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How to Describe the Life's Work of a Scientist? The Œuvre of Christian Schlögl as an Example

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ABSTRACT

This article attempts to present the entire research output of a scientist in terms of his publication activity and its impact as comprehensively as possible. To this end, a bibliometric overview of the scope and structure of his research output is first provided. Furthermore, the visibility of this output in the various information services is analyzed. Christian Schlögl authored a total of 177 publications, including 77 journal articles. This set of publications is only visible through the use of personal publication lists in an institutional repository (Uni Graz Online). In contrast, only a fraction of these publications are included in the common information services; in the Web of Science, for example, not even a third exist. The publication output is then examined in more detail, including preferred topics, co-authors, and journals. Next, a citation analysis is conducted, revealing, for example, the temporal distribution of citations and the most frequently cited publications. Finally, the seven most important research areas are briefly presented. For each of these areas, a co-author was asked to comment on Christian Schlögl's working methods and collaboration. Overall, this article could serve as a good illustrative example for analyzing the research performance of an individual researcher.

Keywords: oeuvre, researcher, scientometric micro level, bibliometrics, research activities, Christian Schlögl

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1. INTRODUCTION

How does one describe and analyze the oeuvre of a particular researcher in terms of publication activity and its impact? Should we use multidisciplinary bibliographical information services, a reasonably complete publication list, interviews with peers and colleagues, or all of them? We want to address this topic using a concrete example. Our case study focuses on the research of Christian Schlögl (1961-2024), an Austrian information scientist who was one of the most influential information scientists in the German-speaking world at the beginning of the twenty-first century. He authored nearly 180 publications and was a highly active member of the scientific community. He maintained international contacts with colleagues from Croatia, Germany, Great Britain, Hungary, the United States, and South Korea, often resulting in publications. In addition, he participated in countless scientific conferences as a co-organizer, reviewer, presenter or moderator, regularly reviewed articles for scientific journals, and was also a member of the editorial boards of several relevant journals, such as *Journal of Information Science Theory and Practice (JISTaP)*, published in Korea. As Stefan Dreisiebner told us,

Christian was an important pillar for the Austrian Information Science community. He leaves a gap that is hard to fill. One example: In a recent project, we aimed to collect all Austrian researchers with information science backgrounds. His unique knowledge of the community and his contacts were [badly] missed in this endeavor (personal communication, March 26, 2025).

In addition to research, he was also very committed to teaching and administration. In this context, the development of the international master's degree program "Global Studies on Management and Information Science", in cooperation with a team from Hildesheim, Germany, and Pai Chai University in Daejeon and Chungbuk National University in Cheongiu, both in Korea, should be highlighted. However, the present article is only about Schlögl's research (for other aspects, e.g., on academic teaching, see Reichmann, 2024).

What is the current state of research in describing and analyzing a researcher's professional life work? In the sense of levels of scientometrics, we are working on the micro level, that is, the level of individual researchers (Sandström & Sandström, 2009), in contrast to the meso level (research institutions) and the macro level (countries or regions of research). Following White (2001), we will build an author-centred bibliometric description with the characterizations automatically made and edited online (White's CAMEO). White's bibliometric measures include the subjects of a researcher (e.g., through subject headings or title terms), the publishing journals and publication years, the researcher's co-authors, and– only applicable in citation databases—the researcher's citation identity (all cited authors), the citation image makers (all citing authors), and the citation image (all co-cited authors). The scope of bibliometric analysis options depends heavily on the information service and the databases offered. White worked with the online service DIALOG and the databases of the former Institute for Scientific Information (Science Citation Index and related databases).

Several bibliometricians followed White's proposal and produced scientometric results concerning the micro level on, e.g., Leydesdorff (Vargas-Quesada et al., 2023), Drucker (Uslay et al., 2009), or Stock (Peters et al., 2020). Other studies are limited to a researcher's production, collaboration, and impact (Ayala-Gascón et al., 2012) or additionally include the topics of the papers of a researcher, such as those of Wilhelm M. Frankl (Stock, 1988) or all the members of the Graz School of philosophy and psychology (Stock & Stock, 1990), including a topic analysis also of the citing works. Jacso (2018), in a bibliometric study on Eugene Garfield, preferred to study the citations to Garfield's works, their sources, the citing institutions, and their countries.

However, we should handle informetric, bibliometric, and scientometric studies carefully, as there are methodological problems and incomplete databases (Stock et al., 2023b). Following the literature (e.g., Stock & Weber, 2006), we speak of "informetrics," if all quantitative aspects of information science are concerned, of "bibliometrics" (as a narrower term of "informetrics"), if written published works are quantitatively analyzed, and of "scientometrics," if we describe scientific research in quantitative ways.

Nevertheless, describing and assessing researchers' performance is "vital in the research community" (Rawat et al., 2024, p. 319). It seems practical and promising to create bibliometric-based heuristics (Bornmann et al., 2022), that is, bibliometric results to produce an overview and give hints on the essential topics of a researcher. In addition to bibliometric descriptions, we apply expert interviews (Meuser & Nagel, 2009). The experts interviewed are proven representatives of their field and co-authors of some of Schlögl's publications.

This paper aims to describe and analyze Schlögl's re-

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Table 1. Languages and document types of Schlögl's oeuvre

	Journal articles	Articles in proceedings or edited book	Lexicon entries	Book reviews	Books	Editions	Research data	Total
German	44	16	43	4	1	2	0	110
English	33	31	0	0	0	2	1	67
Total	77	47	43	4	1	4	1	177

Data source: Uni Graz Online, updated; data as of February 2025.

Table 2. Visibility of Schlögl's oeuvre in information services

Information service	Publications	Citations	H-index
Web of Science Core Collection	53	547	11
Scopus	53	673	13
Semantic Scholar[a)]	96	862	-
Dimensions	27	222	-
ResearchGate	78	932	14
ORCiD	30	-	-
For comparison: Uni Graz Online[b)]	177	-	-

Data as of February 2025.
[a)]Aggregation of different entries due to synonymy errors.
[b)]As of June 2024; updated by the authors.

Table 3. Visibility of Schlögl's English-language article publications in selected information services

Information service	Publications	Relative visibility (%)
Web of Science Core Collection	29	45
Scopus	34	53
Uni Graz Online	64	100

Data as of February 2025: only including research articles in journals, proceedings and edited books.

search production (his publications), research impact (the citations the publications attracted), and research topics. In the first step, in Sections 2 to 4, we apply quantitative informetric methods to get a heuristic overview of Schlögl's publications, their topics, and their impact; in the second step, in Section 5, we will shortly sketch Schlögl's main topics, which we found in the informetric results by publication, citation, and topic analyses, and, additionally by the expert interviews. Finally, we will assess the informetric methods used at the micro level.

2. AUTHOR-CENTERED BIBLIOMETRICS OF SCHLÖGL'S OEUVRE: BASIC DATA AND VISIBILITY

We start with a bibliometric overview of Schlögl's oeuvre. In detail, the quantitative overview will include basic data on Schlögl's publications and their visibility in selected information services, his co-authors, the publishing journals, his citation image (that is, the cited authors), the time series of his publications and their citations, the main research topics, Schlögl's citation image makers (that is, the citing authors), their countries and their topics, and, finally, Schlögl's top-cited publications.

Christian Schlögl published 177 papers between 1992 and 2025, of which 62% were in German and 38% in English (Table 1). All raw data is as of February 2025. Most papers were research articles published in journals (44% of all papers) or in proceedings or edited books (27%). German predominates in his journal articles, but the opposite is true for his articles in proceedings and edited books. Schlögl published one book (Schlögl, 2001) and co-edited four proceedings or edited books. Additionally, Schlögl wrote 43 short entries in a lexicon on Library and Information Science (LIS) (Umlauf & Gradmann, 2011/2014), four book reviews, and one set of research data.

An important data source on Schlögl's publications is the research portal of the Karl Franzens University Graz, Austria (Uni Graz Online). The University of Graz was his affiliation during his complete academic life. We worked with a printed version of Schlögl's publication list from mid-2024 for this paper. After his death, further articles appeared, so we updated the list based on Uni Graz Online. This updated version of Schlögl's publication list from Uni Graz Online is our gold standard for all scientometric measures, hoping that this list is indeed correct and true-bounded (Dorsch et al., 2018), which means that the list is complete and that all listed documents are indeed research contributions and authored by Schlögl.

Regarding the visibility (Dorsch, 2017) of Schlögl's work in large multidisciplinary databases, identifying

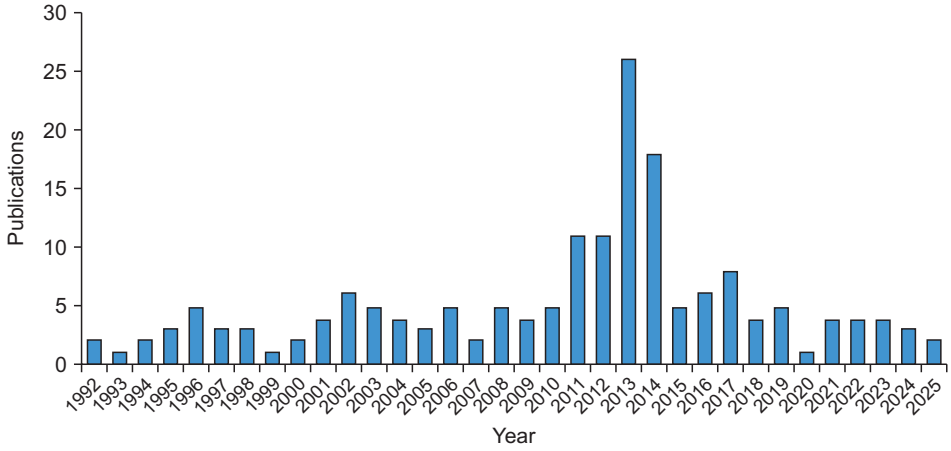

Fig. 1. Time series of Schlögl's publications (1992-2025). Data source: Uni Graz Online, updated; n=177 publications; data as of February 2025.

Table 4. Schlögl's preferred journals

Journal	Number of articles by Schlögl
Information – Wissenschaft und Praxis	20
Scientometrics	7
Zeitschrift für Bibliothekswesen und Bibliographie	4
VÖB Mitteilungen	3
Journal of Information Science Theory and Practice	2
Journal of Informetrics	2
Journal of the American Society for Information Science and Technology	2
Wirtschaftsinformatik	2

Data source: Uni Graz Online, updated; all journals with two or more articles by Schlögl; data as of February 2025.

Table 5. Schlögl's preferred co-authors

Name of co-author	Country of co-author	Number of joint publications
Gerhard Reichmann	Austria	16
Wolfgang G. Stock	Germany	14
Juan Gorraiz	Austria, Spain	10
Kris Jack	UK	6
Peter Kraker	Austria	6
Wolf Rauch	Austria	6
Sandra Boric	Austria	5
Isabelle Dorsch	Germany	5
Christian Gumpenberger	Austria	5
Karin Karlics	Austria, Italy	5
Edgar Schiebel	Austria	4
Stefan Dreisiebner	Austria	3
Robert M. Hayes	United States	3
Franjo Pehar	Croatia	3
DongBack Seo	South Korea	3

Data source: Uni Graz Online, updated; all co-authors with at least three joint publications; data as of February 2025.

Schlögl's publications in information services was difficult. Some services work with identification numbers. In Scopus, Web of Science Core Collection (WoS CC), ResearchGate, and ORCiD, we found one dataset on Schlögl (Scopus) or a manageable number of entries. Scopus works with one identification number (AU-ID=6506241000), while WoS unfortunately uses four different numbers for the same author (A-9343-2008, BBB-9858-2020, JKG-5289-2023, ITM-8469-2023). Semantic Scholar presents many publications by Schlögl, but due to synonym errors, these appear under different entries, which we have intellectually merged. In Dimensions (and similarly in Google Scholar), the problem of homonymy has struck, as many Christian Schlögls are almost inseparably mixed together in the search results lists. Due to incomplete data, Table 2 shows only approximately correct Dimension values. Although there is an entry on Christian Schlögl on Google Scholar, there are inextricably many different Schlögls in a single publication list, so we cannot present a satisfying result.

The most productive information services for Schlögl's oeuvre are Semantic Scholar (96 hits; 54% of the gold standard), ResearchGate (44%), WoS CC (30%), and Scopus (30%), meaning that all mentioned services are more or less incomplete or incorrectly indexed. Therefore, the values for the publications, citations, and H-index in Table

2 can only be viewed as a lower estimate of the "true" results.

We searched again because some multidisciplinary information services prefer to index English-language research articles. We added two search arguments to the name: language (only English) and document type (only articles). We were able to perform such searches in WoS CC and Scopus. Table 3 shows that Schlögl's relative visibility in both WoS CC and Scopus is still limited as there are relative visibility values in Scopus of 53% and WoS CC of only 45% (WoS CC) for all his English-language articles in journals, proceedings, and edited books.

3. RESEARCH PRODUCTION

Schlögl was active in publishing between 1992 and his death in 2024. As a result of the delay in the publication process of some writings, documents are being published even after Schlögl's passing (Fig. 1). There are peaks in the annual publication amount between 2011 and 2014 resulting from publishing short entries in a LIS lexicon. Apart from these short documents, Schlögl published about three to five documents annually on average.

Schlögl published in both German-language and English-language journals (Table 4). His German-language articles concentrate on *Information – Wissenschaft und Praxis (IWP)*, *Zeitschrift für Bibliothekswesen und Bibliographie*, *VÖB Mitteilungen* (Mitteilungen der Vereinigung Österreichischer Bibliothekarinnen & Bibliothekare), and *Wirtschaftsinformatik*. *IWP* is primarily dedicated to information science and practice, while the following two periodicals mentioned above focus more on library topics. *Wirtschaftsinformatik* is dedicated to research in information systems. The English-language articles are spread across many different journals, including *Scientometrics, JISTaP*, *Journal of Informetrics*, and *Journal of Association for Information Science and Technology* (formerly *Journal of the American Society for Information Science and Technology*).

Besides his early works and encyclopedia contributions, Schlögl often worked and published in teams. His preferred co-authors include the two authors of this article and Juan Gorraiz from the University of Vienna, Austria (Table 5). To get an overview of Schlögl's co-authors, we

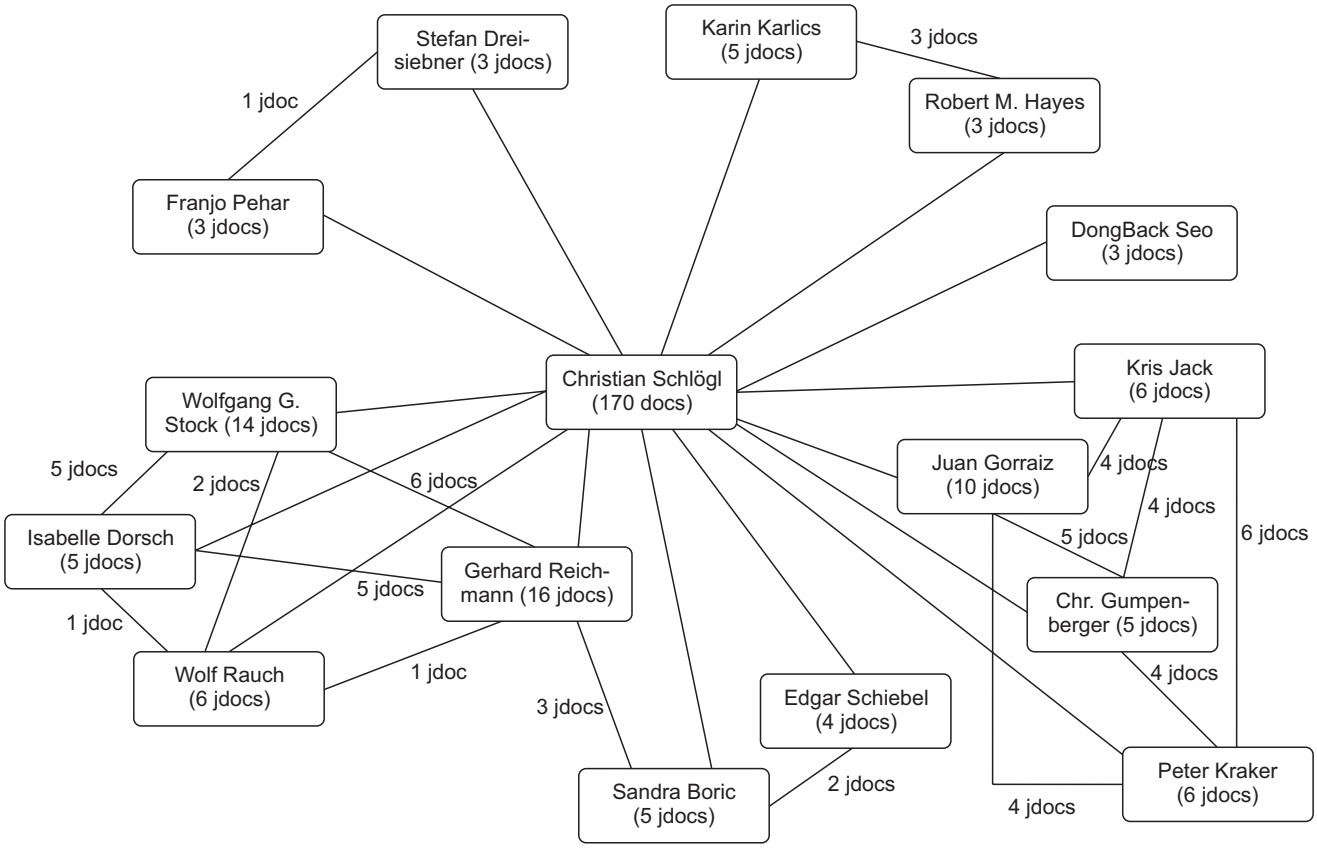

Fig. 2. Cluster of Schlögl's co-authors. jdocs, joint co-authorship documents.

Table 6. Schlögl's citation identity: top-cited authors in Schlögl's articles

Name of cited author	Number of citing articles
Christian Schlögl	36
Wolfgang G. Stock	18
Juan Gorraiz	17
Eugene Garfield	14
Ronald Rousseau	14
Mike Thelwall	11
Judit Bar-Ilan	10
Isabelle Dorsch	10
Christian Gumpenberger	10
Isabella Peters	9
Stefanie Haustein	8
Gerhard Reichmann	8
Ludo Waltman	8
Blaise Cronin	6
Wolfgang Glänzel	6
Chris Jack	6
Peter Kraker	6

Source: Scopus; n=53 articles by Schlögl; all selected authors with six or more mentions in Schlögl's reference lists; data as of February 2025.

created a cluster of his co-authors with whom he frequently collaborated (Fig. 2). Here we see six different author subclusters (A1 to A6):

(A1) Schlögl – Dreisiebner – Pehar,
(A2) Schlögl – Karlics – Hayes,
(A3) Schlögl – Gorraiz – Jack – Kraker – Gumpenberger,
(A4) Schlögl – Reichmann – Boric – Schiebel,
(A5) Schlögl – Reichmann – Stock – Dorsch – Rauch, and
(A6) Schlögl – Seo.

The description of Schlögl's citation identity (White, 2001), that is, authors cited by Schlögl, requires using a citation database. We chose Scopus because there is a search field for authors in cited references (REFAUTH). To find all self-citations of Schlögl, for instance, we worked with the following search argument:

AU-ID("Schlögl, Christian" 6506241000) AND (REFAUTH(Schlögl) OR REFAUTH(Schlogl) OR REFAUTH(Schloegl)).

Applying the REFAUTH field, we had to search for all referenced authors individually, as there is no ranking functionality for cited authors in Scopus. Since we cannot be sure that we have searched for all highly cited authors in Schlögl's publications, we should use the results cautiously. Schlögl's top-cited authors are Schlögl himself (as

Table 7. Top-cited publications of Schlögl in different information services

No.	Short title (year of publication)	Rank (number of citations)		
		Scopus	WoS CC	Google Scholar
1	*A bibliometric analysis of pharmacology and pharmacy journals* (2008)	1 (84)	1 (79)	1 (175)
2	*Comparison of citation and usage indicators* (2010)	2 (81)	2 (73)	4 (130)
3	*Impact and relevance of LIS journals* (2004)	3 (75)	3 (62)	3 (136)
4	*Comparison of downloads, citations and readership data* (2014)	4 (67)	5 (51)	6 (87)
5	*Usage vs citation behavior* (2014)	5 (62)	4 (52)	5 (92)
6	*Global usage vs global citation metrics* (2011)	6 (48)	6 (42)	7 (72)
7	*Information and knowledge management* (2005)	7 (35)	8 (26)	2 (148)
8	*Practitioners and academics* (2008)	8 (33)	7 (31)	8 (53)
9	*Download vs citation vs readership data* (2013)	9 (24)	10 (16)	-
10	*LIS journals: an editor survey* (2005)	10 (22)	9 (19)	9 (46)
11	*Visualization of co-readership* (2015)	-	-	10 (43)

Top ten cited articles of each information service; data as of February 2025.
Wos CC, Web of Science Core Collection; LIS, Library and Information Science.

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expected, since Schlögl published very actively in his research areas), Stock, Gorraiz, Garfield, etc. (Table 6). The cited authors from Table 6 are either citation authorities in bibliometrics (e.g., Garfield, Rousseau, Thelwall, Bar-Ilan, or Cronin) or colleagues who knew Schlögl personally, as many of them were his co-authors (Table 5). Another problem with Scopus is that the number of Schlögl's citing articles is stated here, regardless of how many articles by the cited author are mentioned in each document. For instance, in Schlögl and Stock (2004), four different works by Eugene Garfield are cited, but Scopus counts "1."

We decided to analyze the title terms to describe the content of Schlögl's publications. Here, we limited ourselves to the English-language titles to avoid translation errors and to the knowledge that only Schlögl's English-language papers are often cited (see Table 7). Schlögl's top topics are *citation* and *journal*, followed by *information literacy*, *readership*, and *usage* (Table 8).

In Fig. 3, we have created a cluster starting with Schlögl's two most frequent English-language title terms, *citation* and *journal*. From this, it is possible to identify four topic subclusters (T1 to T4):

(T1) citation – journal – downloads – readership,
(T2) citation – usage – behavior,
(T3) journal – readership – LIS, and
(T4) citation – journal – usage – Scopus – WoS – pharmacology.

Table 8. Most frequent terms in the titles of Schlögl's English-language articles

Title term	Frequency
Citation	15
Journal	13
Information literacy	7
Readership	7
Usage	6
Austria	5
Bibliometrics	5
Downloads	5
Graz	5
Business administration	4
Pharmacology	4
Research evaluation	4
Research institution	4
Web of Science	4
Autonomous driving	3
Behavior	3
Information science	3
Library and Information Science	3
Scopus	3
Visualization	3

Data source: Uni Graz Online; n=64; all English-language title terms with three or more mentions; data as of February 2025.

4. RESEARCH IMPACT

Scientometric analyses of research impact normally work with citation studies. The problem is that we are dependent on the large citation databases including WoS and Scopus (Pranckutė, 2021), which are unfortunately all incomplete in coverage of the research literature and partially only weakly indexed (Stock et al., 2023b). As a result, our data are only approximations of more accurate results.

If we analyze Schlögl's impact in terms of citations of his publications based on Scopus, we see a slow but steady increase in the annual numbers of citations until around 2013 (Fig. 4). Between 2014 and 2024, his Scopus-indexed publications attracted about 40 to 50 citations yearly (except in 2022, with fewer than 30 citations). All in all, Scopus counts 673 citations for Schlögl's oeuvre.

Who did Schlögl's work cite? In the sense of White (2001), we asked for Schlögl's citation image makers. For this, we conducted a cited reference search in WoS CC and found more than 200 authors citing aspects of Schlögl's oeuvre (Table 9). Here, we did not use Scopus but rather WoS because there is elaborated cited reference search functionality.

The top citation image makers are Gorraiz (who is one of Schlögl's preferred co-authors and also one of his top-cited colleagues), Schlögl himself (citing some earlier publications in newer articles), Gumpenberger, Costas, Glänzel, Reichmann, Thelwall, Haustein, Stock, and nine other authors with four to five citations each.

If we compare the lists of Schlögl's preferred co-authors (Table 5), his most cited authors, that is, his citation identity (Table 6), and the most citing authors, that is, his citation image makers (Table 9), we see a remarkable similarity between the top positions of all three lists. Social circles are behind Schlögl's references and citations (Milard, 2014). Schlögl often cited and was often cited by personally known colleagues. Those colleagues work, for instance, at the University of Graz (Reichmann and Boric) or the

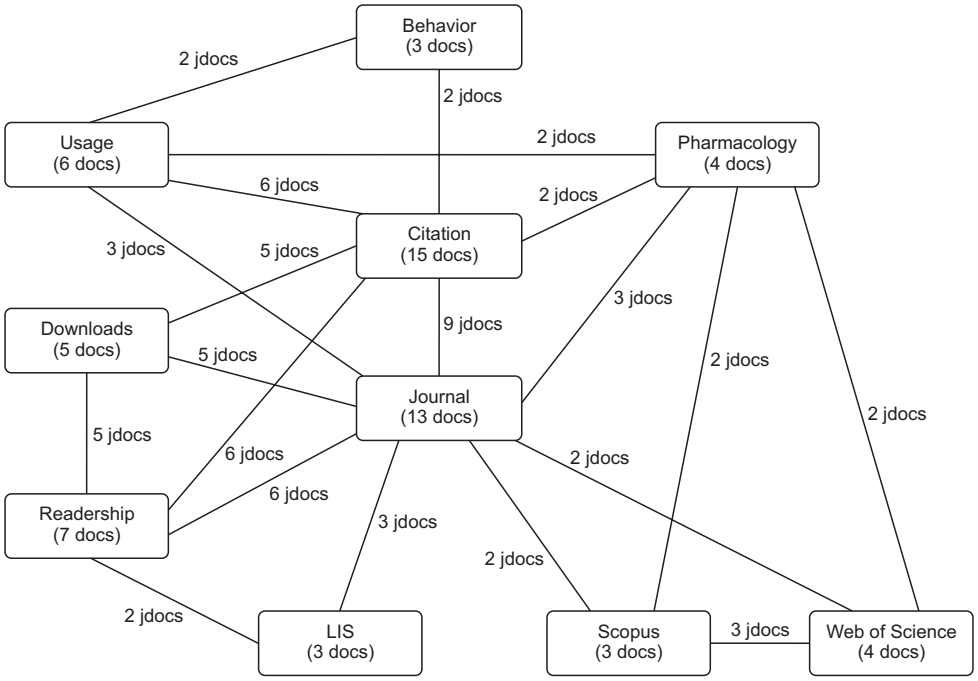

Fig. 3. Cluster of Schlögl's topics around *citation* and *journal*. Topics from Table 8, which co-occur with *citation* or *journal* in three or more English-language document titles; in brackets: number of publications in Schlögl's oeuvre; jdocs: number of co-occurrences of topics in titles; data as of February 2025. LIS, Library and Information Science.

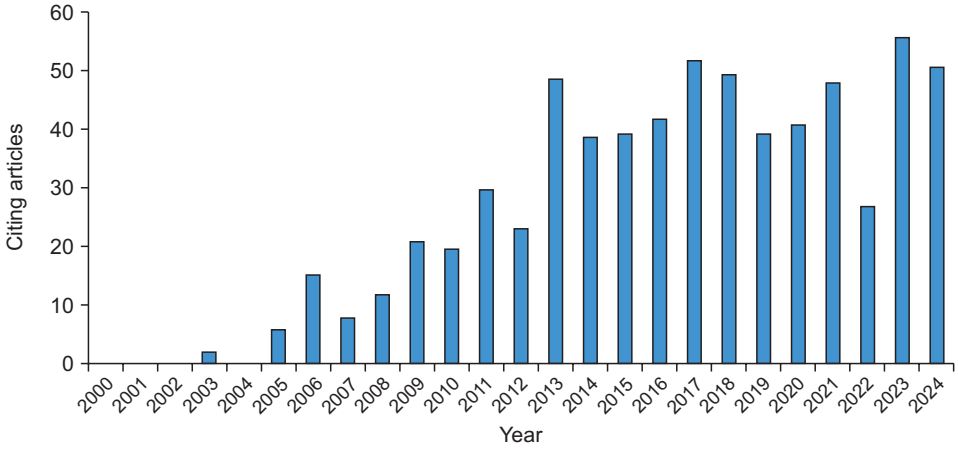

Fig. 4. Time series of citations to Schlögl's publications (2000-2024). Data source: Scopus; n=673 citations; data as of February 2025.

Know Center in Graz (Kraker), in other Austrian cites (e.g., Gorraiz in Vienna), or in institutions all around the world (e.g., Hayes in the USA, Jack in the UK, Sutheo in Hungary, Seo in Korea, Pehar in Croatia, and Stock as well as Dorsch in Germany). Overall, the top-cited and top-citing authors were socially connected to Schlögl (Johnson & Oppenheim, 2007). "Who will cite you back?" Daud et al. (2017) ask. For Schlögl's oeuvre, there is a clear answer: The reciprocal citation behavior of the researchers around Schlögl is strongly influenced by their co-authorships. Cronin and Shaw (2002) found similarities between the authors' citation identities and their citation image makers in their case studies; we have to add the vital role of the co-authors.

In Table 10, we show in which countries Schlögl's research results took effect. The citation image makers' countries of activity include countries from all over the world, starting with Austria and followed by the United States, Germany, China, England, the Netherlands, Canada, and many others.

Using a very rough classification, WoS offers research topics of the citing literature. Schlögl's citation image is dominated by *bibliometrics* and—to a much lesser extent—by *information literacy* and—even less—by *knowledge management* and *entity resolution* (Table 11). Obviously, his primary influence on the international research

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Table 9. Schlögl's top citation image makers

Citing author	Number of articles citing Schlögl
Juan Gorraiz	19
Christian Schlögl	18
Christian Gumpenberger	10
Rodrigo Costas	7
Wolfgang Glänzel	7
Gerhard Reichmann	7
Mike Thelwall	7
Stefanie Haustein	6
Wolfgang G. Stock	6
Vincent Larivière	5
Pei-Shan Chi	4
Stefan Dreisiebner	4
Zhichao Fang	4
Peter Kraker	4
Isabella Peters	4
Cassidy R. Sugimoto	4
Daniel Torres-Salinas	4
Martin Wieland	4

Data source: Web of Science CC, cited reference search; n=235 citing authors; all authors with four or more articles citing Schlögl; data as of February 2025.

Table 10. Countries of origin of Schlögl's citation image makers

Country of origin of citation image maker	Number of articles citing Schlögl
Austria	41
USA	33
Germany	28
China	26
England	21
The Netherlands	16
Canada	15
Australia	10
Belgium	7
India	7
Malaysia	7
Hungary	6
South Africa	6

Data source: Web of Science CC, cited reference search; n=235 citing authors; all countries with six or more articles citing Schlögl; data as of February 2025.

Table 11. Broad topic classification of articles citing Schlögl

Web of Science topics	Number of articles citing Schlögl
Bibliometrics	162
Information literacy	27
Knowledge management	7
Entity resolution	5

Data source: Web of Science CC, cited reference search; n=235 citing authors; all WoS topics with five or more articles citing Schlögl; data as of February 2025.

community was (and still is) in *bibliometrics*.

In Table 7, we get a more detailed picture of Schlögl's research impact. We searched for the most cited publications by Schlögl in Scopus, WoS CC, and Google Scholar. Google Scholar revealed the most citations, followed by Scopus and WoS CC; however, the ranks of the top-cited publications are similar in the three information services. An exception is publication no. 7 on information and knowledge management, which ranks second on Google Scholar but seventh and eighth on Scopus and WoS.

Schlögl's most cited publication is "*A bibliometric analysis of pharmacology and pharmacy journals*" (published in 2008), followed by "*Comparison of citation and usage indicators*" (2010) and "*Impact and relevance of LIS journals*" (2004). Because of their age, older publications have a greater chance of being cited than articles from recent years. Therefore, Table 7 is necessarily biased toward older writings. Apart from publication no. 7, which is on information and knowledge management, all frequently cited papers of Schlögl (from Table 7) are in the field of bibliometrics, which confirms the result from Table 11 with bibliometrics as the top-citing research branch.

The citations of Schlögl's publications form an inverse-logistic distribution (Stock, 2006), meaning that there are several frequently cited documents and—below the turning point of the curve—many documents with low citation rates in the form of a long tail. A power-law distribution would have been more expected, as it is the most common in informetrics. There would be one highly cited work at the top of the curve and a steep drop in citation rates. In the context of indexing and retrieval, Peters and Stock (2010) speak about "power tags," meaning the top terms of an inverse-logistic distribution of terms assigned

to a document in an information service supporting user-created tags. In our case (Table 7), we can identify "power publications" that are the author's most cited and, thus, most influential works.

5. RESEARCH TOPICS

What were Schlögl's main research topics? We applied the scientometric results to find heuristics on essential themes. In this overview of a complete oeuvre of a researcher, we can only give brief information on the content of Schlögl's research. We will concentrate on the research questions, applied methods, and main results. We also obtained comments on the research style of and collaboration with Christian Schlögl from former co-authors in the respective research area. However, examining the individual research aspects in more detail is a task for future studies.

5.1. Library and Information Science Journals: Authors, Readers, and Editors

We found this theme through articles no. 3, 8, and 10 in Table 7, topic cluster T3, and through parts of author cluster A5 (however, only connected with Stock). Here, the co-authors are Stock and a group of students of Graz and Cologne, who published under the pseudonym "Grazia Colonia." The findings were published between 2002 and 2008.

This project aimed to analyze the relationships between citations and references to scientific journals on the one hand and the readership of the journals on the other (Grazia Colonia, 2002). Subjects of the study were international and German-language LIS periodicals. Schlögl and his research team formulated two research questions, namely (1) "What is the impact of LIS journals?" and (2) "What is the relevance of LIS periodicals to their readers?" (Schlögl & Stock, 2004, p. 1156). Grazia Colonia applied two empirical methods. Besides citation analysis, they worked with questionnaires. Data from the 40 international LIS journals were collected from the Journal Citation Reports, while the data for the German-language periodicals were counted manually—1,494 source articles with 10,520 references. The response rate of the reader survey with 257 usable questionnaires from German-speaking information specialists was relatively high. The main results include a negative correlation (-0.11) between the impact factor and the reading frequency for all analyzed 50 journals and a high correlation (+0.70) between the regional impact factor and the reading frequency of the 10 German-language LIS journals. There were huge differences between the reading behavior of researchers and practitioners (Schlögl & Stock, 2008). The correlation between the regional impact factor of the ten German-language periodicals and the reading frequency was +0.71 for the practitioners and -0.17 for the scientists because the latter preferred to read international journals and not German-language papers. Schlögl checked the results by conducting an empirical survey of editors; however, the editors confirmed the results concerning practitioners and scientists in their roles as readers as well as authors (Schlögl & Petschnig, 2005).

At the end of the project, Juchem et al. (2006, p. 32) determined five basic dimensions of the scientometrics of journals: (1) production (papers and their authors), (2) content (topics), (3) reception (readers), (4) formal research communication (references and citations), and (5) editorial work (editorial policies and publishing houses). These facets provided a template for the structure of Haustein's famous book on multidimensional journal evaluation (Haustein, 2012).

Kerstin Wolff, née Juchem, was student at the University of Applied Sciences in Cologne, Germany, at this time and was one of the participants in the Grazia Colonia project. Now she is the head of two public school libraries in Kerpen, Germany. Wolff states,

> As part of the 'Grazia Colonia' group and beyond, I had the opportunity to work with Christian Schlögl. Initially separated by the two location-based groups in Graz and Cologne and by the various tasks, one thing in particular became apparent in the 'Grazia Colonia' example: Christian Schlögl was passionate about his cause. Achieving a good result was, however, more of a pleasant side effect. In his dealings with 'his' students—among whom we students from Cologne can now count ourselves despite the border—he always had one thing in mind: He offered each and every person involved in the project help to help themselves, was always ready to support wherever help was needed or a perspective needed to be steered in a different direction. His unconventional manner and the way we met on equal terms turned us into a team with a common goal in mind (Wolff, personal communication, May 1, 2025).

5.2. Web of Science and Scopus as Tools for Bibliometric Analyses

We selected this research topic because the primary publication is highly cited (article no. 1 from Table 7 is Schlögl's top-cited paper), and it is part of the author clus-

 https://doi.org/10.1633/JISTaP.2025.13.4.1

ter A3 (however, it is only connected with Gorraiz). It is the theme of the topic cluster T4. The co-author of this research project is Gorraiz from the University of Vienna, Austria; the results were published in 2008.

The leading research question of this project is: How suitable are the citation databases WoS and Scopus for scientometric analyses (Gorraiz & Schloegl, 2008)? As the researchers' publication and citation behavior depend on the scientific discipline, Gorraiz and Schlögl considered only one research field: pharmacology and pharmacy. In most cases, the impact factors of the journals were higher in Scopus than in WoS. However, since Scopus covers more journals than WoS, "a journal in Scopus has a higher chance of getting cited in general" (Gorraiz & Schloegl, 2008, p. 717). The authors could demonstrate that both WoS and Scopus have problems with the accuracy of data, e.g., concerning the correct determination of the articles' document types. Furthermore, "the assignment of subject categories to journals is not always transparent and differs between Scopus and WOS" (Gorraiz & Schloegl, 2008, p. 723).

Juan Gorraiz remembers the projects with Schlögl:

I first met Christian Schlögl in Eisenstadt, where he had just begun laying the foundations for the *Fachhochschule* (University of Applied Sciences). At that time, I was teaching a few courses there, and it was during those early encounters that I had the opportunity to spark in him not only an interest but what I believe became a genuine passion for bibliometrics. That shared curiosity quickly turned into a rich and long-standing collaboration. At the time, I was still heading the Department of Information and User Services at the Central Physics Library in Vienna, so my time for research and publishing was limited. Christian more than made up for this. He developed into an ideal co-author—diligent, original, and full of energy—quickly finding his own style and applying bibliometric methods to topics close to his heart.

Our first joint project was in fact a small milestone: We were among the first to use Scopus as a data source in bibliometric analyses. We presented our results at the 11th International Society for Scientometrics and Informetrics (ISSI) Conference in Madrid in June 2007, where our work was met with strong interest and warmly received by the scientometrics community. It felt like a shared entrance onto a bigger stage. What followed were many discussions—often long and lively—whenever we met at conferences or university events. Some of the most memorable ones happened in the context of the University Course for Library and Information Studies, where we both contributed and exchanged views passionately. It was during these meetings that I came to appreciate even more his critical mind, his dry humor, and his generous collegiality.

Among the areas we worked on, usage metrics became our most focused domain—recognizing their importance alongside traditional citation metrics. Christian approached this topic with characteristic pragmatism and intellectual rigor. Later, with my new responsibilities as head of the newly established Bibliometrics Department at the Vienna University Library, our professional paths diverged. But we never lost touch (Gorraiz, personal communication, April 23, 2025).

5.3. Information Usage Behavior of Researchers: Citations, Downloads, and Reference Services

This theme is mirrored in articles no. 4 and 9, topic cluster T1, and author cluster A3. In this project, Schlögl worked together with Gorraiz, Gumpenberger (University of Vienna), and Jack (Mendeley). The publication from 2015 resulted from a cooperation between Schlögl, Jack, Lindstaedt, and Kraker (the latter from Know Center in Graz at the time of publication). The cooperation between Schlögl and Gorraiz on this project lasted between 2010 and 2015 and is strongly connected with the project from paragraph 5.2.; the other authors joined the publication activities on this research between 2013 and 2015.

With the offers of full-text articles and user-generated reference services, new retrieval and document delivery options have emerged as well as new means of scientometric research. Now, there is more data measuring research impact, including:

- citations (as before),
- downloads of article full texts (new),
- metadata on reference services (as a new proxy of readership).

Data sources were Scopus and the Journal Citation Reports of WoS for the citations, Elsevier's Science Direct for downloads, and Mendeley for readerships (Schlögl et al., 2014a). Schlögl and Gorraiz (2010, p. 569) introduced new scientometric indicators with the usage impact factor and the usage half-life. These new indicators were constructed in analogy to the journal impact factor and the journal half-life. Articles have the highest download rates immediately after being available online, while citations come years later. Therefore, downloads have another

"meaning" than citations, "which denote only a small aspect of science communication" (Schlögl & Gorraiz, 2010, p. 578), and "usage metrics can be regarded as an interesting complement to citation metrics" (Schlögl & Gorraiz, 2011, p. 161). The article's readership belongs to different sectors, including academics, governmental or industrial readers, and the general public: "As a logical consequence, articles are often downloaded many times but remain uncited due to the fact that they are used for other purposes (pure information, learning, teaching, etc.) apart from the publish or perish 'game'" (Gorraiz et al., 2014, p. 1093).

"Readership" becomes defined with an altmetric measure as the number of mentions of an article in Mendeley user libraries (Schlögl et al., 2014b, p. 1119). A study on two paradigmatic information systems journals shows medium to high rank correlations between downloads and citations, relatively high correlations between downloads and readerships, and much lower correlations between readership and citations (Schlögl et al., 2014b). Schlögl et al. (2014b, p. 1126) found an interesting hint on the relationship between citations and downloads: "Later on citations contribute to a re-increase in the downloads to some extent."

In analogy to co-citations, a further project introduced co-readership, again based on Mendeley user libraries (Kraker et al., 2015). In addition, other data sets and sometimes other data sources (such as SCIMago) were used and the focus was on relational, not evaluative scientometrics. Co-readership means that two articles are found in the library of an individual Mendeley user. The outcomes suggest that "the results of a co-readership analysis may be much more up-to-date than co-citation analysis" (Kraker et al., 2015, p. 179). Although co-readership probably offers a weaker indication of subject similarity than co-citation, it can still be expected to serve as a useful indication of subject similarity and as a sound basis for the visualization of knowledge areas.

Peter Kraker was researcher at the Know Center in Graz; now he is founder and chairman of Open Knowledge Maps in Vienna, Austria. Kraker notes,

> Christian Schlögl sought to move beyond the well-trodden paths of bibliometrics research, which included his interest in exploring new measures. He had a keen eye for identifying promising research directions and actively forged new collaborations to pursue them. One such example is this project, which ultimately brought together four institutions from Austria and the UK and was among the first to compare citations, downloads, and readership metrics. The insights from this work helped shape the discourse around alternative metrics at a time when such approaches were still emerging.
>
> Christian had a profound influence on me throughout my studies, academic career, and later professional life. His work inspired my own research into scholarly communication on the web and its use in visualizing knowledge domains. He supported my interdisciplinary approach and embraced rather than eschewed the complexities it brought. He was an advisor, mentor, and a consistently positive force in my life—and in the lives of many others. He will be sorely missed (Kraker, personal communication, May 2, 2025).

5.4. Evaluation of Research Institutions

This research topic results from the author clusters A5 and (partially) A4. Co-authors were Dorsch (University of Düsseldorf, later Leibniz Information Center for Economics in Kiel, Germany, now GEMASS [Sorbonne University and CNRS] in Paris, France), Reichmann, and Stock, as well as Gorraiz (in the 2003 publication) and Boric from the University of Graz. The main project's publications started in 2022 and lasted until Schlögl's passing; however, Schlögl also researched this topic in earlier stages of his career.

Schlögl et al. (2003) analyzed two paradigmatic research institutions to show the problems with quantitative research evaluation. They found two groups of issues, namely data and indicators, as "different data and different indicators can result in quite different outcomes" (Schlögl et al., 2003, p. 298). For instance, if one cannot find concrete data on an institution's staff, the number of papers per researcher cannot be calculated. The researcher will get different results for publications and citations when searching for information on various services.

Some of Schlögl's studies include the analysis of his home institution in comparison with other research institutions, e.g., the research subjects of information science institutions in Graz and Düsseldorf via a topic analysis (Dorsch et al., 2017) or a long-time study on the research performance of the Graz institution (Reichmann & Schlögl, 2022). Bibliographic databases cover only 13% (WoS) or 23% (Scopus) of all publications. There are different points of view when the analyzed time intervals change. The complete history (33 years) shows the entire research performance. In contrast, shorter intervals (e.g., from 11 years to 3 years or annually) depend more on publication and citation data fluctuations.

It makes a difference in the determination of the per-

formance of an institution if scientometricians work with simple numbers of employees or with full-time equivalents to calculate the institution's labor productivity and impact (Stock et al., 2023a). However, it is not always easy to get such data on employment. How does one search for an institution, for instance, on WoS (Stock et al., 2025)? One can search for the institution's name or for the names of its research staff in a given time interval. This project provided evidence: A search for affiliated authors outperforms a search for institutions in WoS.

Isabelle Dorsch was part of the project team on the scientometrics at the meso level, and adds:

I have pleasant memories of our discussions and planning meetings with colleagues in Graz regarding our collaboration, for example, the scientometric analysis on the influence of the chosen methodology for research evaluation at the institute level or general research topics. I particularly remember his (Christian Schlögl's) friendly, team-focused, and pragmatic working style when I think of our collaborations. Through his work in this area, he actively contributed to analyzing the methodological variations (and biases) for scientometrics studies, apart from his other foci of study (Dorsch, personal communication, March 31, 2025).

Another project co-authored with Boric and Reichmann covered publications of more than 200 business administration professors in Austria. One can get performance data from WoS or Scopus (Schlögl et al., 2024) or from personal publication lists (Dorsch, 2017; Dorsch et al., 2018) of all researchers to be analyzed (Reichmann et al., 2024). Especially for non-English publications, personal publication lists are very useful for bibliometric approaches. "When comparing the individual researchers' ranks based on their personal publication lists (…) with those based on WoS (…) for the basic variant (…), dramatic ranking differences become apparent" (Reichmann et al., 2024, p. 6). In another project module, Boric et al. (2024) analyzed not the individual researchers but the entire group of Austrian university institutions of business administration. In the light of WoS and Scopus, the ranks of the particular institutions are stable in the rankings based on publications per researcher. In the analysis of citation data, "The ranks of the Austrian business schools remain relatively unchanged when moving from WoS to Scopus. There are larger changes when switching from full to adjusted counting, and even larger (…) when switching from citations per researcher to citations per publication" (Boric et al., 2024, p. 18). The project team worked with several performance indicators. The choice of the indicators heavily influences the rankings. As Boric et al. (2024) conclude, "Therefore, the main contribution of our approach to existing international university rankings is that it demonstrates that no composite indicators should be used. Instead, separate and more comprehensive rankings for each considered indicator should be performed" (Boric et al., 2024, p. 23).

Given the problems with scientometric indicators at the meso level, it is clear that rankings of institutions based upon composite indicators, e.g., according to their alleged "importance," make little or no sense. Such problematic rankings are, among others, the Academic Ranking of World Universities (ARWU), the Quacquarelli Symonds World University Rankings (QS), the Times Higher Education World University Ranking (THE), the Leiden Ranking, and the U.S. News Best Global Universities (Schlögl et al., 2025).

Sandra Boric describes the research project:

In our area of research, one might be inclined to stick to describing numerical values and statistics. Prof. Schlögl, however, always paid attention to including a holistic view in our texts and reminding the reader of the bigger picture we are looking at. When it comes to evaluating research institutions, much of his focus was on the comparison of publication- and citation-based rankings. He made an effort to include concrete examples for value differences in institutions, and he always wanted to (if possible) use Austrian or German institutions as examples to raise their research visibility and cover this niche topic of research.

His methodologies heavily focused on reproducibility and describing the data collection process. We also used several levels to classify data, e.g., on the researcher level, subject area level, and institutional level (which again shows the desire to remind the reader of the bigger picture we are looking at). His mantra was that the data sources should always be reliable and (if possible) easily accessible, while the data collection process and used indicators can be as diverse and detailed as the research project requires.

In our research institution evaluations, Scopus generally fared better as a data source than WoS. We knew that the larger institutions would rank higher in absolute terms and visibility, so we adjusted counts, developed a model of ranking variants for business schools, and looked at the ranking stability across institutions. We derived implications for research practice for rankings based on the number of publications, the number of pages per researcher,

the share of highly active researchers (e.g., with ten or more publications), the institution's top five most publishing researchers' publication counts, the average citation count (per researcher and publication), the institution's top five most cited researchers' citation counts, and the H-indices (Boric, personal communication, March 21, 2025).

5.5. Estimating the Demand of a Country's Information Professionals

Author cluster A2 gave us hints to this project. Schlögl's co-authors were Hayes (at the time of the project, Professor Emeritus of the UCLA Graduate School of Library and Information Science in Los Angeles, CA, USA) and Karlics (Graz and Bolzano, Italy). This research was published between 2009 and 2013.

The project's leading research question is: What is the size of the information industry in a country? Austria serves as an example of an economy (Hayes et al., 2009). A primary objective is to estimate the need for information management activities. Such activities are essential for university libraries, which serve as models for the complete knowledge industries of a country. Using the Library Planning Model from Hayes, the staffing needs of an average Austrian university library in media processing and user support are determined. These needs represent the starting point for estimating the knowledge industries' demand for information management activities. The number of librarians in university libraries can be used to roughly estimate the demand for information specialists in knowledge-intensive industries (Hayes et al., 2011). Data sources are the official statistics for the national input-output system, including data on, e.g., products of publishing houses and data on the number of employees in libraries and knowledge industries (in full-time equivalents). For the libraries, the actual number of all librarians per library user could be determined—Hayes et al. (2011, p. 328) calculated a value of 0.007733. Following their model, the same value is valid for the number of information specialists per knowledge worker in the economy. In Austria, there are 337,755 knowledge workers, 114,117 students needing knowledge, and 3,494 full-time equivalents of information specialists (Hayes et al., 2013). According to the Austrian official statistics, there were 3,477 information specialists in the Austrian knowledge industry in 2005. Therefore, the calculated value applying the Library Planning Model seems to be a good approximation of the official value.

Karin Karlics describes this research project.

The idea behind the project with the Library Planning Model was to strengthen the role of librarians, in particular, that of information specialists. The goal was to increase their visibility and enhance the value of their professional activities. Christian Schlögl, who was involved in training librarians in various roles throughout his career, was open to this innovative project.

Estimating the demand for a country's information professionals based on data from academic libraries was considered unusual and controversial. However, it was precisely this exploratory research approach that gave the project its unique appeal. The result of approximating the official value surprised even the authors.

The bibliometrician Christian Schlögl demonstrated remarkable openness to new, albeit unconventional, approaches through this project. However, further studies would have been necessary to substantiate the results. In particular, analyses at the micro level or international comparative studies could have provided valuable additional insights (Karlics, personal communication, March 23, 2025).

5.6. Information Literacy

Author cluster A1 led us on the trail of this topic. The primary co-author is Dreisiebner from Graz, who later worked in Hildesheim, Germany, and Villach, Austria; however, Schlögl also worked with colleagues from several countries. The publication activities took place between 2015 and 2019.

The main attempts of this research line were to determine the level of students' information literacy and options for improving them. Schlögl adopted a standardized test for measuring information literacy, which Beutelspacher (2014) created in Düsseldorf, Germany. In his course on information science for business administration students, Schlögl taught fundamentals of information literacy, and the information literacy questionnaire was used instead of the usual written exam (Beutelspacher et al., 2015). In general, the students answered most questions successfully. After finishing this questionnaire, the students received a second (now anonymous) questionnaire on their appreciation of the information literacy questionnaire. This evaluation also had positive outcomes. The next project step was a semi-structured interview to collect data on the perception of information literacy among academic staff at the universities of Graz, Tallinn, and Zagreb (Kirinić et al., 2015). A further step led Schlögl to South Korea. In cooperation with Seo and Rust, Schlögl compared the information literacy of students from the

University of Graz and Chungbuk National University (Rust et al., 2017), applying a modified version of Beutelspacher's test. Another project team with Maurer and Dreisiebner used the Beutelspacher test again to compare the information literacy of beginner students from different study programs (Maurer et al., 2017). The difference in information literacy across the various disciplines was not very high, but the overall competencies were weak or mediocre. As was reflected, "Another interesting result of our study is that students' self-assessed level of information literacy is much higher than it actually is" (Maurer et al., 2017, p. 317).

Are there textbooks for teaching information literacy? Dreisiebner and Schlögl (2019) analyzed discipline-specific teaching materials via a structuring content analysis. The most significant difference between the disciplines is determining the nature and extent of the needed information, especially in identifying potential sources of information, e.g., discipline-specific information services. The authors also discussed the implementation of Massive Open Online Courses (MOOCs) into academic teaching, noting, "Besides regular classes, MOOCs might be a possible solution, which have the advantage to be completely web-based and thus allow the direct integration of practical exercises and examples" (Dreisiebner & Schlögl, 2019, p. 410).

Dreisiebner here remembers:

Christian initially brought my attention to the research field of information literacy during our first consultation session for my Ph. D. studies. He immediately recognized the fitting to my educational background and interests. Indeed, this was a perfect fit, and until today, information literacy stays one of my core research fields. I am very grateful for his guidance in these early days of my academic career. Christian held some popular courses on information literacy for business and Ph. D. students, which were perceived by students as very helpful. The practical experience from his teaching offers, as well as his involvement in the training of librarians in Austria and the information literacy groups among librarians in general inspired his research, where he was especially concerned with the facilitation and evaluation of information literacy in classroom settings. In our work, we also explored new approaches for information literacy facilitation, specifically through MOOCs. He was especially familiar with quantitative approaches to measuring information literacy. Some of his key findings concerned the gap between students' self-perception of their information literacy skills and actual evaluation results, subject-specific differences in information literacy skills, as well as approaches for subject-specific adaptations for information literacy achievement tests (Dreisiebner, personal communication, March 26, 2025).

5.7. Information and Knowledge Management

Article no. 7 from Table 7 and the mention of knowledge management in Table 11 gave hints to this topic, which Schlögl processed alone. Besides this paper from 2005, Schlögl published a book (Schlögl, 2001) and some articles on this topic.

The book (Schlögl, 2001) is an "inventory" of information management and includes a literature overview and a bibliographic study. Schlögl justified the twofold approach: "Since a conventional literature analysis always carries the risk of a certain subjectivity and therefore cannot satisfy fundamental scientific criteria such as intersubjective confirmation, a more objective method was also used: a scientometric study" (Schlögl, 2001, p. 1). Additionally, he analyzed the main dimensions of information management, utilizing an author co-citation study (Schlögl, 2003). This bibliographic study identifies three main branches of information management: technology-oriented information management, content-oriented information management, and knowledge management (Schlögl, 2005).

Since the early days of his research, Schlögl followed an empirical approach to information science, which is always supported by literature studies. By this way, in this article, we adopted Schlögl's approach.

6. DISCUSSION AND CONCLUSION

6.1. The Œuvre of Christian Schlögl in a Nutshell

Our bibliometric analysis reveals that Christian Schlögl was an extremely active and respected researcher. Over the course of his academic career, he authored 177 publications, which have been cited almost 700 times to date (based on Scopus). It should be noted that only the 34 English-language journal articles recorded by this information service have a chance of being counted in the number of citations. The impact of all other publications, including numerous German-language journal articles as well as contributions to proceedings and edited books, cannot be quantified.

It seems positive that Christian Schlögl published relatively consistently over the years, thus showing no research fatigue even in his advanced career. Therefore, it can be assumed that numerous more publications would

have appeared had his sudden death not abruptly ended all research activities.

The numerous collaborations and co-authorships are a strong indication that Christian Schlögl was an extremely cooperative and popular researcher. Collaborations were also a welcome opportunity for him to pass on his extensive knowledge to younger colleagues, as emphasized in several comments by co-authors.

Christian Schlögl's research content was quite broad, as confirmed by the topic analysis. This is also reflected in the variety of publication venues he chose. The focus of his journal-based publications was not only information science journals, but also library and computer science journals. If one wanted to reduce the main research topics from the seven previously presented to two, this would be:

a) Scientometrics of journals, including the information behavior of their readers, and
b) Scientometrics of research institutions (which are on the scientometric meso level).

As part of his research activities, Christian Schlögl used a variety of empirical methods and data sources, such as publication analysis, citation analysis, co-citation analysis, questionnaires, semi-structured interviews, usage statistics, official statistics, tests (e.g., for information literacy), and content analysis, as well as altmetrics (Mendeley).

Isabelle Dorsch, one of his many co-authors, characterizes Schlögl's research topics and his research style:

Based on my personal perception, our joint projects, and personal contact over the last decade, I would characterize Christian Schlögl's research style as an empirical approach focusing on quantitative analysis within scientometrics. For his studies focusing on the micro or meso level, he utilized publication metadata that was self-obtained or provided by different information services. He contributed to the international and national body of information science research (Dorsch, personal communication, March 31, 2025).

Juan Gorraiz also states,

Christian, to me, embodied what a true colleague and co-author should be: sharp, curious, constructive, and always open to new ideas. He challenged me, supported me, and inspired me. Even now, I often find myself thinking of him when I reflect on a project or prepare a presentation. Just like the "invisible colleges" that shape the intellectual landscape of science, I believe in the presence of "invisible colleagues"—those who, though no longer with us, remain part of our professional and personal journey. Christian is, and will always be, one of those for me (Gorraiz, personal communication, April 23, 2025).

6.2. Scientometrics at the Micro Level: Strengths, Weaknesses, Opportunities, and Threats (SWOT)

Our final section is a SWOT analysis of scientometrics (Rousseau & Rousseau, 2021) in the service of the description of the oeuvre of an individual researcher. Fig. 5 exhibits the scientometric indicators which we applied. Concerning basic data, one must confirm that the lists of publications and citations are truebounded. As we have to work with information services, we should calculate the visibility of an ego's oeuvre on different information services. The bibliometric picture of the research production is mirrored in the ego's publications, their document types, and their time series. Given a truebounded publication list, one can easily determine the co-authors, the cluster of co-authors, and the preferred publication sources.

Additionally, we tried to find the ego's citation identity, that is, the authors of the literature cited by the ego. Regarding the research impact, we searched for literature citing our ego and created a time series. The citation image makers are the authors who cited documents of the ego. Analyzing the countries of activity of the citation image makers, we obtained a picture of the diffusion of the ego's research results all over the world. "Power publications" are the most-cited documents written by the ego. The research topics can be viewed from two perspectives: the ego's publications and the citing literature.

Besides the truebounded Uni Graz Online information service, we applied WoS and Scopus, although underbounded, for data acquisition. The different search functionalities of both information services drove the decision for each.

The *strength* of a bibliometric approach on the micro level is the mostly easy handling of the basic data. However, we needed an appropriate database. For our case study, it was the institutional research repository (Uni Graz Online) and not the commonly used information services such as Scopus or WoS, as they all were incomplete. A further strength of this approach is the offer of citation data by the information services; however, we must assume that this information again is incomplete. But when it comes to citation data, there is nothing better. In line with Rousseau and Rousseau (2021, p. 1436), we can confirm that bibliometric studies are objective and reproducible as

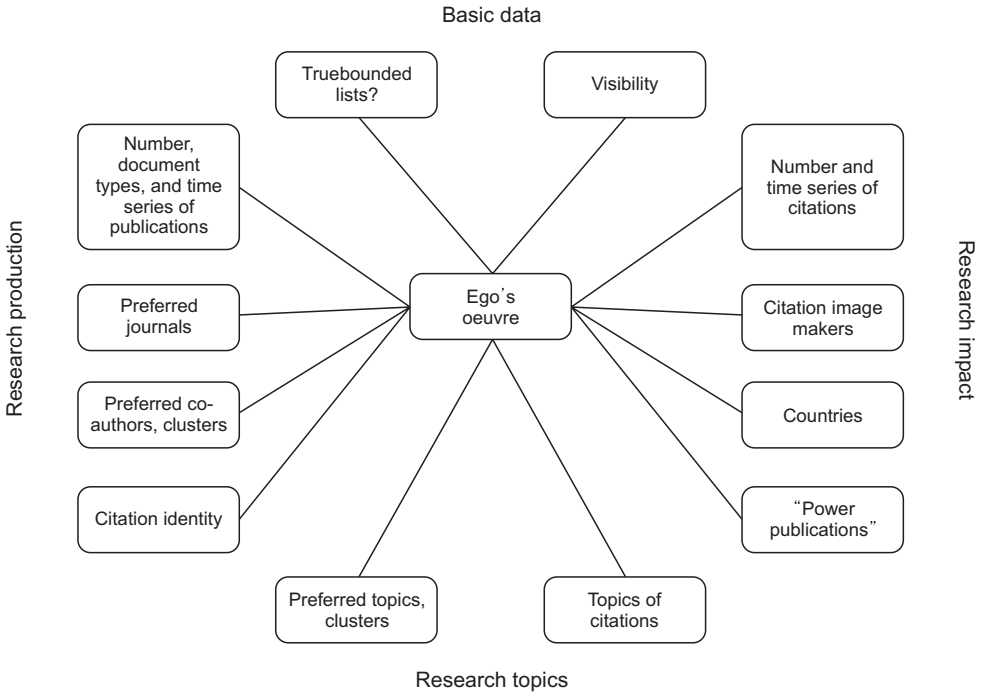

Fig. 5. Scientometric indicators for the description of a researcher's oeuvre.

well as cost- and time-effective. Additionally, they allow for tracing the history of ideas, in our case, the history of the ideas of an individual researcher.

There are many *weaknesses* in bibliometrics (Stock et al., 2023b). The main problems are the incompleteness of information services and the absence of consistent indexing. While Scopus could identify Schlögl through a unique researcher number, all other used databases failed. They failed to correctly handle homonymy (showing and merging other researchers with the same or similar name) and synonymy (indexing name variants of the same author as different researchers, here, e.g., Schlögl, Schloegl, and Schlogl). In our case, Google Scholar was completely unusable. If researchers want to be correctly indexed in Google Scholar, they must necessarily correct their publication lists, that is, adding missing publications, merging synonymous author names, and deleting publications by other researchers with similar names.

It takes some time before a publication can be cited. Therefore, recent works initially have little chance of being highly cited, and so citation databases and, subsequently, bibliometrics are biased towards older publications. We did not find important recent articles by Schlögl via citation analysis but through author clusters or topic clusters. A further weakness is the missing functionality of information services such as WoS or Scopus. We were sorely missing a rank command for all the names of the cited authors when looking for Schlögl's citation identity. However, Semantic Scholar offers ranked lists for a researcher's citing authors, referenced authors, and co-authors. But we could not use these options as we failed to correctly identify Schlögl and his publications due to errors concerning synonymy and homonymy.

A great *opportunity* of bibliometrics, in contrast to other methods (e.g., interviews or literature studies), is the provision of a "big picture" (Rousseau & Rousseau, 2021, p. 1436) of the complete oeuvre of a researcher. This "big picture" will be complete if we use a complete database with all publications by an author (as in our case, Uni Graz Online); it will be sketchy and mutate into a *threat* if one applies information services such as WoS or Scopus. In our case study, these problems concern Schlögl's citation identity, citations of his articles, citation image makers including their countries and topics, and Schlögl's power publications.

We have to mention a practical *limitation* of the applied method. Concerning our illustrative example, our approach works well, especially as there is a reliable and (more or less) clean and complete digital database, which could be validated through collegial insight. However, our approach is not easily generalizable if there is not such a rich data source. Problems in data collection may arise through homonyms and synonyms of author names, researchers publishing in under-indexed languages, or miss-

ing institutional repositories or personal publication lists. Additionally, one has to find the best-fitting experts for interviews who are willing to share their knowledge. All the experts we interviewed provided us with their written texts, so no revisions or edits were necessary. We were very happy and grateful here. Our methods work only well when the researcher is well known and has a truebounded publication list and when he had co-authors in order to provide contextual information.

As professional information services as WoS or Scopus are probably underbounded for all individual researchers, it is very helpful for all scientometric studies to have available truebounded online publication lists for the analyzed researchers, be it an institutional repository (Rothfritz et al., 2025) or personal publication lists (Dorsch et al., 2018).

It would be an interesting research topic to compare researchers' "true" scientometric representations (based upon their time-dependent complete sets of publications and citations for a specific period of time) and their representations in single information services (e.g., WoS and Scopus) or in combinations of these information services. A reviewer of this article called such a representation a "scientometric personhood," being "an algorithmic-bibliometric view of the academic self, shaped as much by indexing systems and visibility infrastructures as by the researcher's own agency" (anonymous reviewer, personal communication, August 15, 2025). Such scientometric personhoods exhibit "how scholarly lives are represented—and sometimes reduced—by quantitative proxies" (anonymous reviewer, personal communication, August 15, 2025).

Scientometric indicators are appropriate for an overview of a researcher's life work and provide us with heuristics for the researcher's research production, research impact, and research topics. However, quantitative data on publications, citations, and topics are only the beginning of the description, analysis, and interpretation of the contents of an ego's publications and the citations those publications attracted. At this point, we have to talk with colleagues and co-authors, and we have to read and understand all the literature that is recognized as important.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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