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**International Library and Information Science
Research:
A Comparison of National Trends**

by

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Introduction

This Professional Report of the IFLA Section of Library Theory and Research compares national trends in library and information science (LIS) research, especially topics for research and the research methods used. Järvelin and Vakkari (1990 and 1993) started the study of national trends in international LIS research. They compared the distribution of topics, approaches and methods in the years 1965, 1975 and 1985, using as their source material articles published in the core journals of LIS. This study led to a research project that compared LIS research in the Scandinavian countries of Denmark, Finland, Norway and Sweden (Aarek et al. 1993; Vakkari et al. 1993; Vakkari 1996).

The Section of Library Theory and Research of the International Federation of Library Associations and Institutions (IFLA), with Maxine Rochester as Chair 1993-1995, initiated a series of national studies based on the research by Järvelin and Vakkari, a series that continued with Beverly Lynch as Chair during the period 1995-1997. These national studies were inspired by Cano and Rey's (1993) presentation on trends in Spanish LIS research - using the classification schemes developed by Järvelin and Vakkari - at the Section's Open Forum Meeting in Barcelona 1993. Although Cano and Rey raised justified criticism of these classification schemes, the Section of Library Theory and Research, by the study of Cano and Rey, considered them as validated tools for comparing research in LIS in various countries. The Section of Library Theory and Research provided an ideal forum for this international research applying the same classification schemes and definition of research to analyses by content analysis of national LIS journal research literature in both developed and developing countries. At the Open Forum Meetings of the Section there have been reports on LIS research from Turkey at IFLA Istanbul (Yontar 1995), China at IFLA Beijing (Cheng 1996) and from the United Kingdom (UK) at IFLA Copenhagen (Layzell Ward 1997). Small project funding from IFLA assisted a study for Australia by Rochester (1995), one for the UK by Layzell Ward (1997) further expanded (1998), and another for Turkey by Yontar and Yalvac (2000). We will use these in our comparisons.

These national studies under IFLA auspices, plus the Scandinavian studies with NORDINFO support, provided data for an international comparative study and small IFLA project grants to two members of the Section, M. Rochester (principal investigator) and P. Vakkari, for 1997 and 1998 and allowed a comparison of international and national trends in LIS research, together with an investigation of reasons for similarities and differences in the results. There was a preliminary report on the findings presented at the IFLA Conference Copenhagen Open Forum for the Section of Library Theory and Research in 1997 (Rochester and Vakkari 1998).

The first aim of this present publication is to present a summary of findings from the studies mentioned above. We will compare most popular topics, subtopics and methods in the national LIS studies and the findings for Finland from the joint Scandinavian studies, and relate them to the international trends reflected in the study by Järvelin and Vakkari (1990). The countries thus include Finland, Spain, Turkey, Australia, China and the UK. Some of the original papers presenting these findings have been included in this publication as appendices 3 to 6. We also explore why the national characteristics of LIS

differ from each other and from the international trends in LIS research. The comparison reveals the peaks and valleys of the national LIS landscapes, and their relation to the international landscape. This analysis gives us a descriptive account of the situation.

If one is interested in the differences in national features of research, one has to seek the explanation from the social and cultural differences of those countries: this is our second aim. These factors have an impact on the formation of the national innovation system in a country. An innovation system includes systems for higher education and research. The characteristics of the innovation system for its part determines the formation of LIS research. Both economic and cultural features of a country affect LIS research through its innovation system. This had already been explored for the Scandinavian countries of Denmark, Finland, Norway and Sweden (Vakkari 1996), an exploration that has been expanded here to include Australia, China, Spain, Turkey and the United Kingdom.

Construction of library and information science and its subfields: How to squeeze reality in a mould

In order to be able to study the trends of LIS research one has to differentiate research from non-research, for example, from professional writings, and to demarcate research in LIS from other research. After that, it is possible to develop a content analysis scheme for the subfields of LIS and other features of research.

Järvelin and Vakkari (1990) excluded professional publications from their analysis. If the knowledge base consisted of other than research results and meta-theoretical statements, we would be dealing with pseudo-science. Their definition of research, which was adopted from Peritz (1981), was expressed in quite general terms: "Research is an inquiry, where the goal is to elicit, through a systematic method, some new facts, concepts or ideas." Today we would use some additional criteria: a sound frame of reference, exact problem formulation, and connection to earlier research. However, Järvelin and Vakkari still believe that the definition they used was strict enough for helping to differentiate research in a quite unequivocal sense.

When constructing a classification scheme of LIS one has to have some kind of understanding about the scope of LIS and its major subfields. How should the discipline be demarcated from other fields? Which themes and problems belong to the domain of LIS, and which do not? What are its central subfields? In the same way we are able to name a familiar object like an orange, and divide it into segments, there is no pre-existing entity that can be called LIS. Thus, the solutions and definition of the domain are always, to some extent, normative. It is a construction guided by some meta-theoretical presuppositions and directives.

In their 1990 article Järvelin and Vakkari defined LIS ostensibly by referring to the core journals of LIS. What is published in these journals indicates the domain of LIS. In connection with the Scandinavian study (Vakkari & al.1993; Vakkari 1996) a definition was developed:

We conceive of LIS as a discipline that views information processes from an information seeking perspective. This does not mean that the research exclusively focuses on information seeking, but this perspective essentially structures the discipline. The objective of the investigation is the information seeking of individuals and groups, the factors that generate this activity, as well as various arrangements and conditions that support the information seeking and provide access to information (for example, LIS units).

A ground plan for the topics of LIS was outlined from this perspective. However, the definition did not contain clearcut and detailed building blocks for constructing the branches of LIS. The original classification scheme was designed partly on the basis of the contents of the articles forming the data, and partly on the basis of relevant earlier classifications and the theoretical knowledge of the authors. Although the final version was a result of the interaction of the data and the theoretical understanding of the discipline, the most crucial was the latter one. One would claim that it is impossible to create a theoretical construct solely on the basis of the data. Single units of the data as such would not tell one what kind of classes one should form. In order to be able to infer classes from the data, to conceptualise it, one has to have some theoretical ideas in mind. All our observations are theory laden. It depends on our way of seeing, on our reference frame, whether the bottle is half empty or half full.

The classification scheme for topics of LIS by Järvelin and Vakkari (1993) was a construction of LIS and its subfields (Appendix 1). It reflects the understanding of the field as it was in the middle of the 1980s. One can consider how well this drawing of the map resembles the landscape of LIS after a lapse of time. At the time of its creation the topic scheme of LIS was the most comprehensive and systematic attempt to divide our field of research into subfields. That it has been used for further studies is an indication of that. It left, however, room for improvements. It was criticized - justifiably - by some colleagues. Cano & Rey (1993) suggested that it should include more elements of library and information systems input and also take into account the social dimension in more detail. Despite criticism, no one has presented a more valid version of it. An old truth is that it is always more difficult to be a system builder than its critic.

To test how robust the Jarvelin and Vakkari classification scheme would be when applied to recent material, Elisabeth Davenport applied the scheme to a set of 1995 international literature (Davenport 1996). She used the same definition of research, but a sample of the literature different from the thirty-seven core journals used by Jarvelin and Vakkari in 1985. Davenport selected only research journals. From the top ten journals using JCR (Journal Citation Reports) impact factors averaged over the ten year period 1985-1995, she selected eight that had been on Jarvelin and Vakkari's international list, and for these eight Davenport analysed the first six months of 1995 issues. They yielded ninety-eight research articles.

Despite the different sampling methods used, it is interesting to compare these two samples. The most popular topic for research in the Davenport sample, at 30%, was information retrieval. This had been most popular, at 29%, in 1985. When research

method was analysed there were 18% of articles employing the survey method, 16% employing system and software analysis and design, and 14% employing mathematical or logical method. In 1985, 23% of the authors had used the survey method, while 14.5% had used system and software analysis and design. There was a difference for verbal argumentation and critique, part of conceptual research strategy, with 22.5% of authors using it in 1985, and only 3% in the Davenport sample. Likewise there was a difference for mathematical or logical method, only 3% using in 1985, but 14% in the Davenport sample.

Davenport concluded that the Jarvelin and Vakkari classification scheme could still be used for recent material. If the classification is still valid, then the articles selected in 1995 must have been quite similar to those analysed by Jarvelin and Vakkari for 1985.

Classification scheme for research methods

The classification of research methods (Appendix 2) by Järvelin and Vakkari is also open to criticism. Some classes are not always easy to differentiate from one other. The problem is the lack of the necessary detailed operational definitions of classes that would help sort the problematic cases into the right position in the scheme. The same problem holds in the scheme for the topics for some cases. Cultural differences especially might affect the understanding of the content of similar expressions. Although a common noun is used, persons from different backgrounds might refer to a different set of entities, for example, interpretations of some classes both in the topic and method schemes are different in the Chinese study of LIS research (Cheng 1996). Although the scheme provided a sound base for the analysis of national LIS research output, it is evident that it reflects the cognitive tradition of LIS in the western industrialised world. It might be more difficult to apply it to the research output of other countries.

Data from the participating countries

A summary of the data from the studies used for analysis in this project is presented below in Table 1.

Table 1. A Summary of the Data from the Analysed Studies

Study	Area	Time period	Sources	# of Documents
Järvelin & Vakkari 1993	International	1965 - 85	39 core journals	142; 359; 449
Vakkari et al. 1993	Nordic countries	1965 - 89	All monographs & articles	D=429; F=403; N=228; S=668
Cano 1999	Spain	1977 - 94	2 journals	354
Rochester 1995	Australia	1985 - 94	2 journals	126
Cheng 1996	China	1979 - 94	23 journals	1930; 2447; 2665
Layzell Ward 1998	UK	1965 - 95	9 journals	44; 79; 95; 153
Yontar & Yalvac 2000	Turkey	1952- 94	1 journal	127

The time periods of the studies vary to some extent. International trends are from the years 1965, 1975 and 1985. Data from Scandinavia is presented as cumulations of three periods, 1965-74, 1975-84, and 1985-89. Turkish data is a cumulation of ten years intervals 1952-1964, 1965-74, 1975-1984, and 1985-94. The data from the UK is from the years 1965, 1975, 1985 and 1995. Spain includes a cumulation for the period 1977-1994. The rest of the studies include data for a shorter time period. The Australian study uses a ten year cumulation for the period 1985-1994. The Chinese results are based on data from the years 1985, 1990 and 1994. The time periodization of the national data sets is mostly comparable. Also the international data representing the trends with intervals of ten years is comparable with some of the national data.

How well the data represents the research output of LIS in the studied countries depends upon the selection of the sources whence it has been acquired. The Scandinavian data included all the research publications, both articles and monographs. The data from the other countries consisted of articles from the core research journals of the field. However, not all the studied countries have pure research journals. Thus some of the journals were professional ones that also included research articles. It is difficult to assess how well the selected journals represent the total research output of each country. It is plausible, however, to suppose that the core journals are publishing the most important research results and thus reflect the main trends of research in the countries involved. Still, one can doubt that the publication patterns in the subdomains of LIS differ so that, for example, humanistically oriented scholars publish their results in the form of monographs rather

than as journal articles. One can claim, however, that humanists also publish articles in general and particularly when preparing a monograph. Thus, in this respect, the data is also representative.

Topics for research

When we consider the findings of the three most popular topics for research from an analysis of the international and the national studies of LIS research, as given in Table 2, we find some broad similarities. The classification of topics devised by Jarvelin and Vakkari is given in Appendix 1. The cautions already expressed about the application of the classification schemes should be kept in mind.

In the international journal literature information storage and retrieval was the most popular topic, and library and information services the second most popular for the years 1965, 1975 and 1985. The analysis of the UK literature revealed that library and information services were the most popular topic in each of the years 1965, 1975, 1985 and 1995. Information storage and retrieval was the third most popular UK topic in 1965, and second most popular in the years 1975, 1985 and 1995. Also, information seeking, the third most popular topic internationally at 8% in 1965, was the second most popular, at 25%, for the UK. Information seeking was still popular in the UK in 1985 at 22% and in 1995 at 16%. Thus the UK and the international journal literature showed similarities for topics to be investigated over an extended period of time.

For Turkey, library and information services were investigated by 43% of the researchers in the early period, the same percentage in the period 1965 to 1974, and 60% in the period 1976 to 1984, and still 59% in the period 1985 to 1994. As for the international articles and the UK, information storage and retrieval was popular for Turkish researchers: 14% in the period to 1964, 50% in the next ten year period, 9% and 11% in the next two ten year periods to 1994. Library history accounted for 43% of the research topic articles in the early period, but did not feature again as a popular topic.

For Finland, we also find library and information services a popular choice: 36% researched it in 1975, 21% in 1985 and 19% for the period 1985-1989. Information storage and retrieval was also popular: 20% in the period to 1985, and 28%, the most popular, in 1985-1989. Information seeking also featured for Finnish researchers: 32% in 1975, 25% in 1985 and 11% in the final period.

Table 2 Three Most Popular Topics

Study	Time Period			
	1965	1975	1985	1995
International	IS&R 32 L&I Services 25 Info Seeking 8	IS&R 26 L&I Services 25 Other LIS Topics 15	IS&R 29 L&I Services 27 Other LIS Topics 10	
Australia				L&I Services 40 ^a Info Seeking 20 History 14
China			Principles LIS 26 L&I Services 25 Related Disciplines 19	Principles LIS 28 L&I Services 20 Info Industry 15
Finland		Services 36 Info Seeking 32	Info Seeking 25 L&I Services 21 IS&R 20	IS&R 28 ^b Services 19 Info Seeking 11
Spain				IS&R 19 ^c Services 19 Sci. Comm. 19
Turkey	Library History 13 ^d L&I Services 43 IS&R 14	IS&R 50 L&I Services 43	L&I Services 60 IS&R 9 History 9	L&I Services 59 IS&R 11 Info Seeking 10
UK	L&I Services 27 Info Seeking 25 IS&R 23	L&I Services 49 IS&R 25 Sci. Comm. 10	L&I Services 34 IS&R 22 Info Seeking 22	L&I Services 41 IS&R 22 Info Seeking 16

- a Period 1985-94
- b Period 1985-89
- c Period 10 years
- d Period 1952-64

In the Chinese literature, library and information services were the second most popular topic in the two periods: 25% in 1985 and 20% in 1995. Other popular topics were unique to China: principles of library and information science at 26% in 1985 and 28% in 1995; and related disciplines at 19% in 1985, and the information industry, at 15%, in 1995. For the Spanish library literature, a continuous period 1977 to 1994 was analysed. Library and information services was the most popular in Spain at 19%; information storage and retrieval also attracted 19% of researchers. Scientific communication, also at 19%, was unique for Spain. Library and information services was the most popular topic in Australia for the period 1985-1994 at 40%, and information seeking next, at 20%, and library history, at 14%, for Australia was third most popular, as it had been for Turkey in the early period.

It seems that strong interest in LIS services has been typical of the research in Australia, Turkey and the UK. The literature in these countries contains relatively more publications on this topic than the international journals. Information seeking has been a more popular topic in Australia, Finland and the UK than in the international literature. The internationally most popular topic, information storage and retrieval, has been a well researched area only in Finland and the UK. LIS research in these two countries seems to reflect international trends more closely than research in the other participating countries.

We should also consider the most popular subtopics investigated (Table 3). The data are more sparse here and there seem to have been difficulties in applying the classification scheme. The popular subtopics for the topic information storage and retrieval were classification and indexing, information retrieval and cataloguing. The most popular subtopic in the international literature was classification and indexing: 22% in 1965, and 14% in 1975. It was most popular also in Turkey in the period to 1975. In China it attracted 8% in 1985 and in 1995. Cataloguing attracted 14% in Turkey to the period 1975. Information retrieval was the subtopic for 8% of international articles in 1975, and 13% in 1985. For Finland information retrieval attracted 9% of research authors.

For the popular topic, library and information service activities, we find the subtopics collections, administration and automation popular in the international articles. Administration and collections were also popular in Australia. Circulation, collections, administration, automation and several interconnected activities were also examined by researchers in Turkey.

The topic, information seeking, had some popular subtopics: use of library and information services attracted 10% in Australia; information seeking behaviour attracted 7% in Finland; and use/users of information attracted 6% in Turkey in the period to 1984, and 8% in the last period.

As shown in the examination of topics below, among the subtopics there was a reflection of international trends in some countries. Among the subtopics of the topic information storage and retrieval we find classification and indexing popular for research in the international literature, and also in Turkey and China. The subtopic, information retrieval, was popular internationally and in Finland. A similar scatter was found for the subtopics of library and information service activities, with popularity in international, Australian and Turkish research for some subtopics.

TABLE 3 Three Most Popular Subtopics

Study	Time Period			
	1965	1975	1985	1995
International	Class & Index 22 Automation 8 Collections 6	Class & Index 14 IR 8 Administration 6	IR 13 Collections 7 Administration 6	
Australia				Library Use 10 ^a Administration 9 Collection Study 7
China			Principles LIS 16 Class & Index 8 Bibliography 7	Principles LIS 15 Info Industry 9 Class & Index 8
Finland			History 10 ^b IR 9 Info Seeking Behaviour 7	
Turkey	History 10 ^c N=too small for other subtopics	Class & Index 29 Administration 29 Cataloguing 14	Administration 26 Several Activ 11 Collections Use/users 6 Catalog Circulation 6	Administration 31 Automation 10 Several Activ 8 Use/users of info 8

a Period 1985-94

b Period 1965-89

c Period 1952-64

Library oriented and non-library oriented topics of research

For the countries included in the analysis of research in this study, we will consider the degree of identification with the professional library community, that is, whether the LIS research addresses purely professional issues or addresses wider information problems. We will do this by examining the topics researched. We will assume that fields or topics investigated can be categorised as library oriented and non-library oriented research (Vakkari 1996: 31). Thus topics that are LIS service activity ones we can assume are professionally oriented. Research into information storage and retrieval is used in a wider range of organisations than only libraries, so can be assumed to be not purely library oriented research. For the category of research in information seeking, except for the subtopic research into the use of library and information services, we can assume not a purely library orientation. Research into scientific and professional communication can also be considered non-library oriented research.

We will apply these categories to the findings for each country. Vakkari has already done this for the studies from the Scandinavian countries of Denmark, Finland, Norway and Sweden for the period 1965-1989. He found that Denmark and Finland had 47% and 44% respectively focused on broader topics than purely library oriented research. For Sweden and Norway the research was less focussed on non-library oriented research - 33% and 26% respectively.

For Spain there was research in two areas addressing wider information problems: in information retrieval, and scientific and professional communication. This accounted for 38% of the topics of research articles (Cano 1999: Table 1). Research on information seeking was not addressed at all. User studies concerned use of library services (Private communication V. Cano 23 March 1998).

For the United Kingdom the topic, information storage and retrieval, accounted for 22% of research articles in 1995, and scientific and professional communication accounted for 6% (Layzell Ward 1998, Table 3). For the topic information seeking there were few articles addressing it broadly (Private communication P. Layzell Ward July 1998).

For Turkey, from the research publications for the most recent period, 1985-1994, it was found that 21% of the publications addressed non-library oriented research (Yontar and Yalvac 2000: Table 2b). The analysis of Australian research articles for the period 1985-1994 showed only 16% addressed non-library oriented topics (Rochester 1995: Table 4).

The topics for the Chinese research articles have not been included as a special classification scheme for LIS topics in China was used. However most research articles addressed professional issues in LIS.

When Jarvelin and Vakkari made the analysis for non-library oriented topics of research for the 833 articles published in 37 core international journals in LIS for the year 1985 they obtained a figure of 40% (Jarvelin and Vakkari 1990: Table 1).

In Sweden, Norway, Turkey and Australia, topics of research show identification with the profession as research into library oriented topics dominates research activities in the field (over two thirds).

Overall the percentages in descending order for research on broader information topics are as follows:

Percentages for research on broader information topics

Denmark	47
Finland	44
International	40
Spain	38
Sweden	33
Norway	26
Turkey	21
Australia	16

We need to remember the different sources and date coverage from which the data on research publications was obtained. The data for Denmark, Finland, Sweden and Norway was obtained from research publications and from relevant domestic and Nordic journals for the period 1965-1989. For Spain the data came from an analysis of research articles in two major periodicals in the field for the period 1977 to 1994. For Turkey data came from the main Turkish professional journal for the period 1985-1994, while the Australian data came from two Australian library journals for the same time period. As noted above, the international data came from articles in 37 journals for a period of one year, 1985. The percentages obtained are only suggestive and no firm conclusions can be drawn from the data. However, they do seem to show that in some countries there is a close identification with library oriented topics for research, while in other countries researchers are addressing broader information topics as well. Also we need to remember that researchers working in the broader information area may have been publishing in non-library journals both in their own country and abroad.

The Danish and Finnish research was more oriented towards wider information problems. This could be partly due to the stronger social institutionalisation of LIS research, especially in Finland. Identification with the academic norms loosens the ties with the professional community and its problem formulations. Sweden, Norway, Turkey and Australia show identification with the profession as research into library oriented topics dominates research activities in the field (over two-thirds).

Research methods

When we consider the three most popular research methods used we again find some methods are universally popular (Table 4). In the international literature the conceptual research method remained the most popular over time: 29% in 1965 and 1975, 23% in 1985. Also the survey method was often used: by 23% in 1965, 20% in 1975 and 23% in 1985. Historical method was used by 11% in 1965, and replaced in popularity by system design in 1975 and 1985, at 15%.

TABLE 4 Three Most Popular Research Methods

Study	Time Period			
	1965	1975	1985	1995
International	Conceptual 29 Survey 23 Historical 11	Conceptual 29 Survey 20 System Design 15	Conceptual 23 Survey 23 System Design 15	
Australia				Survey 44 ^a Historical 14 Discussion 10
China			Historical 25 Conceptual 16 Mathematical 13	Historical 18 Mathematical 12 Conceptual 11
Finland		Survey 57 Historical 11 Conceptual 7	Survey 32 Conceptual 22 Historical 13	Conceptual 21 ^b Historical 20 Survey 13
Turkey	Conceptual 29 ^c Historical 29 Survey 29	Literature Review 5 Conceptual 21 Survey 14	Literature Review 37 Survey 31 Historical 17	Literature Review 47 Conceptual 21 Survey 17
UK	Discussion Paper 73 Survey 16 Literature Review 7	Discussion Paper 34 Survey 19 Literature Review 10	Conceptual 22 Survey 20 Literature Review 13	Survey 29 Conceptual 22 Case or Action 7 Literature Review 7

- a Period 1985-94
- b Period 1985-89
- c Period 1952-64

Findings for articles over three periods are available also for the UK literature. Here there were changes: the discussion method was very popular with 73% of research article authors in 1965, fell to 34% in 1975, and no longer featured as a popular method in 1985 and 1995. The survey was the second most popular in the first two periods, and in 1985 and 1995 was most popular at 20% and 29% respectively. The literature review featured as third most popular in the four test years. The conceptual method featured as the second most popular method in 1985 and 1995. Case or action research appeared as equal third most popular in 1995. Survey and conceptual methods were the only ones also popular in the international literature. For Turkey in the early period the conceptual method was popular at 29%, as also was historical method: 29% in the early period and 17% in 1975-84. The survey method was also frequently used in each of the four time periods

examined. The literature review took over as the most popular method for the three periods after 1965: 57%, 37% and 47% respectively.

For Finland for the three time periods we find the same three methods used as in the international studies: survey, historical and conceptual, but in different orders of frequency of use. Historical was the method most used in China for both periods examined, 25% and 18% respectively. Also conceptual and historical method appeared in both time periods. For Australia the survey was used by 44%, with historical and discussion method used by 14% and 10% respectively. For Spain we do not have detailed data, but empirical research strategies were employed in 33% of articles, conceptual/mathematical in 7% and descriptive and discursive methods in 36%.

Thus overall we see the survey method was popular internationally and nationally, as was the historical method and the conceptual. We need to ponder these findings and think about the popularity and changes in popularity of various research methods over time. The popularity of the survey, conceptual and historical research methods may be due to these methods being relatively cheap to employ; LIS researchers working with little financial and other support can use such methods. They can be employed by researchers working alone. This may be due to some research articles being publications coming from higher degree theses. One should ask also why some research methods, such as experimental or qualitative, widely used in other discipline areas, are so little used in LIS. As LIS schools/departments become integrated into the university research culture with more professors and research positions a greater variety of research methods and more inter-disciplinary research should be used.

Analysis of differences in LIS research

Social and cognitive institutionalisation of research fields

Whitley's (1974) differentiation between social and cognitive institutionalisation of research fields gives us a tool for analysing differences in LIS research between countries. The social aspects concern in particular differences in the structuring of education and research and the degree of organisation within the scientific community. The cognitive aspects refer to how central concepts and theories within the discipline are defined, as well as to main research areas, basic problems, methods and relevant solutions. Whitley's basic idea is to examine the association between intellectual products and the way in which they are produced.

The basic difference between scientific structures is the degree of their institutionalisation. Institutionalisation refers to the patterning of actions and meanings. The degree of coherence and organisation of actions and perceptions, and the extent to which ideas are articulated and adhered to constitute the degree of institutionalisation. A field exhibits a high degree of institutionalisation when the researchers share a common attitude in terms of its aims, methods, and explanation ideals. The more consensus there is about the central ways of conceptualising the field, its basic problems and methods, relevant solutions and results, the more cognitively institutionalised it is.

Social institutionalisation refers to the creation and maintenance of formal structures, which demarcate members of a cognitive structure. These arrangements function as a basis for the social identity and as an organising principle for the activities. Social institutionalisation is made up of two dimensions. On the one hand it refers to the degree of internal organisation and boundary-definition, and on the other hand to the degree of integration in the social structures in terms of legitimisation and resource allocation. (Whitley 1974: 72) The first dimension includes the foundation of research associations and formal communication channels like scientific conferences and journals. The latter dimension refers to the degree of integration of the field into university departments and teaching curricula. University departments, chairs, teachers' and research posts, and doctoral programs are the hallmarks of a mature social structure of a speciality. One could suppose that a cognitive structure implied by a high degree of social institutionalisation of LIS differs from the cognitive structure produced by a lesser institutionalised social structure.

The compared studies do not include data about the social structures of LIS research because the source articles did not include this problem formulation. Thus, the differences in the research between the analysed countries can be explained only by giving civilized guesses. However it is possible to illustrate how the social dimension of research shapes its cognitive output by examining the context for research in the countries used for our study. We will complete our analysis of trends in LIS research by using material for Scandinavia, followed by Australia, China, Spain, Turkey and the United Kingdom.

Scandinavia

A comparative study of LIS research in the Scandinavian countries of Denmark, Finland, Norway and Sweden has used Whitley's frame as its point of departure (Vakkari 1996). In the following we examine the connection between social institutionalisation and cognitive development of LIS in Scandinavia during the period 1965-1989. The case is based on the article by Vakkari (1996). First we analyse the development of the social structures within LIS and the research conditions that have been created in these countries. Then we examine the cognitive development of the research in relation to the social structures.

Social structures

Library and information science was and is integrated in the Nordic institutions of higher learning in various ways. One extreme is the situation in Finland, where LIS has been a part of the university structure since 1971. Elsewhere LIS has been linked to various separate professional colleges, although there have been changes, starting in the late 1980s, especially in Sweden. In Finland, the discipline has established itself as a part of the traditional university structure. Separate disciplinary departments with professors and research positions of their own have been established. This has guaranteed a continuity of the research. The establishment of doctoral programs has also strengthened continuity. It offers opportunities to educate researchers who concentrate on LIS.

In the other Scandinavian countries LIS has been placed in separate professional schools. During 1965-89 the schools in Denmark, Norway, and Sweden did not have any professorships or any research positions. Neither did they have any doctoral programs.

During the period of investigation, social institutionalisation was found to be most developed in Finland. In spite of scarce resources, social institutionalisation in Finland meets all the conditions that Whitley's (1974: 72) definition of a high degree of social institutionalisation requires: a department, a professor, research positions, and programs of research training as well as a scientific association and a scientific journal that function as the basis for communication.

Up until 1989 no funds had been allocated for a professor level position in LIS in Sweden, but a few occasional research positions in connection with other disciplinary departments had been financed. There were no doctoral programs, and the researchers had to get their research training in other disciplinary programs. However, research opportunities increased with financing that was targeted exclusively to LIS. In Sweden, a scientific journal in the field is being published. In Denmark, the social organisation of the research is limited to funding that The Royal School of Librarianship has allocated for research, the publishing of a journal and the library history year-book. Research positions or research training did not exist. Norway lacked most of the social structures of LIS. At the library school in Oslo there is a body called BRODD (School's consultancy and applied research unit). It can be viewed as a social structure that integrates the professional goals of the research and the profession.

Because of the low degree of social institutionalisation in Denmark, Norway, and Sweden, the researchers in these countries had limited structural opportunities to associate with the social organisation of LIS. The preconditions, everything from research training to communication channels, were inadequate. This is why the profession offers for researchers a noteworthy alternative for the creation of an identity. The low interest in the field's research themes on the part of other disciplines contributes to marginalising those with research training and strengthens their connection with the profession. Other disciplines don't succeed in offering attractive enough social structures. In Sweden, however, there were a few academic departments that have been able to attract library researchers. They offered a research environment with opportunities for communication and identification.

When the degree of social institutionalisation is low, a strong professional organisation with significant financial resources can regulate the cognitive direction of the research by favouring certain subject areas and problems. A good example is Folkebibliotekens Rådighetssumma (The Public Libraries' Financial Research Aid) in Denmark, which led to Danish library research being directed toward public library problems. Another example is the problems concerning automated library systems, which in Norway and Sweden in the 1970s and 1980s led to a concentration on library research in these areas.

The degree of social institutionalisation affects the way the discipline and the cognitive features of research are seen. In Denmark, Norway and Sweden the social structure of LIS was undeveloped. When the structural opportunities for research are almost completely

lacking, the profession offers the only obvious road for creating them. The researchers usually had a professional background, thus, it was only natural to identify themselves with the ideals of the profession. The implication of this identification was the sharing of the ideals concerning the nature of the discipline and research. The discipline was linked to the problems of library and information service organisations. The internal distinctions within the profession were generalised to apply to the discipline as a whole. The functional differences were projected onto science as well. This has not been an uncommon feature in discussion about the nature of LIS outside Scandinavia (Biggs 1991; Cronin 1995; Ford 1990). The strong links with the professional structure also caused a stronger emphasis on applied research. The weak social institutionalisation of LIS implied in research output a more system-oriented understanding of LIS, concentration on library-related problems, and seeking for solutions that have immediate applicational value. These features were reflected by the choice of library organisations, and topics that are related to them, as a research object in studies more often in these countries than in Finland.

In Finland, the integration of LIS within the university organisation meant that the researchers started to identify with the norms of the research community. This was the only way to obtain legitimisation of the discipline within that community. At the same time it caused a distancing from the norms of the profession.

The primary goal for the academics is to educate competent researchers and to do good research. The primary contribution is the internal development of the discipline, the creation of new theories and concepts, and the improvement of methodology. The practical applications that are of importance to the profession are of secondary importance to the discipline (Bunge 1982; Giere 1988; Vakkari 1989). Basic research therefore has become a priority.

The integration of the discipline into a university community meant that the character and the definitions of the discipline had to be problematised. The research community disassociated itself from a definition based on the library organisations and replaced it with a view that is based on a broader theoretical foundation. The idea of facilitating access to information was the integrator of the discipline. This also affected the choice of research themes and problem formulations in other areas than the library-oriented problems. The library organisations were viewed as special cases.

It looks as if the social organisation of LIS in the Scandinavian countries was associated with what kind of research was being pursued. The researchers' identification with either the research or the professional community functions as a mediating factor. Strong social institutionalisation creates identification with the norms of the research community, which leads to an appreciation of basic research and theoretically broader problem formulations. Weak social institutionalisation leads to a professional orientation, which is followed by a compliance with the research ideals of the professional community. It appears that the differences in identification in general lead to diverging views on the research object of LIS. The research community rewards non-system-oriented studies, where the LIS organisations are viewed as a component in the information gathering process. Professionally oriented research concentrates on library organisations. The

consequence is a difference in the cognitive structures within LIS. The research community also considers themes, perspectives, problems and solutions other than those that focus on the LIS organisations as important for research, while professionally oriented research focuses on themes that are important for the LIS organisations.

The results suggest that the degree of social and cognitive institutionalisation is not clearly linearly dependent in the Scandinavian countries. However, the general direction is that a well developed social structure implies a non-system-oriented cognitive structure. The Finnish research exhibited more of these features than the others. In Norway, where the social institutionalisation was the weakest, the research most clearly exhibited a professional cognitive orientation. When the cognitive features were concerned, Denmark and Sweden were often placed between Norway and Finland. The differences were not always systematic, but often supported the hypothesis.

Australia

Social structures

In the mid 1980s in Australia there existed only two library schools in universities; they both had professors of librarianship. Other library schools were in higher education institutions known as colleges of advanced education or institutes of technology. These institutions emphasized teaching rather than research, but some began to offer research Masters degrees in the 1980s. In the late 1980s there was a major reorganisation of higher education in Australia, with mergers and upgrades of these college institutions to university status. Material on social structures is based on material in a book by Rochester (1997).

All eleven library schools/departments are located in universities, and all are enhancing their research cultures. Faculty are beginning to identify with the research community. Nevertheless the Australian Library and Information Association is the accrediting body for first professional courses in librarianship and teacher librarianship, so maintains a professional orientation in courses. The Australian Library and Information Association does not have a research committee. Those teachers without doctoral qualifications are mostly in the process of acquiring them. There are now a dozen full professors and associate professors as well as lecturers in the LIS area in Australia, but few research positions. The discipline areas represented among the schools/departments are traditional LIS, teacher librarianship, archives and records management. As Australia has a population of over 18 million people and there are eleven schools/departments, there are some small departments. The number of schools can be partly attributed to the immense distances between cities in Australia. Research Masters and doctoral programs are available and the number of students taking research degrees is increasing. However as most students study part time progress is slow. The schools/departments are associated with larger academic groupings: computing, business and communications are favoured, and one is associated with an education school. Now Australian LIS is beginning to meet the conditions that Whitley (1974: 72) laid down for a high degree of social institutionalisation.

Cognitive features

Because of the social situation of education for librarianship in Australia, research has been mainly of an applied nature. As shown in the content analysis of the articles in the two main Australian librarianship journals for the period 1985 to 1994 (Rochester 1995) only 24% of articles could be classified as research ones, with most research being professionally oriented. Of these research articles 40% were concerned with research on library and information service activities, 20% with information seeking and 14% with library history. The main research strategies used were the survey method by 44% of the researchers and historical method by 14%.

The characteristics of the authors of the research articles for the 10 year period of the journals were examined (Rochester 1997) to see whether authors wrote alone, or collaborated with others, etc. There were 76% single authored papers; it was concluded that "most LIS researchers in Australia seem to be working in lonely isolation." There are few large research grants available, so there are few research collaborations. The research methods used are those that can be employed in non funded research.

China

Social structures

Cheng Huanwen's study of LIS research in China covers the period from 1985 to 1994. He places the golden period of LIS research in China as commencing in 1979, with a further subdivision of three phases:

- (1) recovery phase 1979-1985;
- (2) flourishing phase 1986-1990; and
- (3) phase of further development 1991+.

The end of the cultural revolution in China and a period of national reform called for the development of library and information services and also of library education. Since 1978 there has been rapid expansion. In 1978 there were two library schools with 200 students; already by 1987 there were fifty-eight schools with more than 6300 students. Information science education has also expanded. From 1991 doctoral level education was available - in library science at Peking University, and information theory and research methods at Wuhan University (Zheng and Liu 1997). There are over 100 professors in the library schools of universities, and more than 500 associate professors. The qualification levels of faculty members are increasing but they are still not very active in carrying out research and publishing its results (Wu and Shao 1997).

Communication and exchange of information, both internally and internationally, have been encouraged by two organisations: the China Society of Library Science established in 1979, with individual and subordinate library societies as members, and the China Society for Scientific and Technical Information in the information science area, founded in 1978 (Barclay and Li 1991: 112-117).

The professional literature has been expanded, with large numbers of national and provincial journals since 1979. Cheng chose articles for his study of LIS research in China from 13 core journals in library science and 10 core journals in information science, making 23 journals altogether. Cheng found the percentage of research articles in the 23 journals had grown from 51% in 1985 to 60% in 1990, then 59% in 1994. Writing in 1991, Barclay and Li say of the journal literature:

There exists much reportage literature. Other literature is heavily conceptual in nature, focussing on theoretical and ideological, rather than practical and management-related issues (Barclay and Li 1991: 138).

Cheng found the percentage of research articles in the 23 journals had grown from 51% in 1985 to 60% in 1990, then 59% in 1994.

Spain

Social structures

There has not been a strong academic LIS tradition in Spain. It was only in 1995 that librarianship/documentation undergraduate degrees were recognised as an academic degree in Spanish universities. Most librarians had other academic backgrounds and had on-the-job training in librarianship and short courses run by the library associations (Cano 1999).

Spanish LIS has been influenced by the work of Belgian and French documentalists: Paul Otlet, La Fontaine and Suzanne Briet. They still influence Spanish LIS research, with Cano finding that information retrieval and scientific communication were two of the favourite topics of research (Cano 1999).

Information science research has taken place for fifty years in Spain and has been linked with library science. The major developments of information science in Spain have taken place at three institutions: the Centro de Informacion y Documentacion Cientifica (CINDOC), the information institute of the Spanish Scientific Research Council; the Department of Documentation at the Universidad Complutense de Madrid; and the Department of Documentation at the Universidad Autonoma de Barcelona, Catalonia (Sagredo Fernandez and Garcia Moreno 1997).

Cognitive features

From an examination of the Spanish research articles Cano suggests there are two research communities: science based and humanities based. The authors in the journal *Documentacion*, published by the Department of Documentation at the Universidad Complutense in Madrid, research in bibliographic-historical topics, while the authors in the journal *Revista Espanola De Documentacion Cientifica*, published by the Spanish Institute for Scientific Information (CINDOC), research scientific communication and information retrieval. Cano found little overlap of authors between the two journals. She

notes also that most of the editors of *Revista* have doctorates and postgraduate qualifications in the sciences, and the articles in the journal have an emphasis on empirical research. The editorial board of *Documentacion* hold doctorates in the humanities, literature and linguistics, and the articles published in the journal use research methods commonly used in these fields (Cano 1999). The authorship pattern shows a predominance of single authorship, 68%; there was little cooperative research.

Cano also examined the publication patterns of the 205 authors in international publications, searching the 1994 version of *Library and Information Science Abstracts (LISA)* on CD-ROM. Only 47, 22%, of the authors had published an article in a non-Spanish language journal. Language barriers may be a significant factor in selecting publication outlets for Spanish LIS research (Cano 1999).

Turkey

Yontar offers suggestions for the interpretation of the findings of her study of research in Turkey (Yontar 1998). There are departments of librarianship in three universities in Turkey, the first university level librarianship course having been founded in 1953 at Ankara University with the collaboration of the American Library Association. The two other courses are at Istanbul University (started in 1964) and Hacettepe University (1972). In all departments there are separate chairs for “librarianship” and “documentation and information”. In two there is also a chair for “archive”. There are positions for professors, associate professors and assistant professors, as well as positions for research assistants. All departments offer undergraduate and graduate level education.

Despite this apparently good environment, there are problems in the educational and research environment of Turkey which help to explain the low quantity of research output. Yontar suggests:

- the low level of educational expectations of the student body creates a negative effect on the motivation of researchers for more and better research;
- faculty members complain of not having enough time for doing quality research; and
- there is a low level of intellectual cooperation among research workers.

Research has focussed more on library and information services topics rather than topics in information storage and retrieval. The focus of LIS research has not changed over the last forty years. There has been no research in the area of dissemination of information or information seeking. Yontar attributes this to the definition and perception of LIS. Discussion has continued for a long time on how to translate the terms ‘library science’ and ‘Bibliothekswissenschaft’ into Turkish. The professional community supports research morally and financially on the practical and present day problems of librarianship, rather than research with broader perspectives. Attention has focussed on practical problems such as automation and management.

United Kingdom

The context of United Kingdom (UK) library and information science research is examined by P. Layzell Ward in the expansion of her IFLA Copenhagen paper. As she points out, the context of research influences the nature of the output as literature (Layzell Ward 1998). The research output of articles in the UK was very low. Much research appeared as a report, and was then not disseminated in any other form.

The Library Association set up a research committee in 1946, and funded research projects from 1964. In the mid 1960s government funding for LIS research became available through the Office for Scientific and Technical Information in the Department of Education and Science. With the establishment of the British Library in 1974, the British Library Research and Development Department was formed with a merger with the Office. Good funding for research was available until 1980-81, and then gradually declined. Now library and information services were able to apply for grants, and the type of research funded was broadened. Research into public libraries and technical processes increased, reflecting the impact of information technology. Information storage and retrieval remained the most popular topic. More recently the British Library Department has become a British Library Centre and the Library and Information Commission, an independent body set up in 1995, plays a role in agenda setting for research and development.

Another development in the 1960s was the establishment of full time library schools with degree and postgraduate courses in universities and polytechnics (Wood 1997). By the 1990s all LIS schools were located in universities. Faculty members and students completing higher degree programs were undertaking research.

Summary

From the examination of the social and cognitive institutionalisation of the LIS research field in the studied countries we can find some explanations for the differences in topics and research methods used in the reported research. The social aspects of the structuring of education and research and the degree of organisation of the community differ widely from country to country. There have also been recent changes whose effects we would expect to have an impact on LIS research. There has been an enormous expansion of LIS education in China and now efforts are going to maintaining its quality. In Australia and the United Kingdom in the late 1980s and early 1990s all professional LIS education was established in universities with the consequences of increasing the academic culture for teachers and students, and professorships, research posts, doctoral programs and other hallmarks of a mature academic speciality.

The cognitive aspects of how the central concepts and theories within LIS are defined, as well as the main research areas, basic problems, methods and relevant solutions can also be examined for the countries examined. In Spain and Turkey there is no agreement on central ways of conceptualising the field. Cano suggests for Spain that there are two

research communities: science based and humanities based. For Turkey Yontar suggests there is disagreement about the definition and perception of LIS.

Some interesting results were obtained from the division into library oriented and non-library oriented topics for research of the publications for the countries examined here. It seems that countries with a low percentage of research addressing wider information problems are at a low level of research productivity in LIS. As Yontar says of Turkey:

The profession supports research morally and financially on the practical and present day problems of librarianship, rather than research with broader perspectives. Attention has focussed on practical problems such as automation and management (Yontar 1998).

As previously noted, the topics of LIS services had been favourites in Australia, Turkey and the UK.

Australia, with only 16% of research articles directed to broader information topics, had few research articles compared to the number of professional articles in the two journals analysed, at 24%. When the authorship of the research articles was examined it was found that 76% were single-authored papers (Rochester 1997). Similarly for Spain, it was found that 68% of papers were single authored ones (Cano 1999). Cano analysed articles from only two Spanish LIS journals, selected from a possible eleven journals. The two selected contained only refereed articles. In both countries there were few international authors published in the journals studied, showing intellectual isolation. Researchers in both countries were working in lonely isolation, probably the result of few large research grants allowing collaborative research.

In general it seems that in countries with a more developed social structure in LIS in terms of integration into the universities, research is more oriented towards general information problems and basic research. In Finland, especially, LIS has a longer tradition in research and research education at the university level than in other countries. This is reflected in the cognitive features of the research, also in trends in LIS research in these countries.

Conclusions

The comparison has shown a remarkable variation of emphases and trends in research in the countries examined. Each has its own research profile, which does not follow very closely the international trends. Despite the differences there are similarities. A strong interest in LIS services was typical of the research in Australia, Turkey and the UK. Research trends in Finland and the UK reflected most closely the research profile in international core journals.

We have shown how the research methods commonly employed are restricted in number. Conceptual method and surveys are universally popular, and, to a lesser extent, historical method. Perhaps this is because these methods can be employed cheaply and by

researchers working alone. Demanding research methods such as experimental or qualitative have been little used.

We can seek explanation for national differences in research in the cultural differences of these countries. We have suggested how the social institutionalisation of LIS has an effect on research output. A developed social structure of the discipline has a positive impact on the quality and quantity of research output.

As previously noted there is a need for a new topic classification scheme if a similar analysis was made of the LIS research literature in the new century. There is also a need for a stricter definition of research to be applied now. Thus the authors recommend that no analyses of the current research literature be made using the methods found suitable for the literature of the early 1990s and previous years. The current series of studies shows the findings from a variety of countries at various stages of development in LIS research and allows us to draw some conclusions about the context needed to foster sound LIS research. It seems that integration of research and research education in LIS in universities is crucial for its development as a field of research.

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Appendices

- Appendix 1: The classification scheme. In Järvelin, K. and P. Vakkari. 1993. The evolution of library and information science 1965-1985: A content analysis of journal articles. *Information Processing & Management* 29: 129-144. Appendix B.
- Appendix 2: Methods - Research strategy. In Järvelin, K. and P. Vakkari. 1993. The evolution of library and information science 1965-1985: A content analysis of journal articles. *Information Processing & Management* 29: 129-144. Appendix B.
- Appendix 3: Rochester, M. 1995. Library and information science research in Australia 1985-1994. A content analysis of research articles in *The Australian Library Journal* and *Australian Academic & Research Libraries*. *Australian Academic & Research Libraries* 26: 163-170.
- Appendix 4: Cheng Huanwen. 1996. A bibliometric study of library and information science research in China. Paper presented at IFLA General Conference in Beijing, 1996, Library Theory and Research Section Open Forum.
- Appendix 5: Yontar, A. and M. Yalvac. 2000. Problems of library and information science research in Turkey: A content analysis of journal articles 1952-1994. *IFLA Journal* 26: 39-51.
- Appendix 6: Layzell Ward, P. 1998. A preliminary study of the UK research literature of library and information science.