical  
658 delimitation and catchment areas while opening to the possibility of building a remote  
659 and potentially worldwide clientele.

660 Overall, the present results only draw some tentative conclusions on the actual  
661 composition of the UK business web space in its early years; however, with a more  
662 exhaustive enquiry of the available directories and with more powerful means of  
663 analysis for the comparison of the data provided by the directories and by the WHOIS  
664 protocol, it will be possible to further investigate these and other aspects of the  
665 development of business websites and their influences on the larger web sphere. In this  
666 sense, this paper hopes to offer a useful set of tools and to serve as a starting point for  
667 further research on the history of the business web sphere.

668

669 **ANNEX I:**

670 Musso M. and Merletti F., *Annex 01\_list of directories* [xlsx]. Available at <  
671 <http://fm.to.it/uk-web-annex1>>

672

673

674

675 **ANNEX II:**

676 Musso M. and Merletti F., *Annex 02\_domain dataset* [xlsx]. Available at <  
677 <http://fm.to.it/uk-web-annex2>>

678

679

680

681 **ANNEX III:**

682 Musso M. and Merletti F., *Annex 03\_UK Companies active between 1994 and 2001* [xlsx].  
683 Available at <<http://fm.to.it/uk-web-annex3>>

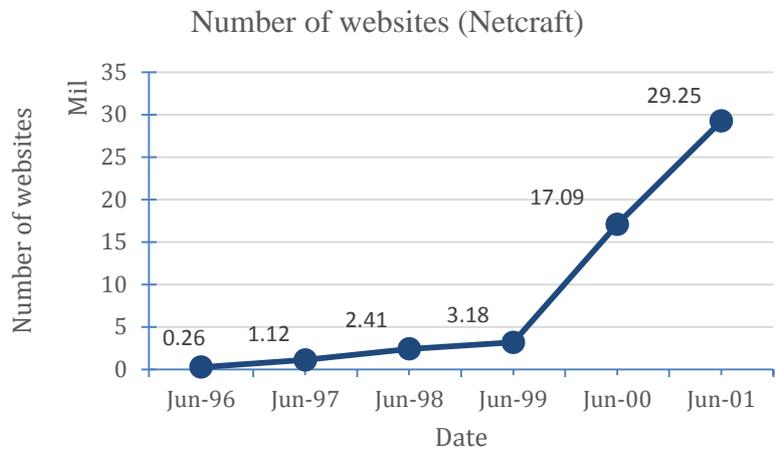
684

685

686 **FIGURE 1: TOTAL NUMBER OF WEBSITES 1996-2001**

687

Period	Websites
June 1996	257,601
June 1997	1,117,255
June 1998	2,410,067
June 1999	3,177,453
June 2000	17,087,182
June 2001	29,254,370



688

689 Source: Netcraft, March 2015 Web Server Survey. Available at:

690 <<http://news.netcraft.com/archives/category/web-server-survey/>> [Accessed 12 April 2015].

691

692

693 **FIGURE 2: DIRECTORIES ANALYSED**

694

695

696

<b>Name and Address</b>	<b>1<sup>st</sup> crawl</b>	<b>Last crawl</b>	<b>Crawl analysed</b>	<b>No of links</b>
<b>UK Directory</b>	19 Dec 1996	Still live	20 Jan 1997	388
<a href="http://web.archive.org/web/19961219105803/http://www.ukdirectory.com/">http://web.archive.org/web/19961219105803/http://www.ukdirectory.com/</a>				
<b>DMOZ</b>	9 Feb 1997	Still live	24 Jan 2001	8048
<a href="https://web.archive.org/web/20001003162214/http://dir.dmoz.org/Regional/Europe/United_Kingdom/Business_and_Economy/">https://web.archive.org/web/20001003162214/http://dir.dmoz.org/Regional/Europe/United_Kingdom/Business_and_Economy/</a>				
<b>Yell</b>	16 Jun 1997	2000 (live as Yell.com)	05 Jun 2000	475
<a href="http://web.archive.org/web/19970616081900/http://www.yell.co.uk/yell/web/companyaz.html">http://web.archive.org/web/19970616081900/http://www.yell.co.uk/yell/web/companyaz.html</a>				
<b>Waternet</b>	19 Feb 1999	2003	19 Feb 1999	15,834
<a href="http://web.archive.org/web/19990219194117/http://www.water.net.uk:80/ukcompanies/">http://web.archive.org/web/19990219194117/http://www.water.net.uk:80/ukcompanies/</a>				
<b>Total number of links gathered:</b>				<b>24,745</b>
<b>Links appearing in multiple directories:</b>				<b>1,006</b>
<b>Unique links gathered:</b>				<b>23,739</b>

697

698 Sources: Annex I and Annex II

699

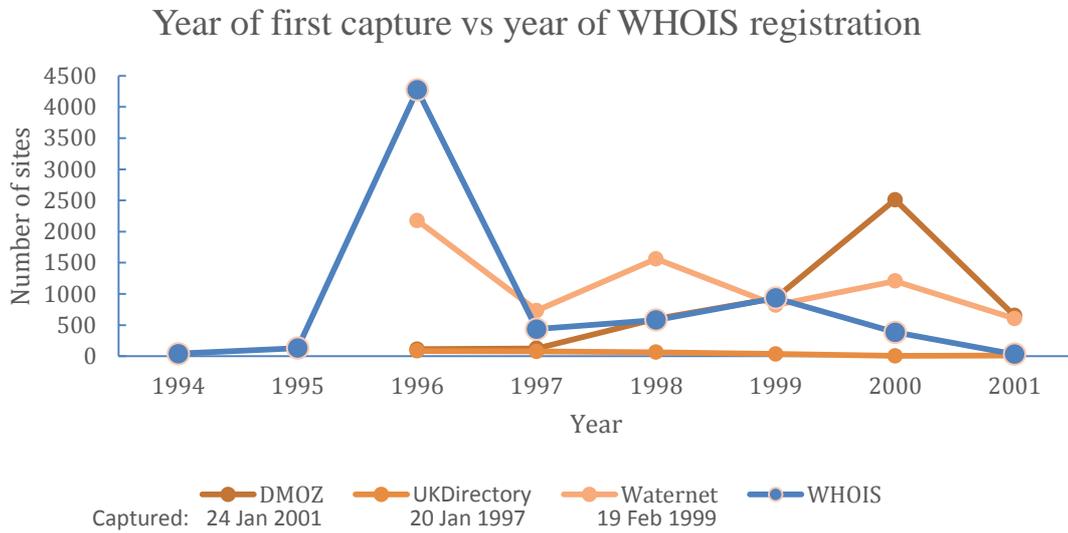
700

701

702 **FIGURE 3: REGISTRATION YEAR AND CATEGORIES**

703

704



705

706

707 Source: Annex II

708

709 **FIGURE 4: COMPARISON OF WEBSITES / REGISTERED COMPANIES BY**

710 **CATEGORY**

711

712

<b>CATEGORY</b>	<b>COMPANIES HOUSE</b>	<b>DIRECTORIES (DMOZ, UK Directory)</b>	<b>%</b>
41 Construction of buildings	26143	5	0.01
10 Manufacture of food product	2748	5	0.18
73 Advertising and market research	3510	28	0.79
62 Computer programming, consultancy and related activities	29780	291	0.97
42 Civil engineering	4266	42	0.98
68 Real estate activities	60462	594	0.98
18 Printing and reproduction of recorded media	3807	54	1.41
07 Mining	139	4	2.87
64 Financial service activities, except insurance and pension funding	16595	643	3.87
69 Legal and accounting activities	6699	270	4.03
78 Employment activities	3456	488	14.12

713

714 Source: Annex II and III; for details of aggregation, see Annex II

715

716 **FIGURE 5: COMPANIES' WEBSITE ACCORDING TO SIC CATEGORIES**

717 **IN THE UK AND IN GENERAL**

718

719

454 C. Greaves et al. / *International Journal of Information Management* 19 (1999) 449–470

Table 1  
Web sites according to the standard industrial classification

	UK (1998) (%)	Ng (1997) (%)
Financial services	6.70	4.52
Real Estate, renting and business	6.20	10.40
Computer related	19.10	16.63
Internet related	5.10	1.72
Transport, travel storage and communication	10.20	6.25
Utilities	0.80	0.38
Construction	2.50	3.25
Education	1.10	0.72
Retailing	2.40	3.49
Mining and quarrying	0.10	0.18
Agriculture	0.75	0.60
Publishing	3.90	4.47
Entertainment	10.01	14.07
Food	3.50	3.35
Engineering and manufacturing	10.00	14.07
Scientific and environmental	2.00	1.33
Miscellaneous	14.30	10.94
Shopping centres	0.30	0.80
Health	2.60	5.11

720

721

722 Source: Greaves, Kipling and Wilson (1999) Business Use of the World-Wide Web,

723 with particular reference to UK companies, *International Journal of Information*

724 *Management*, Vol. 19: 449-470

725

726

727 **PICTURE 1: ARCHIVED SEARCH ENGINES AND DIRECTORIES**

728

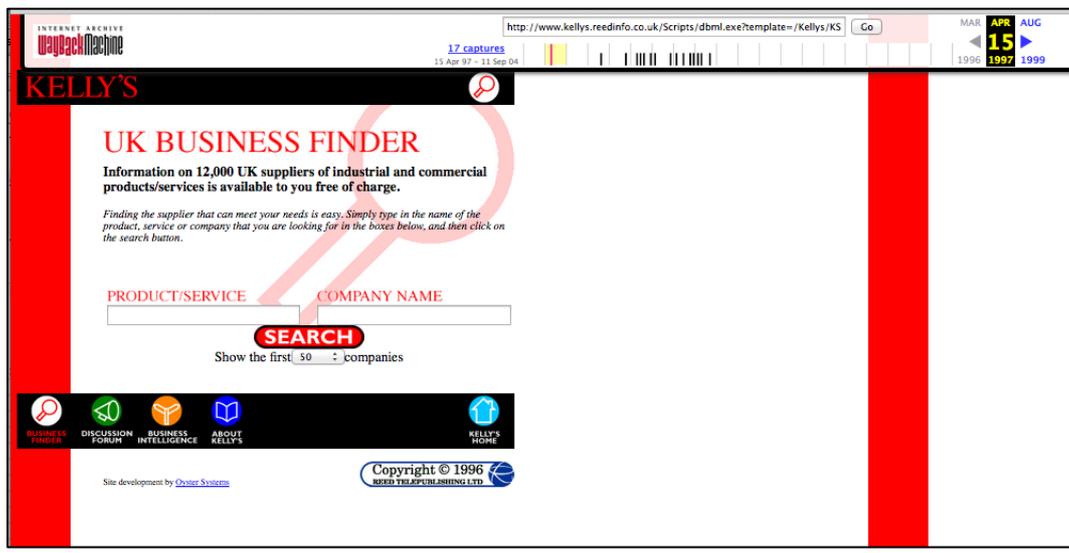
729

730

731 **Kelly's Web**

732

733



734

735

736 Source: Kelly's UK Business Finder,  
737 <<http://web.archive.org/web/19970415015024/http://www.kellys.reedinfo.co.uk/Scripts/dbml.exe?template=/Kellys/KS1.dbm>> [Internet Archive, site captured 15 Apr.  
738 1997]  
739  
740

741 **Delia Venables**

742

743

INTERNET ARCHIVE  
Wayback Machine  
Wayback Machine home page

43 captures  
2 Dec 98 - 25 Jun 13

http://www.venables.co.uk/legal/firms.htm Co

NOV DEC JAN  
1997 2 1998 2000

 **English Firms of Solicitors  
on the Web**

*This page was last updated on November 15th.*

To search for a Solicitor in a particular town, use the "Find" facility in Netscape (on the Toolbar). In Explorer, go to Edit and choose "Find (on this page)". Try both the town and search both pages.

*Note to anyone copying these pages - don't!*

[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) (on this page) and [K to Z](#) (separate page)  
There are separate pages for [Wales](#), [Scotland](#), [Northern Ireland](#), [Off Shore](#) and [Ireland](#).  
There is also a separate page for [Groups of Firms](#), both in the UK and across wider areas.

- [Adler & Adler](#) - Dorking
- [November!](#) Alcock Grinditch & Rigley - Mansfield
- [Alexander Harris](#) - Altrincham, Cheshire
- [Alexander Johnson](#) - London
- [Allen & Overy](#) - London and International
- [Alsters](#) - Bath
- [Andersons](#) - Nottingham
- [Anthony Gold Lerman & Muirhead](#) - London
- [AP Partnership](#) - Peterborough
- [Archers Solicitors](#) - Stockton-on-Tees
- [Ashley Wilson](#) - London
- [Ashurst Morris Crisp](#) - London
- [Askews](#) - Cleveland
- [Aspinall Wright & Co.](#) - Glossop, Derbyshire
- [Aspinall Wright & Co.](#) - London

744

745

746 Source: Delia Venables, English Firms of Solicitors on the Web,

747 <[http://web.archive.org/web/19981202064024/http://www.venables.co.uk/legal/firms.](http://web.archive.org/web/19981202064024/http://www.venables.co.uk/legal/firms.htm)

748 [htm](http://web.archive.org/web/19981202064024/http://www.venables.co.uk/legal/firms.htm)> [Internet Archive, site captured 2 Dec. 1998]

749

750

751 **PICTURE 2: DIRECTORIES ANALYSED**

752

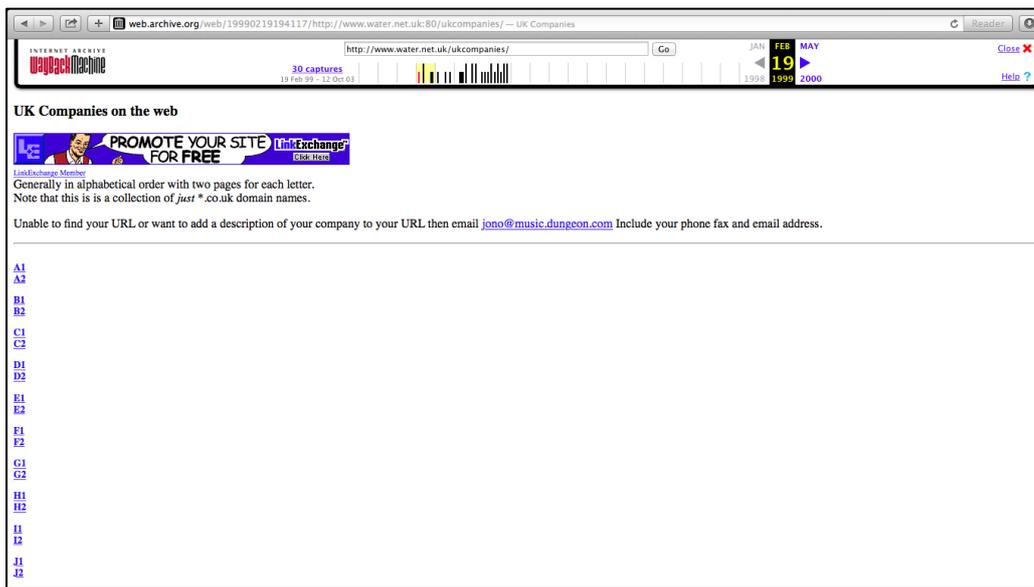
753

754

755 **Waternet**

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757



758

759

760 Source: Waternet, UK Companies on the web,  
761 <[http://web.archive.org/web/19990219194117/http://www.water.net.uk:80/ukcompani](http://web.archive.org/web/19990219194117/http://www.water.net.uk:80/ukcompanies/)  
762 [es/](http://web.archive.org/web/19990219194117/http://www.water.net.uk:80/ukcompanies/)> [Internet Archive, site captured 19 Feb. 1999]  
763

764

765

766 Yell

767

768



769

770

771 Source: UK Yellow Web,

772 <[http://web.archive.org/web/19970616081900/http://www.yell.co.uk/yell/web/compan](http://web.archive.org/web/19970616081900/http://www.yell.co.uk/yell/web/companyaz.html)

773 [yaz.html](http://web.archive.org/web/19970616081900/http://www.yell.co.uk/yell/web/companyaz.html)> [Internet Archive, site captured 16 Jun. 1997]

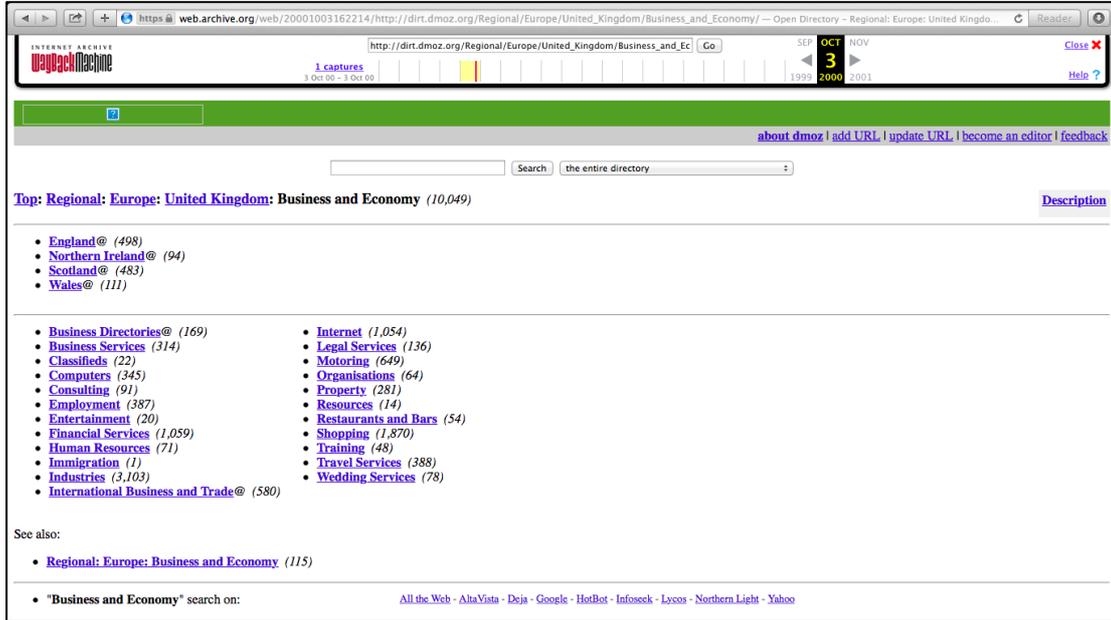
774

775

776 **DMOZ**

777

778



779

780

781 Source: DMOZ,

782 <[https://web.archive.org/web/20001003162214/http://dirt.dmoz.org/Regional/Europe/](https://web.archive.org/web/20001003162214/http://dirt.dmoz.org/Regional/Europe/United_Kingdom/Business_and_Economy/)

783 [United\\_Kingdom/Business\\_and\\_Economy/](https://web.archive.org/web/20001003162214/http://dirt.dmoz.org/Regional/Europe/United_Kingdom/Business_and_Economy/)> [Internet Archive, site captured 03 Oct.

784 2000]

785

786

787

788

789 **UK Directory**

790

791

The screenshot shows a web browser window with the URL <http://www.ukdirectory.com/>. The browser's address bar and navigation buttons are visible. The page content includes a search bar with the text "Search for" and buttons for "Start" and "Reset". Below the search bar is a section titled "or...Try the Quick Pick List" with a list of categories and their descriptions:

- Business** Commerce, Lawyers, Property, Marketing, Manufacturing
- Community** Libraries, Religion, Medical, Lottery, Charity, UK Weather, Clubs
- Computers** Hardware, Software, Internet Services, Multi Media, IT Consultants
- Education** Universities, Colleges, Art, Museums, Science, Nature and Technology
- Employment** Jobs, Recruitment, Vacancies
- Entertainment** Restaurants/Pubs, Music, CD's, Television, Satellite, Radio, Games
- Finance** Banks, Mortgages, Accountants, Finance, Investment, Insurance
- Government** Politics, Taxes, Local Councils
- Home Pages** (Personal only) Some of these are really GREAT! - Send yours in [NOW](#).
- News** E-zines, Magazines, Publishing, Journals and on-line Periodicals
- Shopping** Books, Groceries, House and Garden, Fashion
- Sports** Racing, Football, Watersports and Sporting facilities.
- Transportation** Car Dealers, Bikes, Boats, Transportation Businesses
- Travel** Holidays, Airlines, Hotels, Travel Agents

At the bottom of the list are links for [\[The Full Search\]](#), [\[The Complete Index\]](#), and [\[The Full Alphabetical Listing\]](#). Below the list is a paragraph: "UKdirectory is a **FREE** service, listing all the WWW sites in the **UK**. There are over **8,600** separate URLs listed here with more being added every day. Should your site be listed here? If so, then **e-mail** us now and we'll do the rest for **FREE!**"

At the bottom left is a badge that says "TOP 5%" and "See why the UKdirectory was voted into the top 5% of all WWW sites".

792

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794 Source: UK Directory,

795 <<http://web.archive.org/web/19961219105803/http://www.ukdirectory.com/>> [Internet

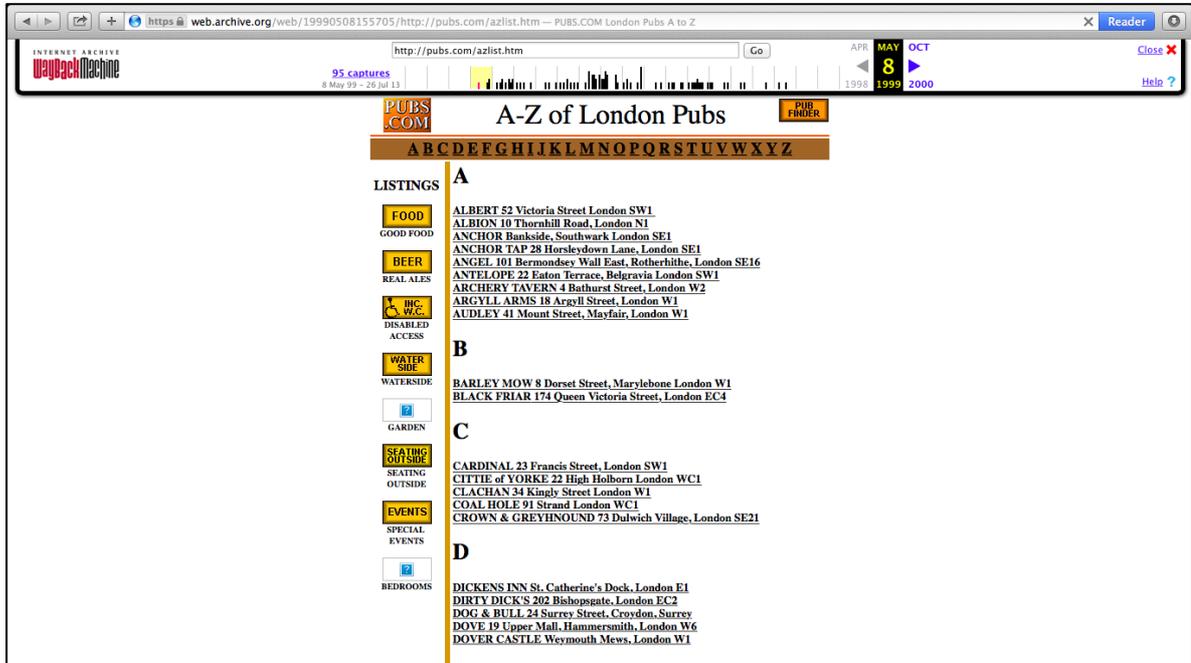
796 Archive, site captured 19 Dec. 1996]

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798 **FIGURE 3: PUB.COM DIRECTORY**

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803 Source: Pubs.com,

804 <<https://web.archive.org/web/19990508155705/http://pubs.com/azlist.htm>> [Internet

805 Archive, site captured 8 May 1999]

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812 Source: Source: Pubs.com,

813 <<https://web.archive.org/web/19990508155705/http://pubs.com/azlist.htm>> [Internet

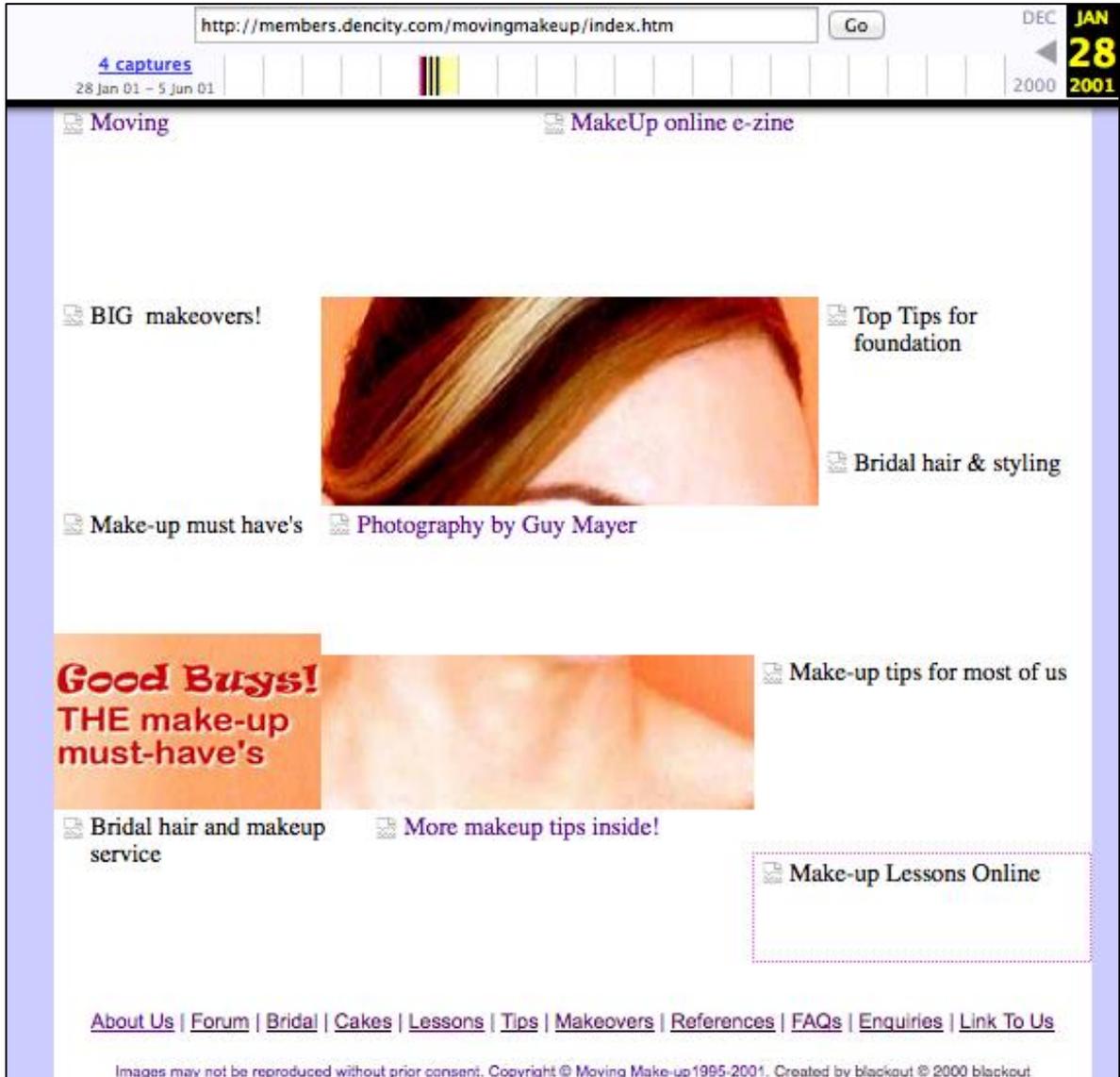
814 Archive, site captured 8 May 1999]

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816 **PICTURE 4: MOVING MAKE-UP HOME PAGE**

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820 Source: Moving Make-up,  
821 <<https://web.archive.org/web/20010128101100/http://members.density.com/movingmakeup/index.htm>> [Internet Archive, site captured 28 Jan. 2001]  
822  
823

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- <sup>ix</sup> Ng, Pan and TD Wilson (1998) Business Use of the World-Wide Web: a report on further investigation. *International Journal of Information Management* Vol. 18: 291-314
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- <sup>xiv</sup> Internet Archive, Wayback Machine. Available at: <<http://archive.org/web/>>
- <sup>xv</sup> For the full list of item searched, please refer to Annex I
- <sup>xvi</sup> See Coll and Murray (1999), UK companies directories on the Web, *Business Information Review*, vol. 16(1). For a full list of terms searched, please refer to Annex I
- <sup>xvii</sup> Abpi – The Association of the British Pharmaceutical Industry, <<http://web.archive.org/web/19961023052832/http://www.abpi.org.uk/abpimem.htm>> [Internet Archive, site captured 23 Oct. 1996].
- <sup>xviii</sup> Delia Venables, English Firms of Solicitors on the Web, <<http://web.archive.org/web/19981202064024/http://www.venables.co.uk/legal/firms.htm>> [Internet Archive, site captured 2 Dec. 1998].
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- <sup>xxv</sup> Francesco Merletti, *UK-companies-scraper*. Available at Github, <<https://github.com/mjs2020/uk-companies-scraper>>
- <sup>xxvi</sup> Bulk Whois Api. Available at: <<https://bulk-whois-api.com>>
- <sup>xxvii</sup> The Registrar is the organisation through which a company reserved its domain. The Registrant is the owner of the domain - an accurate comparison between the registrant data and the company data allows to identify false negatives and false positives.
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*Information Management* Vol. 16: 83—102; Ng, Pan and TD Wilson (1998) Business Use of the World-Wide Web: a report on further investigation. *International Journal of Information Management* Vol. 18: 291-314; Greaves, Kipling and Wilson (1999) Business Use of the World-Wide Web, with particular reference to UK companies, *International Journal of Information Management*, Vol. 19: 449-470; Goode (2002) Management Attitude Towards the World Wide Web in Australian Small Business, *Information System Management*, vol. 19 45-48

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<sup>xxxii</sup> For a complete list, see Annex II

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