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Library Collections Contribute to Doctoral Studies: Citation Analysis of Dissertations in the Field of Economics and Administration

Abstract

Purpose: The impact of university libraries was analyzed by investigating the availability of the references of dissertations in the university's own library. A special attention was given to the electronic availability of cited works.

Methodology: Citation analysis was used. Ten dissertations of economics and administration from two Finnish universities were analyzed. The dissertations were completed in 2005-2006. The comparison of the availability of references in two different universities, a large, multidisciplinary university and a small, specialized university, was carried out.

Findings: The availability of the references of dissertations was good in both universities. A large part of references, especially journal articles, were already available electronically. The university libraries have a significant role in contributing to the doctoral studies, because they offer the access to adequate information resources.

Research limitations: The sample is quite limited: only two Finnish universities and ten dissertations were included in the data. The good availability of references might result from doctoral students' unwillingness to search sources outside. However, doctoral students do not cite all sources that they read. The impact of the library on the doctoral studies can be even bigger than we can show by citation analysis.

Practical implications: The paper indicates that the citation analysis is a good tool in promoting the library's impact.

Originality/value: The paper emphasizes that the impact of libraries can be demonstrated by presenting the visibility of their collections in dissertations. Because of the rapid change of information environment, the study considered the availability of electronic sources of dissertations. The interesting comparison between two different universities was carried out.

Keywords: Library collections, Doctoral dissertations, Citation analysis, References, Electronic sources, Availability

Paper type: Research paper

Introduction

An essential part of university libraries' everyday life is analysing their function and impact. The libraries must be able to show that they use the resources given to them in the best possible way, and that the library funding benefits the university's research, teaching and studying. Uni-

versity administrators expect to get a return on investment in university libraries (see e.g. Luther, 2008). The libraries invest a major part of their budget in collections, or scientific literature, including scientific journals. Therefore the library collections should also appear in the references of research conducted in the university.

In this study, we examined the visibility of library collections in the references of dissertations. Some previous studies (see e.g. Edwards, 1999; Smith, 2003; Beile et al., 2004; Haycock, 2004; Fuchs et al., 2006) have also explored the availability of sources for dissertations in the university's own library collection. In addition to the library ownership of the works cited in the dissertations, these studies have paid attention to the format of the materials cited (journal articles, monographs, proceedings etc.), the titles of the most cited journals, and the age of the cited works. The main findings of previous studies show that doctoral students rely on the university library's collection and use information sources that are available and owned locally.

Dissertations are the particular useful objects of the research in finding out the impact of library collections because they are both a result of independent research and a product of scientific graduate studies, and therefore they represent both the university's research and study. Buttlar (1999) remarks that the doctoral dissertation is an evidence of the author's ability to carry out scientific research, and the citations reflect his/her familiarity with the discipline. It has also been found that students' research interests often reflect those of their faculty advisors (Edwards, 1999; Smith, 2003). Therefore the citations of the doctoral dissertations will reveal what material is needed and used in that certain university environment, also from a more general point of view.

As an indicator of quality, the citation analysis of dissertations has also been criticized. Beile et al. (2004) question the validity of citation analysis of dissertations, especially for evaluating research collections. They remark that citations are not an indicator of the quality of the collection. According to them, doctoral students do not appear to seek sources, which are not locally owned, and the quality of references varies considerably. Further, they claim that the majority of studies that have used the citation analysis of doctoral dissertations have been carried out only in one institution and should therefore be regarded cautiously.

In this study, we focused on the availability, and not the quality of the works cited in dissertations. The assumption was that since the dissertations had been accepted in normal academic order, their references would meet at least the minimal requirements of scientific quality. We were interested in how well the university's own library's collections could support the completion of dissertations.

During the last few years the amount of electronic journals in the collections of university libraries has grown strongly and they form nowadays a large part of libraries' collections (see e.g. Tenopir et al, 2008). Equally, the shift of acquisition budget from print to electronic resources has taken place in many libraries all over the world. Electronic resources have improved the libraries' ability to build their capacity, offer very extensive access to information resources and support their universities' strategic goals.

At the same time, the use of electronic resources has grown. Although their use varies between disciplines, a common phenomenon is that the acceptance of e-resources is growing. Researchers prefer electronic journals because of their availability, ease of access and enhanced searching features in the online environment. (See e.g. Tenopir & King, 2001; Wolf, 2001; Vaughan, 2003.) Tenopir and King (2001) remark that the convenience of desktop access to journal articles also allows researchers to read more and from a wider variety of sources.

The cultural shift from the use of printed journals to the use of electronic journals has happened very rapidly. Brady, McCord, and Galbraith (2006) give a good example from Washington State University where the use of electronic journals in three subject fields (chemistry, mechanical and material engineering, and physics) was studied. In 2001, the share of electronic journals was 71 percent of all journal use; in 2003, it was already 94 percent. The findings of previous studies also confirm that that use of e-resources has increased both the efficiency and productivity of researchers (see e.g. Luther 2008; Tenopir et al., 2008).

Purpose of the Study

The purpose of the study was to analyze the impact of university libraries by investigating the availability of the references of the dissertations in the university's own library collection. We examined how well the references of the business and administration dissertations were available in the own library. One of the universities (University of Tampere, later referred to as University A) is a large multidisciplinary university, whose several fields include economics and administration science. The other one (Turku School of Economics and Business Administration, later referred to as University B) is a small university specialized in economics and business administration. We wanted to find out whether the doctoral students relied on their own libraries' collections equally in these two different types of universities, and whether there were differences in the availability of references in these two universities' libraries.

The increase of electronic resources has meant big changes both to researchers and university libraries, also in University A and University B. In the year 2002 in University A the number of the titles of printed periodicals was 2 466 and in 2006 only 1454. The number of electronic periodical titles in use was substantially bigger, in 2002 there were 5 429 titles and in 2006 already 15 774. In University B, the number of electronic periodical titles in 2002 was considerable (4500 titles) and multiple in comparison with the number of printed periodical titles (605 titles). In 2006, the number of electronic periodical titles in University B was 4 782 and printed titles 675. Because the rapid change of information environment from the printed world to the electronic one, we wanted to pay particular attention to the electronic availability of the references of dissertations. We also wanted to pay attention to the availability of references with different age and format.

To be able to show an example of the contribution of university libraries to doctoral studies the following specific questions were addressed:

- How extensively the references of doctoral dissertations are available in the collection of the university library?
- How extensively the references of doctoral dissertations are already available electronically?
- Are there differences in the availability of various types of works cited in the dissertations?
- Does the publication date affect the availability of works cited in dissertations?
- Are there differences between various types of universities in the availability of references in doctoral dissertations?

Research Method and Data

As a research method, we used citation analysis. Citation analysis has often been used in identifying significant authors in a certain subject field, a core list of journals and monographs for a subject and publishers of influence (see e.g. Fuchs et al., 2006; Vallmitjana & Sabate,

2008). It has also been used in studying scientific communication and diffusion of ideas, in paying attention to such factors as the gender of authors, the countries of origin of works cited and subject disciplines represented by citations (see e.g. Buttlar, 1999). In university libraries citation analysis can be used also as a means of assessing the collection utility and usefulness. With citation analysis the libraries can evaluate the "fit" of the collection with the needs of their patrons. Further, the university libraries can take advantage of citation analysis as a budget allocation tool for determining, for example, the ratio of monographs to journals, and as a collection development tool for guiding especially journal selection, retention, and cancellation decision. (Edwards, 1999; Smith, 2003; Haycock, 2004; Fuchs et al., 2006.) We think that citation analysis is also a good method when studying the impact of the university library through the availability of the sources used in dissertations, as we did in our study.

Ten dissertations were selected for the study. Five of them were from University A, and five from University B, both universities are situated in Finland. The dissertations were in the fields of economics and administration and completed in 2005-2006. During the years 2005-2006 in University A, a total of 25 dissertations in this subject field were approved, and in University B a total of 17 dissertations. The dissertations were selected so that the topics of dissertations from two different universities were counterparts, meaning that their topics were close to each other (marketing, leadership, innovation systems, information systems, and customership).

The data was coded in two stages. First only the references of four dissertations in both universities were coded and the results were analyzed. After, one dissertation from each university was added to the data and analyzed. The comparison of the results before and after the additional dissertations showed that the changes in the results were rather small, only 1-2 percent depending on which factor was considered. The saturation level of the data was achieved quickly. Therefore no more new dissertations were added to the data.

The total number of references cited in ten dissertations was 3 191, ranging from 187 to 490 per dissertation. The average number of references was 319. This is a significant number of references and considerably more than e.g. in Edwards' (1999) study where the average number of references per dissertation in polymer science and polymer engineering was 114 (range from 33 to 196); in Buttlar's (1999) study where the mean value of references in the dissertation of library and information science was 131 (range from 40 to 439); or in Haycock's (2004) study with an average of 105 citations (range from 41 to 295) per education dissertations.

The total number of references cited in five dissertations in University A was 1341, and the average number of references per one dissertation was 268. In five dissertations in University B the total number of references was 1850 and the mean value of the references per one dissertation was 370.

The availability of references was checked by a search in the libraries' own online catalogs (OPAC search), and by a search in Nelli search portal. Nelli portal is used in both libraries to offer an access to electronic materials, both licensed ones and open access materials. Licensed journals, books, encyclopedias and other materials can be found very extensively in Nelli. Instead some open access materials can be lost in searching Nelli portal. Therefore if some references were not found in OPACs or in Nelli portal, and if they were rather new ones, they were also searched for on the Internet. It was possible that the references available in the open network were, for example, the publications of some other university, ministry or civil service department.

The availability of references was coded in four categories: available in an electronic form, available in a print form, available in the open network, and not available. If the reference was available both in print and electronic form, it was coded available in an electronic form. This

was because we wanted to find out, how extensively the material that doctoral students need and use is already available electronically. Bibliographies never indicate how a cited work in the end was accessed (Smith, 2003). Even if the work is available in the university's own library, the users can get it from outside. However, for our purpose it was enough to know, whether the material was available in the library or not, and whether or not it was available electronically.

The differences in the availability of various types of references were also investigated. Therefore references were coded with respect to the format of publication (monographs, journal articles, book chapters, edited books, conference papers, others), and the year of publication.

Limitations

There are some limitations to be mentioned in our study. First, our sample is quite limited. There were only two Finnish universities represented in the data. However, in many previous studies the study has been focussed only one university. In our study, we were able to compare the availability of the references of the dissertations in the university's own library in two very different universities. We were also able to compare our results with the findings of previous studies, and find differences or similarities in the use and impact of libraries' collections between Finnish and American universities. Some common trends or at least indicative observations can be presented.

Second, only the references of ten dissertations were analyzed. However, as we mentioned earlier, the saturation level of the data was achieved quickly. In the beginning, only the references of eight dissertations were analyzed. The adding of the references of two dissertations to the data did not change the results much. The total number of references analyzed was 3 191, which can be considered a sufficiency of data to demonstrate the availability of the references of the dissertations in the university's own library and the library's contribution to doctoral studies.

There is still one additional noteworthy comment to be presented, when we consider the impact of university libraries by investigating if the references of dissertations are available in the collection of the university's own library. Doctoral students do not cite all sources that they search and read during their research and writing process. Only some works have been included as references in the completed dissertation. (Haycock, 2004) The impact of the library's collection on the doctoral studies can therefore be even bigger than we can show by citation analysis.

Findings

Availability of References

The availability of dissertations' references was good in both universities. Within our data, about 80 percent of the references were available in the library's collection or in the open network. However, we did not find it a negative factor if some references were not available in the university library. Although previous studies (e.g. Beile et al., 2004) show that doctoral students use many information resources and scientific literature that is available locally, they should have the skills to search for information for their research elsewhere, and utilize other information channels besides their own library. Further, it is nowadays very typical that Finnish doctoral students spend some time during their doctoral studies abroad where they have an access to different resources.

Although on average the availability of references was good, individual dissertations differed quite often concerning how much they relied on the university library's collections. There were also differences in the availability of references in two universities. In University A, sources that were not available in the library's collection were used more often than in University B. (See Figure 1) One reason for this difference may be found in the different affiliate universities. University A is a multidisciplinary university where the needs of several different subject fields have to be considered in the acquisition of literature. University B specializes in economics and business and the library collections can be targeted for the needs of this specific field.

Remarkably, references for dissertations were already well available electronically; in University B almost half of the sources. In University A only 38 percent and in University B as little as 33 percent of all cited works were available only in print in the university library. This is noticeably less than in the Fuchs et al (2006) study at the University of Texas at Austin Libraries in 1997 and 2002 where 67 percent of the references of the dissertations of educational and 52 percent of the references of the dissertations of civil engineering psychology were available only in print. In their study no substantial shift from printed to electronic resources had yet been seen in the change of the millennium. Instead, in our study, the availability and use of electronic resources was already evident.

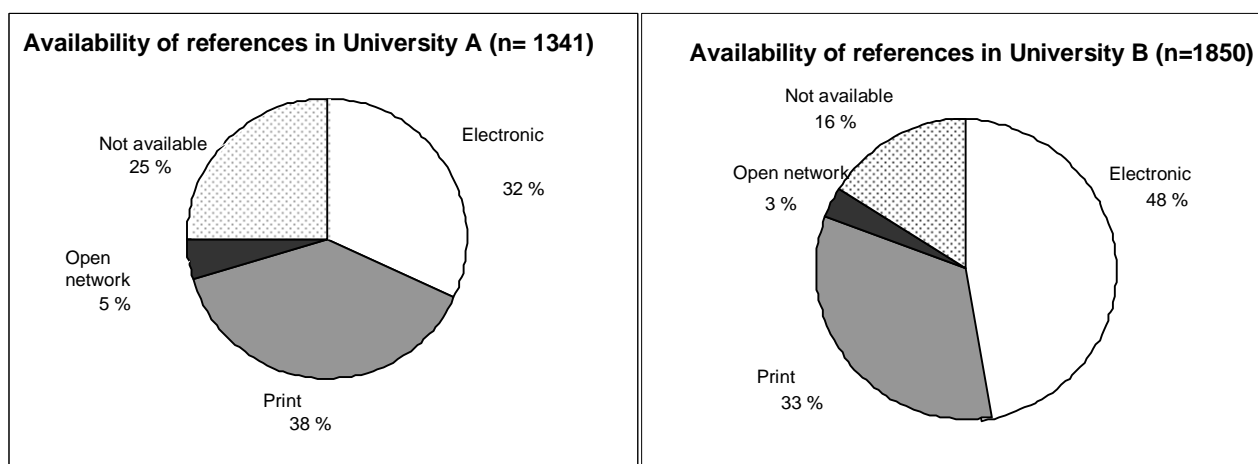


Figure 1. Availability of references in two Finnish universities

Format of References

Different disciplines have their own publishing structures. For example, humanities put emphasis on monographs, medicine on scientific journals, and technology on conference papers. The dissertations we looked at were coded in six categories based on the publication format: monographs, journal articles, book chapters, edited books, conference papers, and other materials. "Other materials" consisted mainly of websites.

The largest category (54%) of references in all the dissertations was journal articles. The second largest reference category was monographs (31%) and the third most common was book chapters (10%). Conference papers did not make up a substantial portion (1%) in the references of economics and administration dissertations. There were, however, differences between two different universities in how the sources were referred to. In University A books were used more than in University B as the references of the dissertations. (See Table 1.)

Table 1. Publication format of the references of dissertations in two Finnish universities.

University A (n = 1341)	%	University B (n = 1850)	%	Total (n = 3191)	%
Monograph	36	Monograph	28	Monograph	31
Journal article	45	Journal article	59	Journal article	54
Book chapter	12	Book chapter	8	Book chapter	10
Edited book	1	Edited book	1	Edited book	1
Conference paper	1	Conference paper	2	Conference paper	1
Other	5	Other	2	Other	3
Total	100	Total	100	Total	100

Journal articles have been found to be the primary references of dissertations also in many other disciplines, for example in library and information science (46 %, see Buttlar, 1999), in educational psychology (62 %, see Fuchs et al 2006), in chemistry (79 %, see Vallmitjana and Sabate, 2008), in civil engineering (46 %, see Fuchs et al., 2006), and in polymer science and polymer engineering (73 %, see Edwards, 1999). However, in education dissertations books and monographs formed the majority of citations (56 %, see Haycock, 2004).

Our findings support the assumption that in economics and administration, journal articles are the essential channel of publishing new research results. However, monographs, too, still have a strong status in the publication structure of economics and administration. When monographs, book chapters and edited books are taken into account as book material, their share was 42 percent. The importance of book material must be considered in developing library collections and ensuring the availability of sources.

Availability of Cited Journal Articles

Because libraries have acquired electronic sources in consortiums, the availability of scientific journals has improved remarkably in Finland in the new millennium. The good availability of journal articles could also be seen in the dissertation references. While the total availability of all references regardless of publication types in the university's own library was 80%, the availability of article references was as high as 89%.

Our findings are very similar to the findings of Smith (2003) and Beile, Boote, and Killingsworth (2004). Smith found that the library ownership of cited periodicals in the University of Georgia Libraries in various disciplines (art and humanities, education, sciences, and social sciences) was very high both in 1991 (on an average 91 %) and in 2001 (on an average 91 %). The ownership of cited articles was lowest in the area of arts and humanities (in 2001 only 65 %), and highest in the field of sciences (95 % in 2001). Beile, Boote, and Killingsworth compared the references of education dissertations in three various institutions in the United States in 2000 and reported that the articles cited in the dissertations were extensively available in Institution 1 (91 %), in Institution 2 (93 %), and in Institution 3 (97 %). The local availability of scientific journals seems to play an important role for doctoral students when they search references for their studies.

Most of the articles in our study were already available electronically although again there were differences between the universities. In University A more than two thirds (68 %) of the articles were available in an electronic form, and in University B as many as 79 percent. (See Figure 2) This is much more than in Smith's (2003) study where in 2001 at the University of Georgia

only 31 percent of all cited articles were available online. We think that in Finland at the beginning of the new millennium we have witnessed a quick transition from print to electronic in the acquisition and use of scientific journals.

In both universities slightly over 10 percent of the article references were available only in print. In University A there were more article references that were not available in the university's library collection in any form than in University B. Only a few article references were published in the open network. The reason may be that Open Access -publishing has still not become a natural way of publishing in economics and administration, that students do not know how to search for articles in the open network, or that they do not want to cite them in their dissertations.

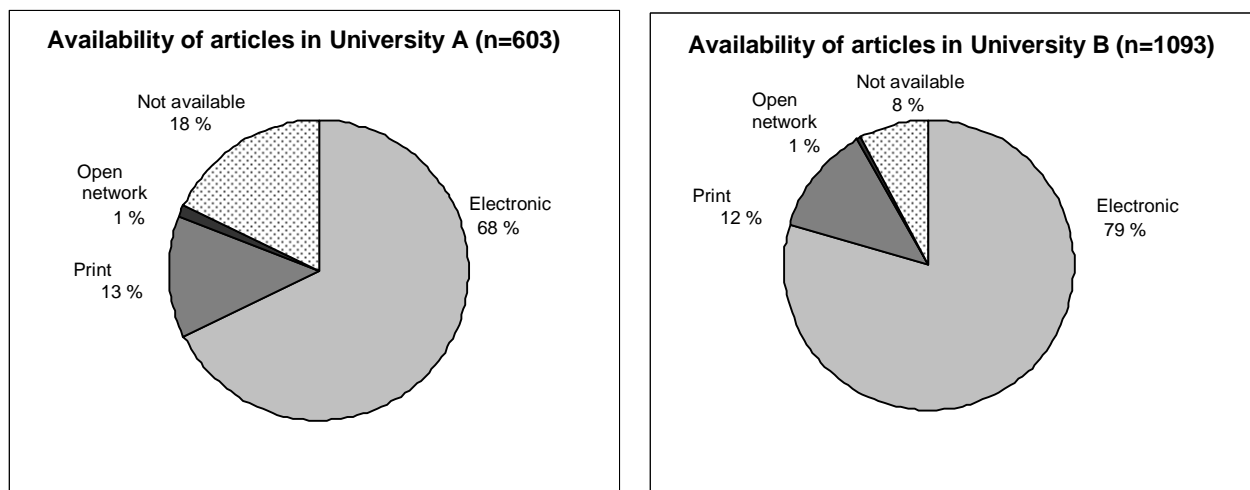


Figure 2. Availability of articles used as references in dissertations in two Finnish universities

Availability of Cited Books

Although journal articles were the most common type of references in dissertations, doctoral students also referred to books. When monographs, book chapters and edited books were counted altogether and considered as book references, the total number of books climbed up to be even slightly more than journal articles in University A (49 % vs. 45 %, see Table 2).

The books cited in dissertations were also quite well available in the university libraries (see Figure 3). The ownership of cited books was 68 percent in University A and 71 percent in University B. This is less than in Smith's (2003) study where 84 percent (in 1991) and 86 percent (in 2001) of the monographs cited by graduate students were available in their own library. However, in Smith's study there were clear differences between disciplines, the lowest library ownership of cited monographs, 69 percent, was in both education (in 1991) and sciences (in 2001) and highest, 97 percent, in social sciences (in 2001). Compared with the previous research we presume that the situation where more than two thirds of monographs are available locally is good enough.

In our study, books were mainly available in print. On average, only two percent of book references were available electronically. The use of electronically published books is likely to increase in the future when more and more e-books enter the market and when people learn to search for them and utilize them. Open Access -publishing is also likely to bring more university publications etc. made available on the web.

Availability of book references in the collections of the university libraries was not as comprehensive as the availability of articles. In both universities, doctoral students had already an access to the “big packages” of electronic scientific journals, but they got some books for readings also outside their own university library. In our study more than a quarter of books cited in the dissertations were sought from elsewhere, for example by purchasing, from a colleague, or through inter-library services. Books that were not available in any form in the university library were more common in University A than in University B.

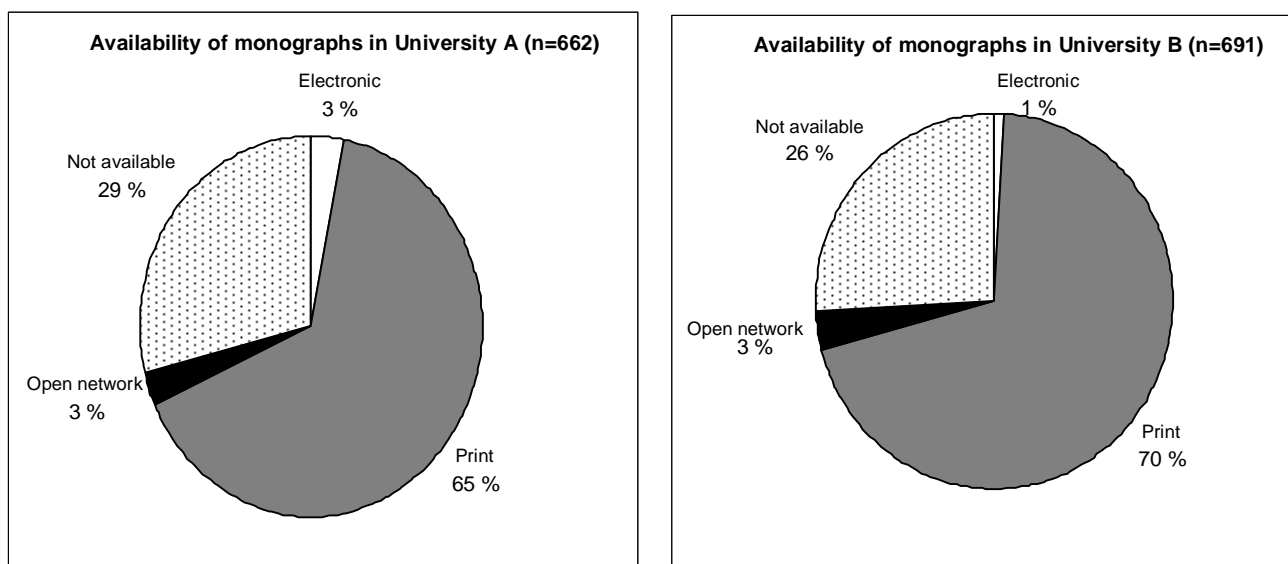


Figure 3. Availability of books used as references in dissertations in two Finnish universities

Age of References

In order to develop the library collections it is important to examine the publication dates of the references. If older literatures have not been used transferring them for example, to Repository Library is worth considering. The dissertations in our data cited relatively current sources. (See Figure 4) More than one third (38 %) of all citations were from works published in 1998-2006, and more than half (58 %) were published in 1994-2006. 17 percent of the sources were published in the 1980's, and only 10 percent were older. According to our study, the dissertations of economics and administration cite fairly recent publications. On the other hand, only 14 percent of all citations were five years old or younger (published in 2002-2006). This is, however, very logical. Doctoral studies usually take many years, and a comprehensive literature search has often been conducted at the beginning of the process (see e.g. Buttlar, 1999.)

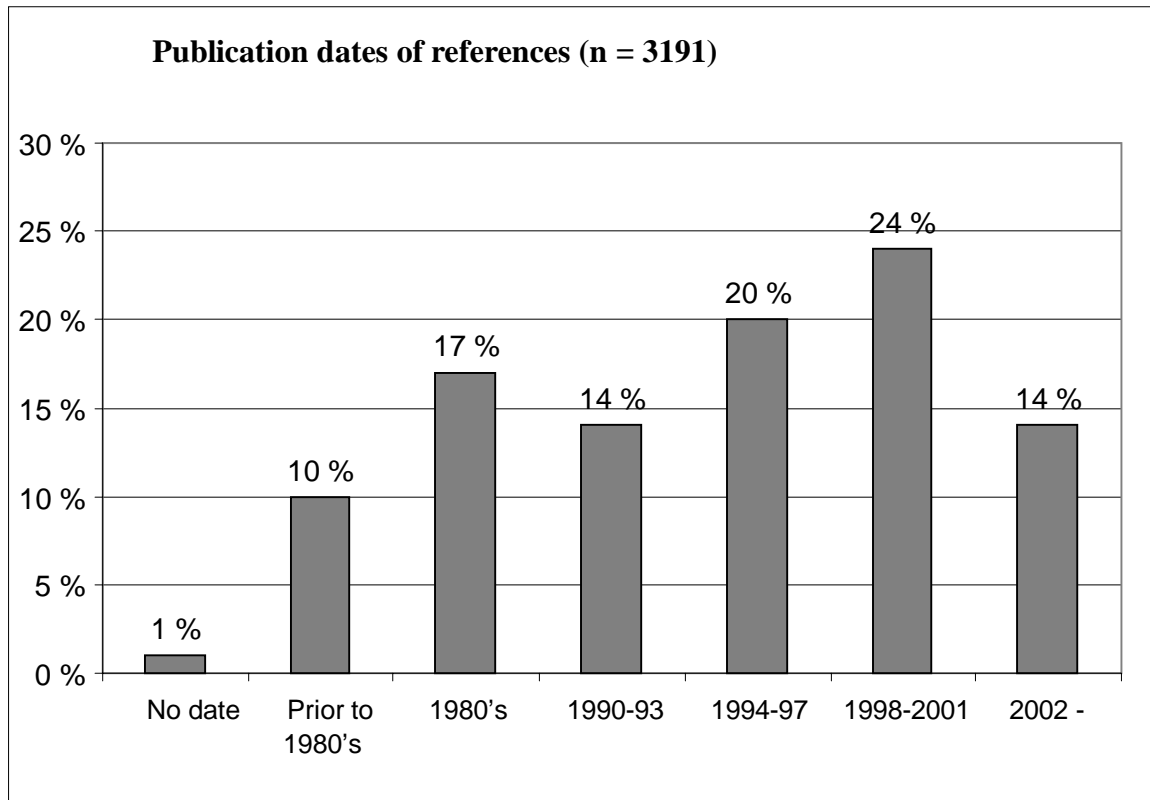


Figure 4. Publication dates of references cited in dissertations in two Finnish universities

Availability of References Sorted by Publication Date

The goal of examining the publication dates of references was to find out how the date affects the availability of the source. The availability of sources in two university libraries rarely varied based on the publication date; sources that were published at different times were fairly well available. (See Figure 5) Sources published after 1994 were available electronically more often than older sources. However, older articles were also fairly well available electronically. As one can expect, the number of sources in the open network increased the newer the material was. Source material, that was not available in the library collections, occurred evenly in all date categories.

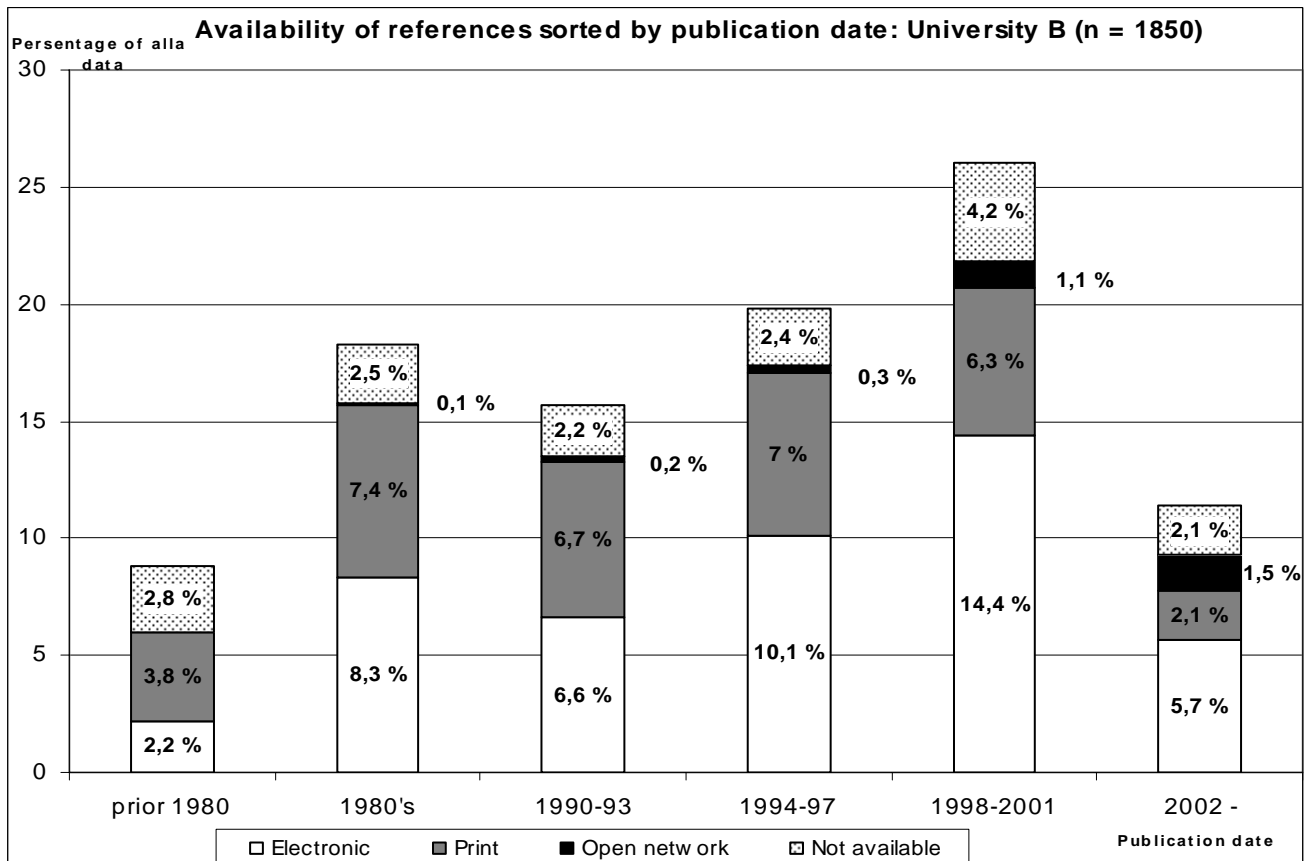
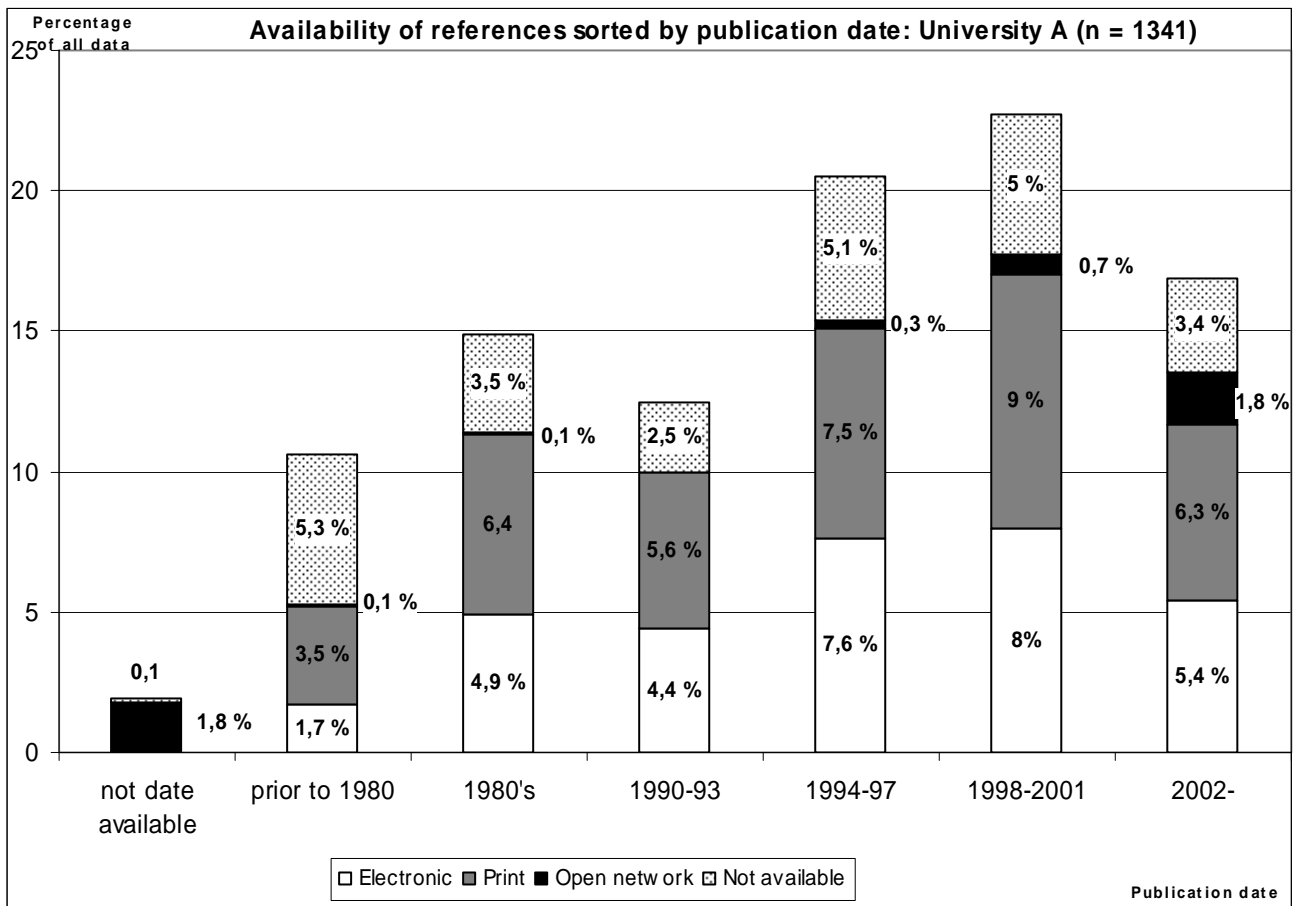


Figure 5. Availability of references sorted by publication date in two Finnish universities

The availability of sources sorted by the publication date varied slightly between the universities (see Figure 5). In University A, the dissertations had more sources published in 2002 or later in comparison to University B. In University A, quite many of the newest sources were offered in print in the library. In University B, on the other hand, sources published in the 1980's were available electronically more often than in print. We must note that in University B the share of electronic sources in all date categories was remarkable. The amount of electronic sources in the newest material was more than double compared to print sources.

It would be easy to assume that older sources are mainly in print and newer sources more often in electronic format. In our study, however, the availability of sources in both print and electronic format in both universities was good regardless of the age. From the libraries' point of view it is also important that the older sources are available electronically because while it guarantees the users easy access to the materials, it also provides the libraries with a chance to save some valuable space. Both University A and University B have gone through some facility changes recently, and the space that before was needed for printed journal collections has now been appointed for other uses.

Publication Format of References Sorted by Publication Date

Categorizing all the references by the publication date also provides information about the publication format of sources of different ages. The percentage of monograph sources is the greatest in the source material published before 1980: approximately one half of all the sources were monographs. In sources younger than this the relative number of monograph sources has stayed smaller being around 30 percent of all the references. (See Table 2)

Table 2. Publication format of the references of dissertations in two Finnish universities, sorted by the publication date.

	Date missing n=25	Prior to 1980 n=305	1980's n=539	1990- 1993 n=456	1994- 1997 n=642	1998- 2001 n=788	2002 - > n=436	All data n=3191
Monograph	0	51	31	29	31	30	26	31
Article	4	43	59	53	57	54	50	54
Book Chapter	4	6	8	14	9	9	12	10
Edited Book	0	1	1	2	1	2	1	1
Conference paper	0	0	0	1	1	2	5	1
Other	92	0	1	1	2	3	6	3
Total	100	100	100	100	100	100	100	100

The relative number of articles was high for all publication dates. Of all the sources published before the 1980's, 43 percent were articles. After this the percentage of articles increased to over 50 percent. An article in a scientific journal seems to be the most typical channel for an author of a dissertation to attain the results of previous studies in economics and administration.

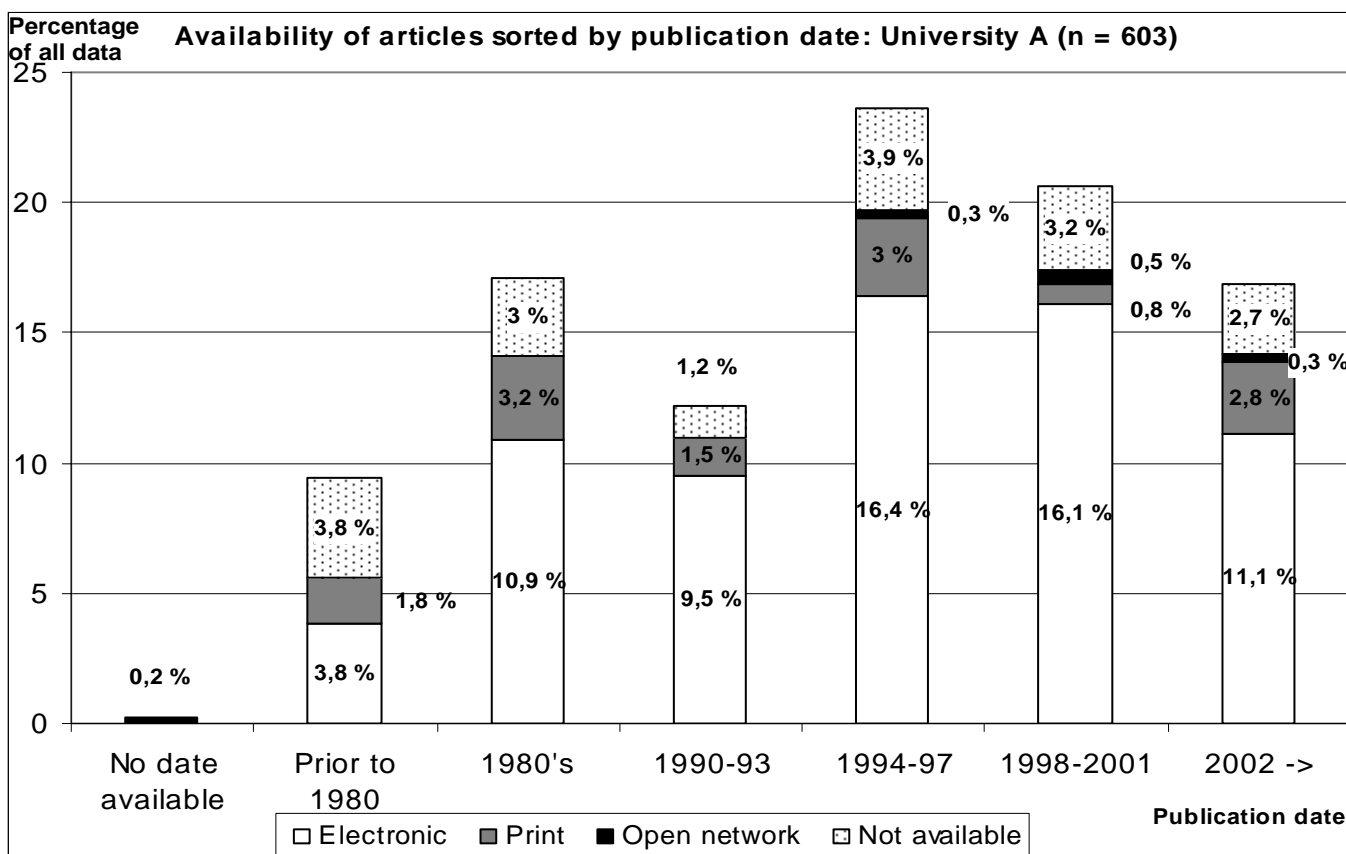
In the newest material, sources published in 2002 and later, the percentage of monographs and articles was slightly smaller than in all the material on average or than in sources published in the 1990's. Among the newest sources there were more conference papers, book chapters, and other sources than on average. This result is a reason to assume that also in economics and administration, the newest scientific data and new ideas spread in many forms, often as conference papers and in the web. Not including the newest material, the use of con-

ference papers as the sources of dissertations in economics and administration was minor in our data.

In Table 2 we can notice the high percentage (92%) of “other” publication types among the sources with unknown publication dates. This category consists mainly of websites where the publication date had not been mentioned in the works cited. Such sources were systematically listed in the category for “other materials” because we could not review the content due to missing or expired links in the works cited. The publication dates could not be coded for these sources.

Availability of Articles Sorted by Publication Date

Journal articles, which was the most common type of references, were published during many decades, although most of them after 1994. As mentioned earlier, the availability of the article references was good. Their availability was outstanding even regardless of the publication date. (See Figure 6) Interestingly, the number of electronic sources did not increase in a linear manner along with the newer publication dates, but also older articles were rather extensively available electronically in both universities.



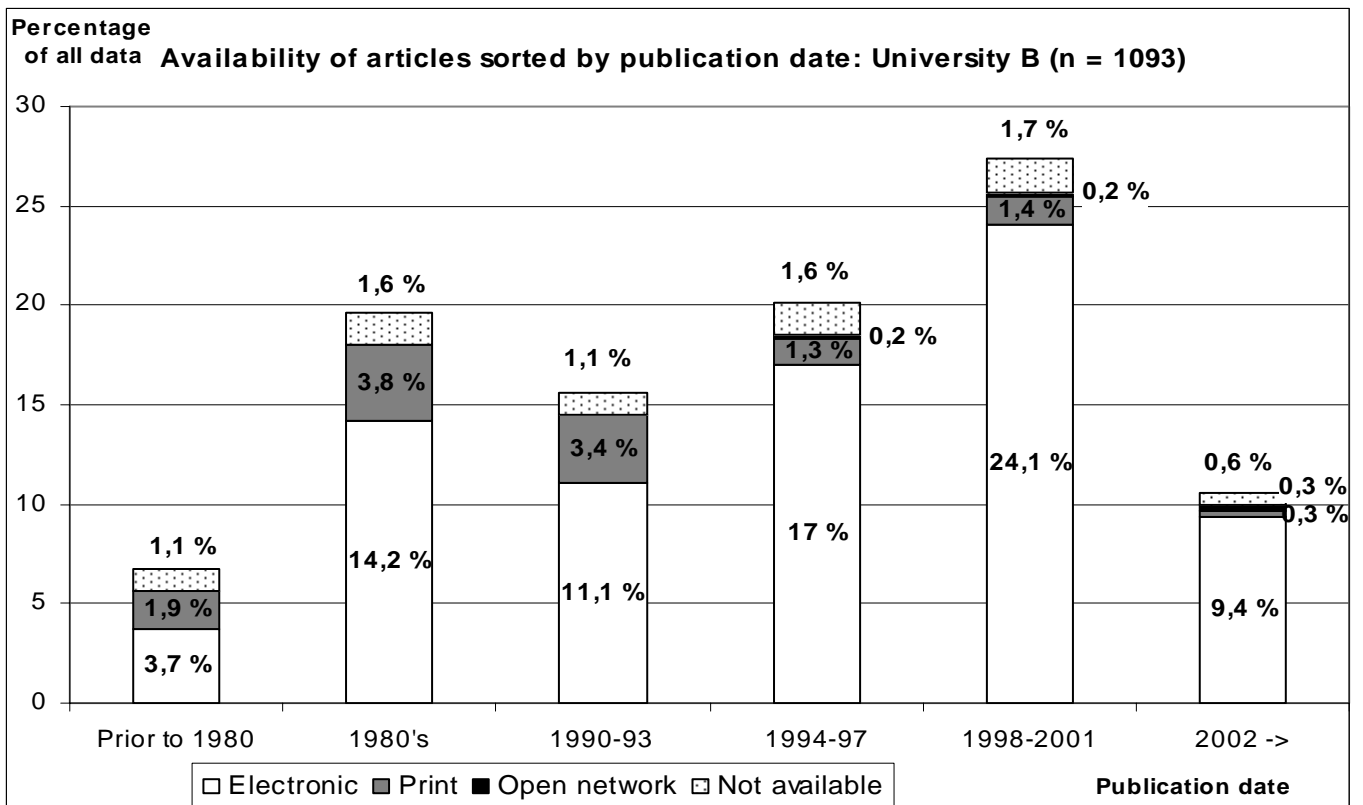


Figure 6. Availability of the article references of dissertations in two Finnish universities

Only a small number of articles listed in the references were available only in print in the university libraries. In University B this category consisted mainly of older articles, but in University A it also included some newer publications.

The number of articles that were available in the open network and cited in the dissertations remained low. Among references there were only a few articles published after 1994 in the open network.

The very good availability of electronic articles implies that the libraries prefer to collect electronic journals enabling their customers to access the older volumes of journals electronically. The acquisition of e-journals is not always possible, for example for financial reasons. In addition, some journals have a restriction on the most recent issues and the journals may, for instance, be available in a year. In these cases, the newest issues are available only in print.

Availability of Books Sorted by Publication Date

Although journal articles were the most common type of references in dissertations, monographs, book chapters, and edited books, all of them referred to here as books, constituted remarkable source material for doctoral students. The books used as references in dissertations were available mainly in print in both universities. Both newer and older books were rather well available in both universities through the university library. (See Figure 7) In University A, the comparative availability of new books (monographs) was slightly better than in University B. As mentioned earlier (see Table 2), in University A the share of books among the references was greater than in University B. It is possible that doctoral students in University A are more book-oriented than their colleagues in University B, and therefore rely more on monographs that are locally available.

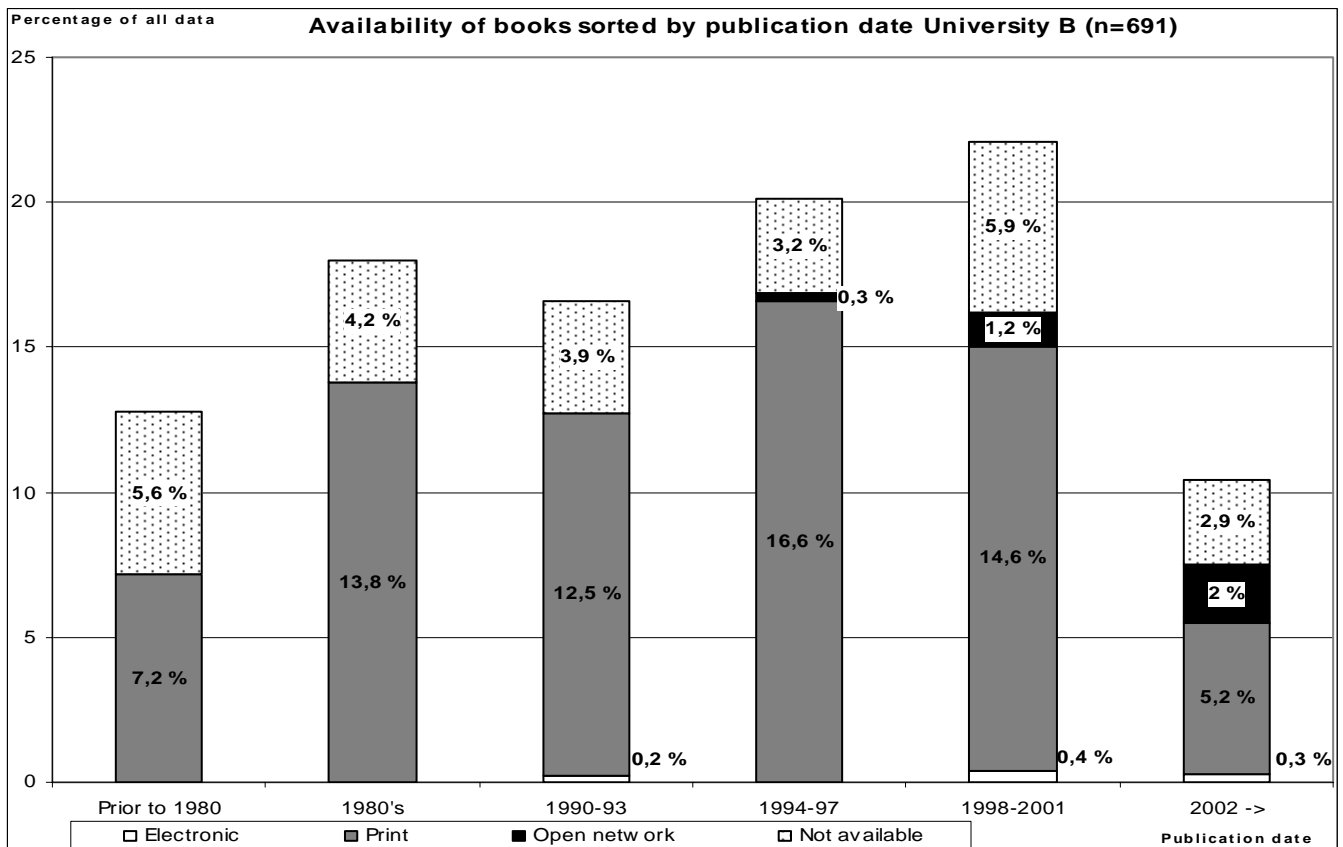
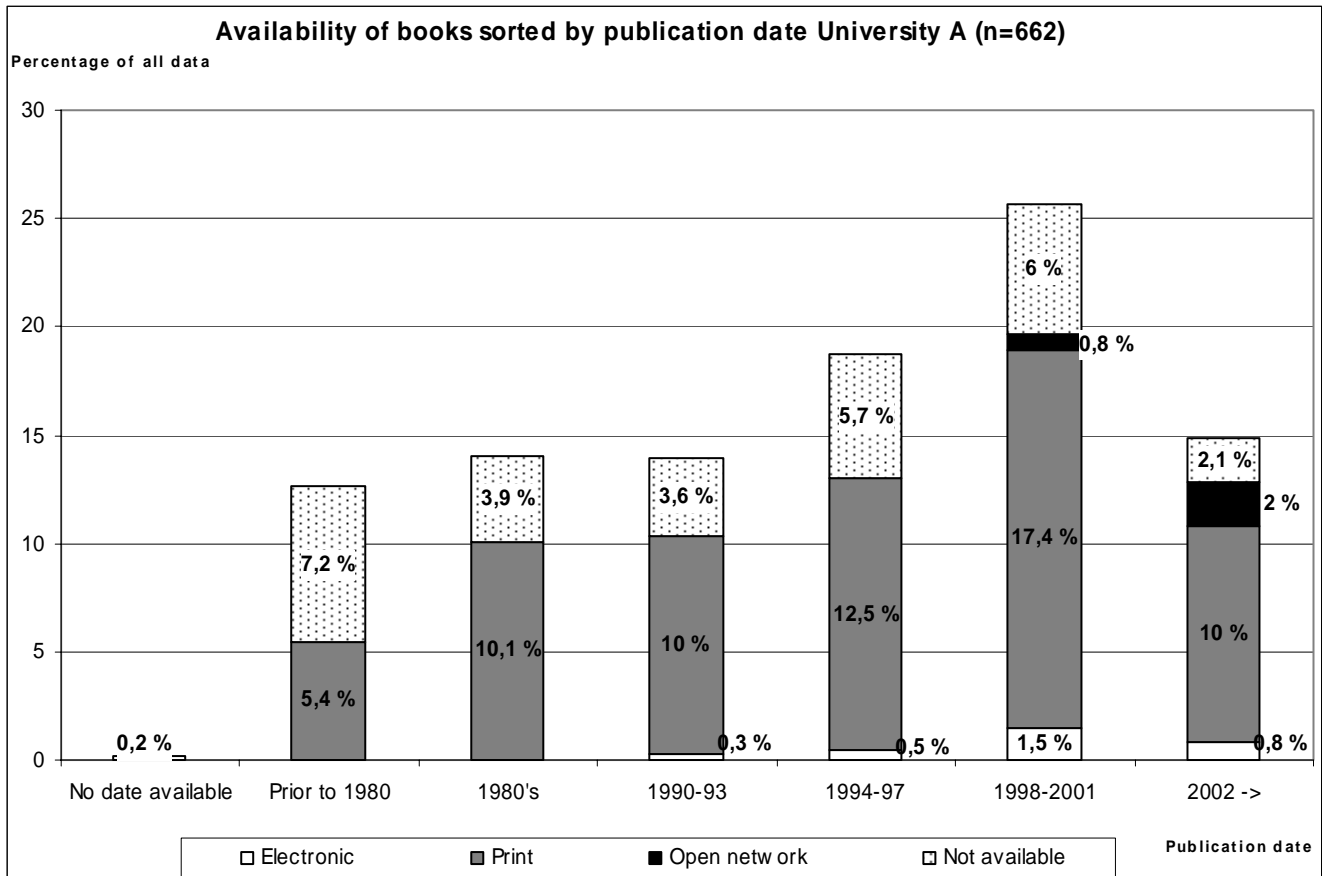


Figure 7. Availability of the book references of dissertations in two Finnish universities

The growing popularity of the Internet as a publication channel was apparent in the most recent book sources: the references also included dissertations that were published in the open network in PDF format more and more often since the beginning of new millennium. The availability of books was better in the open network than in licensed electronic collections.

Conclusions

University libraries are a major part of the university's teaching and research infrastructure. In this study, we wanted to show a concrete example of how this works in practice, and to find out the occurrence of library collections in the references of dissertations. We scrutinized economics and administration dissertations from two universities. Library collections are built on results from previous research. They provide new researchers with good foundation for creating new knowledge. Therefore by looking at works cited in dissertations we can acquire a fair picture of the sources – what kind and how old they are – that new research in these fields is based on.

The availability of references in the dissertations that we examined was fine in the collections of both libraries: 75 percent in University A and as many as 84 percent in University B. Also in previous studies the availability of the sources of dissertations in their own university's library collection has been found to be extensive. (Edwards, 1999; Smith, 2003; Beile et al., 2004; Haycock, 2004; Fuchs et al., 2006). The availability of article references was good in both libraries: 82 percent in University A and 92 percent in University B. These findings are very similar in comparison with the findings of previous research carried out in the USA (see e.g. Smith, 2003; Beile et al., 2004). The availability of book references in the universities' own libraries was slightly less than in Smith's (2003) study in the University of Georgia Libraries, but satisfying. Although Finnish doctoral students sought readings also outside, more than two thirds of monographs were available locally. The phenomenon that doctoral students rely on the collections of their own university's library seems to be rather universal.

Of course it is possible that doctoral students are satisfied with the collection of their own university library, and do not see it necessary to search for information outside, although they should do this. It would be easy to argue that doctoral students follow the law of least effort and do not seek information resources which are not available locally. However, electronic publishing has changed our information environment dramatically, also in universities. University libraries invest substantially in electronic resources and offer an access to much more extensive collections than before. When universities invest their libraries, they get returns when the collections of libraries have been used, and the researchers', also doctoral students' productivity will increase. We agree with Edwards (1999) and Smith (2003) that doctoral students' research interests often reflect those of their faculty advisors. Therefore we can assume that the good availability of the sources of dissertations is not an accident but prove at least at some level about adequate collections in the main research areas. From our point of view it is important to emphasize that the university libraries and their collections have a significant role in contributing to the doctoral studies and completion of academic dissertations because they offer the access to adequate information resources.

A significant finding in our study was that a large part of the references in dissertations, especially journal articles, were already available electronically. In University A, 68 percent of article references were available electronically, in University B as many as 79 percent. The availability of both all references and journal articles in electronic form was better than in previous studies

conducted some years earlier in the United States (Smith 2003, Fuchs et al. 2006). The major role of electronically available sources in our list of works cited shows not only that researchers already know how to use e-sources but also that the university libraries that were included in our data have managed to acquire such electronic sources that benefit the research in these universities. We can assume that a similar transition from printed resources to electronic resources will happen in many fields and many countries in the near future.

Articles were the most frequently used sources of dissertations in our data. 54 percent of all references were the articles of scientific journals and 10 percent were the articles of edited books. A majority of the sources were fairly recent, published in the 1990's and 2000's. Only less than one third of the sources was older than this. According to our study, the dissertations of economics and administration seem to emphasize recent source material. This information is significant when libraries develop their collections. In addition to the acquisition of new literature, the development of the collection includes the elimination of outdated literature and transferring it, for instance, to Repository Library where the material is still available for various purposes, for example for historical research.

In this study, we compared the references of dissertations in two different universities. This comparison was interesting because one of the universities was a large, multidisciplinary university, and the other one was a small university with specialized focus. Although the availability of works cited in dissertations was good in both universities, it was obvious that the dissertations completed in the specialized university included more sources that were available in the university's own library. Interestingly, also the dissertations completed in the specialized university generally referred to a greater number of sources than those done in the large university. Doctoral students in the smaller, more specialized university could rely on their own library's collections more than those in a large multidisciplinary university.

The starting point for our study was to demonstrate the impact of libraries by presenting the visibility of their collections in dissertations. In the academic world it can be difficult to show the impact of libraries, because libraries do not produce degrees and they are not research institutions. The impact of libraries can often be described as a synergy, in other words the libraries affect the learning and research results of the different faculties and departments. Libraries help the production of degrees and also scientific graduate degrees through their collections and services. In a similar manner, the libraries contribute to the creation of new scientific knowledge and research publications through their collections and services. This becomes very obvious when we consider works cited in recent research publications, for example in dissertations and their availability in the university library's collection. Citation analysis is a particularly good tool in promoting the library's impact.

Citation analysis involves quite a lot of work. In our study we quickly realized that the saturation level of the data had been reached. At first, four dissertations from each university were taken under examination, and later a fifth dissertation was added. Adding more dissertations to the sample did not really make a difference in the results. Therefore even quite small samples, even by examining just a few dissertations' references, can lead to an idea of, for example, how important the library collections are for doctoral students in different fields, and whether they support the completion of the dissertations.

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