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Digital Transformation of Public Libraries: Framing the Topic through Bibliometric Research

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Abstract: The central research question of this paper is whether and to what extent the library, particularly the public library, has been recognised as an object of study in scholarly publications on digital transformation. A bibliometric study was conducted in Scopus and Web of Science to identify the most productive authors and affiliations as well as the core journals according to Bradford's law of scattering and to determine the semantic relationships of the term 'digital transformation' with reference to controlled vocabularies and thesauri. The findings indicated that while research on digital transformation in business and public sectors has gained significant attention in academic literature over the past decade, the digital transformation of public libraries remains an underexplored area.

Keywords: digital transformation, public libraries, bibliometrics, Web of Science, Scopus, controlled vocabulary, subject categorisation scheme, publication productivity

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1. Introduction

Digital transformation is becoming increasingly important in modern society. It affects all spheres of public life and not only 'offers significant opportunities for improved quality of life, innovation, economic growth and sustainability but also poses new challenges to the structure, security and stability of our societies and economies' (European Commission, 2022). It implies and is most commonly understood as the use of information technology to support the management of an organisation or activity. However, it is much more than merely implementing and using digital technology. The phenomenon is triggered by alterations in organisational structure and culture, leadership, skills and roles of staff within an organisation in a way that contributes to its value and relevance to the society and its users. Processes can be perceived positively as well as associated with negative consequences. Digital technologies are changing users and their expectations, altering the competitive environment and leading to a significant increase in data and how it is created, used and distributed. Technology enables organisations to change how they create value to meet their objectives. It is also important to understand that inertia in implementing activities and tasks or staff resistance can affect the transformation and implementation of digital technologies (Vial, 2019).

Exploring the digital transformation of a non-profit organisation is based on the same premises and expectations observed in and characteristic of business organisations, even creating an environment of competition between them. An essential aspect to study and analyse is the level of digital transformation in cultural organisations. Comprehending this phenomenon and the readiness of these organisations to reflect it in their specific activities, organisational structure, and services offered to the users would enhance the meaning and place the activities in public focus.

As one of the GLAM organisations, public libraries are also influenced by social and technological changes. The digital transformation in these institutions has different dimensions. Some are primarily technological and are related to the digitisation of library collections, others are part of innovative practices and

model of services and some are organisational transformations. Within the research project 'Digital Maturity of Public Libraries in Bulgaria' , digital transformation is of research interest not only as a concept but also as a stage in the development of public libraries. It is therefore pertinent to investigate the trends in this area, and a part of the research task is the study of publications within the broad scope of the topic to derive principles, guidelines and existing examples of digital transformation in public libraries to develop a model for measuring digital maturity in public libraries (Marquet, 2021).

2. Research Design and Methodology

The bibliometric studies based on Scopus and Web of Science (WoS) databases, used as a tool to measure the impact and significance of research activities and for science mapping, are a predominant part of world knowledge evaluation and comparison (Li et al., 2010; Ellegaard and Wallin, 2015; Shi, Mai and Wu, 2022).

For example, a simple search in Google Scholar for the past 20 years returned 49,000 results for bibliometric reviews (2004–2024). These studies provide not only a retrospective and prospective view of fundamental scientific issues but also a holistic approach to analysing the research ecosystem.

It seems quite logical that bibliometric reviews often focus on peer-reviewed scholarly publications (and mainly in impact-factor journals) in leading international scientometric databases. This is determined not only by the demand for access to high-quality scholarly and research content but also by imperatives set at the level of educational policies, regulatory and legislative documents and various project funding schemes that 'encourage' the process of publishing in such journals.

Although the authors agree that this approach provides beneficial insights into scholarly output and citation counts in the academic context, it may not account for several key discourses and practices. These occur outside of these contexts and are covered by other sources such as grey literature (reports, dissertations,

research papers, institutional reports, etc., often containing innovations and innovative approaches not adequately represented in conventional academic publications).

The authors found it interesting to examine from a research perspective the extent to which publications on the digital transformation of public libraries are present in databases, particularly the WoS and Scopus. The findings are expected to provide a 'snapshot' of this dynamic topic, as reflected in the scientometric databases. Furthermore, they can serve as a foundation for future bibliometric studies with a larger scope of sources and resources.

The process of identifying the most influential publications and authors, as well as the core journals and key aspects of a specific topic, is based on a systematic approach. This involves proper terminological clarification, application of advanced search strategies, analysis of bibliographic data, content analysis and visualisation and analysis of bibliometric data. Thus, a combination of various qualitative and quantitative scientific and scientometric methods and cross-validation of the data were applied to monitor the digital transformation. This process was scrutinised in terms of library development and modernisation considered as part of the digital agenda.

In compliance with the guiding research question of whether and to what extent the library, as an institution, is considered a subject of research in scholarly publications on digital transformation, the following research objectives were defined:

RO1: To develop an advanced search strategy using enhanced search methods in Advanced and Expert Modes, applying Boolean and Facet search to construct queries and filter the results;

RO2: To pose similar search queries both in Scopus and WoS Core Collection for in-depth comparison of bibliographic metadata;

RO3: To sort, extract and visualise the aggregated bibliographic datasets;

RO4: To compare the imported data from Scopus and WoS on the following indicators and exclude the duplicate records/data: Authors, Affiliations, Source Title, Article Title, Author Keywords and Keywords;

RO5: To identify and clarify terms based on the broader and narrower concepts and semantic relationships of the term ‘digital transformation’ in the hierarchy of terms with reference to controlled vocabularies and thesauri.

2.1. Limitations

One of the objectives of the study was to precisely highlight, via the authors’ keywords and contextual analysis, the aspects by which digital transformation in the field of libraries is conceptualised and analysed and to extract alternative concepts (RO5). Hence, the information search was performed based on search strings using the keywords ‘digital transformation’ and ‘library*’, without adding synonyms or alternative terms.

This bibliometric study focused on the WoS platform and its Core Collection and the Scopus database. To avoid duplication of the results, searches in Google Scholar and other platforms containing scientific information were excluded. Bibliographic data retrievals from the Scopus database and the WoS platform were valid as of 20/03/2024.

2.2. Advanced Search Strategy

To identify and highlight trends and research priorities on the topic, the applied systematic research involved five stages:

1) Defining search fields and search modes for keyword-based search

2) Determining a chronological framework based on the number of documents distributed by the year of publication

3) Exploring the topic ‘digital transformation’ with regard to libraries

4) Identifying the presence of publications in Library and Information Sciences (LIS) that are contextually relevant to the digital transformation

5) Highlighting the documents related to the digital transformation of libraries, particularly public libraries

As a first step, to extract the maximum amount of contextual information and to cross-validate the data available in both resources, common criteria were

defined to start the search process. For the keyword-based search in WoS, the 'Topic' (TS) (ClarivateTM, 2023) search field was selected as it simultaneously retrieves information from several fields, revealing the meaningful content of the documents: 'Title', 'Abstract', 'Author Keywords' and automatically added keywords - (Keywords Plus®). Similarly, for Scopus, the combined search field 'Article Title, Abstract, Keywords' (TITLE-ABS-KEY) was selected to extract the textual content from the bibliographic records.

The KeyWords Plus search field data in WoS were 'words or phrases that frequently appear in the citation titles of an article but do not appear in the title of the article itself'. They cannot be modified because they are generated from the citation titles. KeyWords Plus may also be available for articles that do not contain keywords formulated by the author(s) and may also be added as additional keywords that include significant terms not listed in the author(s)' keywords. The availability of bibliographic information in English for almost all WoS articles means that few (if any) KeyWords Plus terms are not in English (ClarivateTM, 2022c).

The algorithm for automatic keyword generation (KeyWords Plus), described by Eugene Garfield (1990a, 1990b), is interesting and not well known. In fact, the idea originated much earlier— in 1957—when Garfield and his colleague Robert Hayne conducted research at SK&F Labs. They investigated how much information could be algorithmically extracted from the titles of cited resources in drug-related articles for indexing purposes. They believed that 'derived' indexing, i.e. using the titles of the articles cited at the end of the text, will aid in extracting more relevant terms for indexing. Their research has not been published, and there have been no further investigations on this issue for a decade (Garfield and Sher, 1993).

The second stage of the information search was related to determining the chronological framework. Considering the results of the initial search, which indicated that the increase in the number of publications on the research topic began in the last 20 years and the presence of less than 20 publications per year

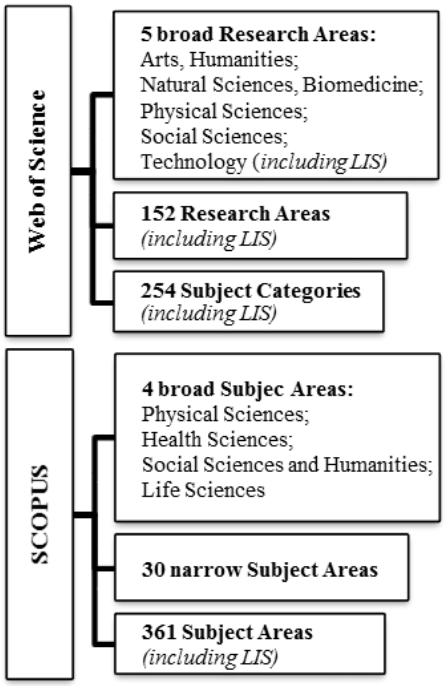
before 2014, a period of 10 years (2014–2023 for WoS; >2013 <2024 for Scopus) was set.

Subject categories contextually relevant to digital transformation were added as a next step to delineate the availability of publications in LIS. The research areas—the schema of subject classification—which is valid for all WoS databases and can be used 'to identify, retrieve and analyse documents from multiple databases on the same subject' (ClarivateTM, 2023a) is categorised into five broad areas in 152 research areas and 254 subject categories (Figure 1). The journals and books covered by the WoS Core Collection are associated with at least one WoS category, each focusing on one research field (ClarivateTM, 2023b).

The equivalent broad subject areas for Scopus are four, with 30 narrow subject areas and a list of 361 subject areas using Elsevier All Science Journal Classification Codes (ASJC) codes (Scopus, 2023) that can be compared with WoS subject categories as they are sub-fields of major research areas. To perform a search using ASJC codes (Kim and Jeong, 2023) insertion, SUBJTERMS codes must be added to advanced search queries. Therefore, to search for LIS articles in Library and information sciences, we had to enter, SUBJTERMS (3309) as code 33 was used for the Social Sciences ASJC category and the Social Sciences and Humanities subject area.

It is important to note that the Refine Results option, supported by both WoS and Scopus, was not implemented as there was a discrepancy in the level of retrieval results by subject areas. As mentioned above, WoS provides Web of Science Categories and Research Areas, while Scopus only offers 30 subject areas for filtering the results. These are highly generalised and cannot be used to specify the results by sub-areas such as Library and Information Sciences.

Fig. 1. Web of Science and Scopus subject categorisation schemes



In comparison with the Field of Science and Technology (FOS) UNESCO/OECD classification, published in the Frascati Manual (OECD, 1963; OECD, 2002: 67), there are six principal fields of science and technology: A. Natural Sciences; B. Engineering; C. Medical Sciences; D. Agriculture; E. Social Sciences; F. Humanities and Fine Arts. The FOS is complete with sub-divisions. However, the LIS field was not added until 2007, when the Revised FOS classification was published in the Frascati Manual. The scientific fields were almost the same, but narrower levels were added: 1. Natural Sciences; 2. Engineering and Technology; 3. Medical Sciences; 4. Agricultural Sciences; 5. Social Sciences, 5. Media and Communications: Journalism, Information Science (social aspects), Library Science; 6. Humanities (OECD, 2007: 10).

2.3. Search Queries and Results

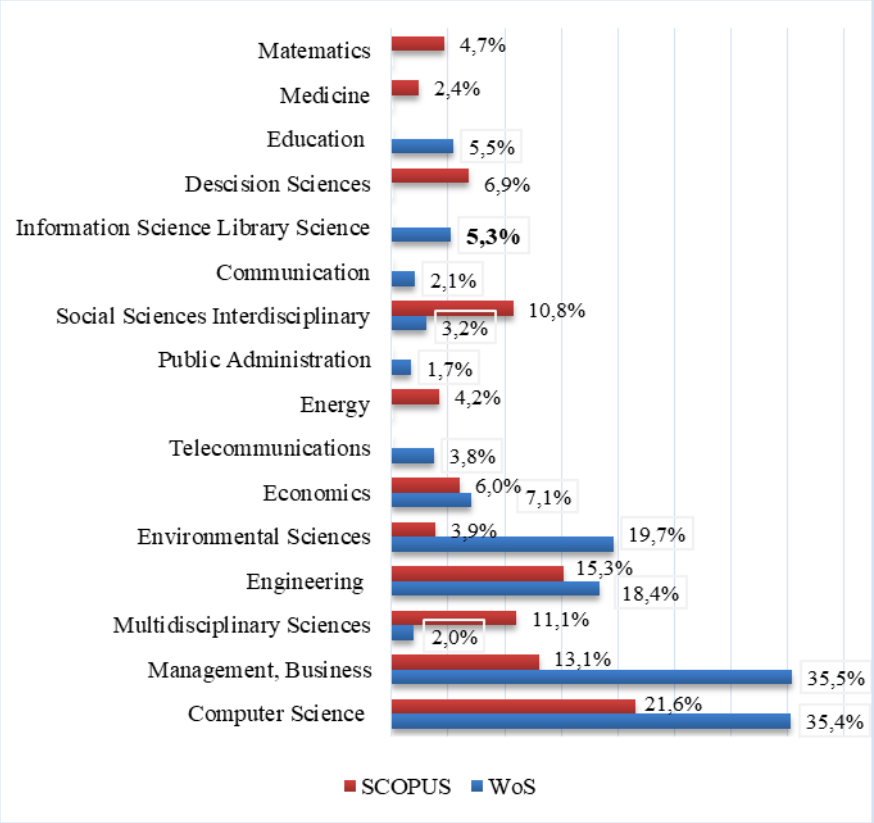
To achieve the objectives (RO1–RO3) of the study and in conjunction with the implementation of the information strategy, several queries and strings were formulated using the advanced search options (Table 1).

Table 1. Web of Science and Scopus – search query strings and results

	Web of Science Core Collection		Scopus	
#	Query	Results	Query	Results
1	(TS=("digital transformation")) AND PY=(2014-2023)	11837	(TITLE-ABS-KEY ("digital transformation") AND PUBYEAR > 2013 AND PUBYEAR < 2024)	21 938
2	(((TS=("digital transformation")) AND TS=("librar*")) AND PY=(2014-2023))	155	(TITLE-ABS-KEY ("digital transformation") AND TITLE-ABS-KEY ("librar*")) AND PUBYEAR > 2013 AND PUBYEAR < 2024	237
3	((TS=("digital transformation")) AND WC=(Information Science & Library Science)) AND PY=(2014-2023)	625	(TITLE-ABS-KEY ("digital transformation")) AND SUBJTERMS (3309) AND PUBYEAR > 2013 AND PUBYEAR < 2024	521
4	(((TS=("digital transformation")) AND TS=(librar*)) AND WC=(Information Science & Library Science)) AND PY=(2014-2023)	90	(TITLE-ABS-KEY ("digital transformation") AND TITLE-ABS-KEY ("librar*")) AND SUBJTERMS (3309) AND PUBYEAR > 2013 AND PUBYEAR < 2024	77
5	(((((TS=("digital transformation")) AND PY=(2014-2023)) AND TS=("digital transformation")) AND TS=("public librar*")) AND WC=(Information Science & Library Science)) AND PY=(2014-2023)	8	(TITLE-ABS-KEY ("digital transformation") AND TITLE-ABS-KEY ("public librar*")) AND SUBJTERMS (3309) AND PUBYEAR > 2013 AND PUBYEAR < 2024	5

The first search query was wide-ranging and aimed to determine how representative the topic of digital transformation was across the two platforms over the selected 10-year period (query #1). The number of results indicated that Scopus had almost two times more documents on the topic than WoS. The distribution of publications by subject area (Scopus) and research category (WoS) for these results outlined the research profile and scientific fields of the topic in the scholarly literature (Figure 2). The percentile ratio was calculated based on the results obtained separately from the two datasets.

Fig. 2. Top 25 scoring categories for the topic 'digital transformation' for the period 2014–2023 from Web of Science Core Collection and Scopus



As illustrated in the chart, the following research areas emerged as the ones with the greatest number of publications related to digital transformation (over (>10%): Computer Science; Management, Business; Engineering;

Environmental Sciences; and Social Sciences. The comparative analysis showed that some of the research areas were not represented in both WoS and Scopus; they appeared in only one of the resources, and the graph depicts this result. The initial observation could be that there were not enough documents in the two databases in the respective fields on the topic under study. However, cross-validation of the metadata indicated that the imbalance was primarily due to variations in topic categorisation schemes in WoS and Scopus (Figure 1). As an argument supporting this conclusion, the research area LIS was specifically examined.

The results of query#1 suggested that LIS documents were available only in WoS (5.3%). Nonetheless, the use of bibliometric analytical tools in Scopus and some additional calculations revealed the following:

- From the 21,938 results obtained, 4,920 publications were classified under the broader research area of Social Sciences (including sub-fields), which equated to 22.4%.
- Of these 4,920 publications, 521 were in the LIS research area, representing 10.7%.
- Therefore, of the 21,938 outputs, those in the LIS area represented 2.4%.

At this stage, drawing a conclusion about the occurrence of the concept of 'library' relevant to digital transformation in the retrieved documents was difficult. To pursue our investigation further, a more in-depth and detailed analysis of the bibliographic metadata had to be conducted and additional searches had to be performed (query #2). The results obtained were quite logically limited in number (155 in WoS and 237 in Scopus). They did not explicitly answer the key research question of whether and to what extent libraries, as institutions, are the subject of research in the scholarly literature in both resources.

The analysis of metadata signified that the intended context of the term library was revealed, but there was also information noise, for example, about the

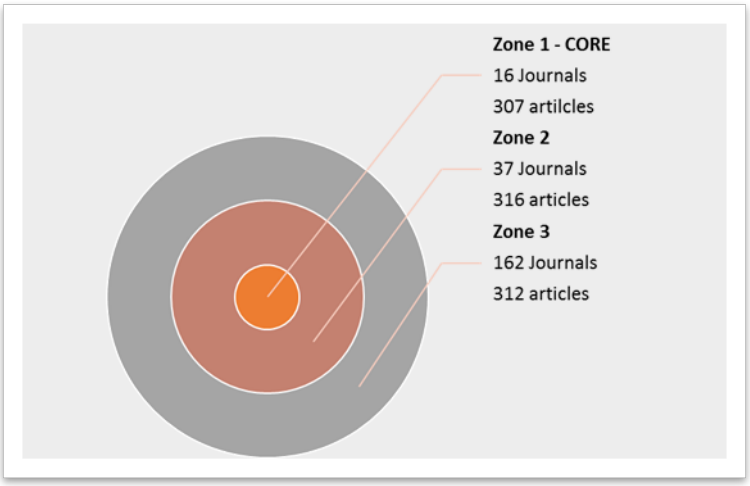
perception of libraries as digital datasets (digital libraries) that were not exclusively related to library issues. However, with the embedded visualisation tools in WoS, 90 documents were determined to be related to the LIS research area. In contrast, in Scopus, only publications classified under the Social Sciences subject area (113) were found.

The subsequent step in the bibliometric study was to investigate the extent to which the topic 'digital transformation' has been explored in LIS (considering that documents are indexed in both resources by subject categories of the journals in which they are published)—query #3—and to explore the distribution of journals based on the highest number of publications according to Bradford's law. The law states that 'documents on a given 'subject' are distributed (scattered) according to a certain mathematical function so that a growth in papers on a subject requires a growth in the number of journals/information sources'.

The number of groups of journals to produce a nearly equal number of articles is approximately in proportion to 1: n: n2 …, where n is the Bradford multiplier (Hjørland and Nicolaisen, 2005). According to Bradford, journals could be categorised into three zones, as follows: 'the first group thus becomes the nucleus of periodicals in a subject field and necessarily contains more articles on that subject than periodicals including articles on related subjects; the second zone contains a large number of moderately productive journals; and the third zone contains a large number of low-productivity articles'. (Mathankar, 2018).

The retrieved data from query#3— 625 documents from WoS and 521 from Scopus—were chosen for Bradford law implementation. After the removal of duplicates, the total number of publications was 935 and the number of journals was 215 (Figure 6).

Fig. 6. Distribution of the topic 'digital transformation' in Library and Information Sciences research field journals in WoS and Scopus in total according to Bradford Law



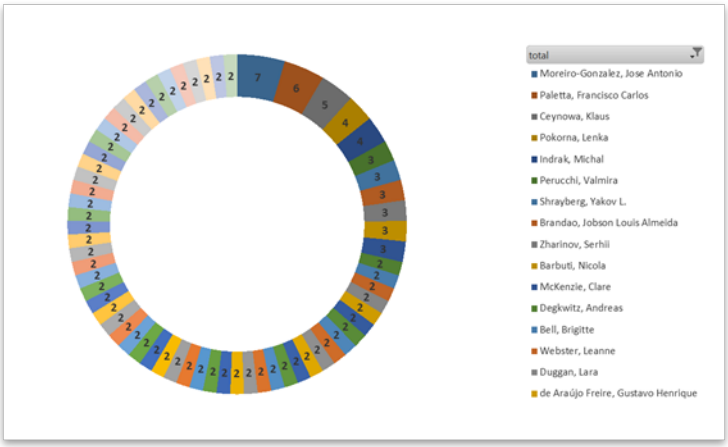
The information search conducted up to this stage revealed certain interesting observations and correlations. However, to frame the results on the topic of digital transformation of libraries, the next search string was formulated (query #4). This string was based on the assumption that the digitisation of library infrastructures is mostly studied in the field of LIS. In fact, this was already confirmed for WoS by the results of a previous query (#2), where the 90 documents from the field of LIS were ranked first among the top 15 of WoS research areas.

The results indicated the presence of 90 documents in the WoS and 77 in Scopus, with the topic linked to the digital transformation of libraries. This observation led to the conclusion that all 90 documents identified in WoS during the previous search for digital transformation in the LIS research area were also contextually related to the keyword 'library*'. Nonetheless, precision was lacking for Scopus owing to the categorisation scheme, and a more detailed analysis is needed.

The implementation of RO4 required extracting metadata from the results of query#4 to compare the documents in the two datasets on various indicators and

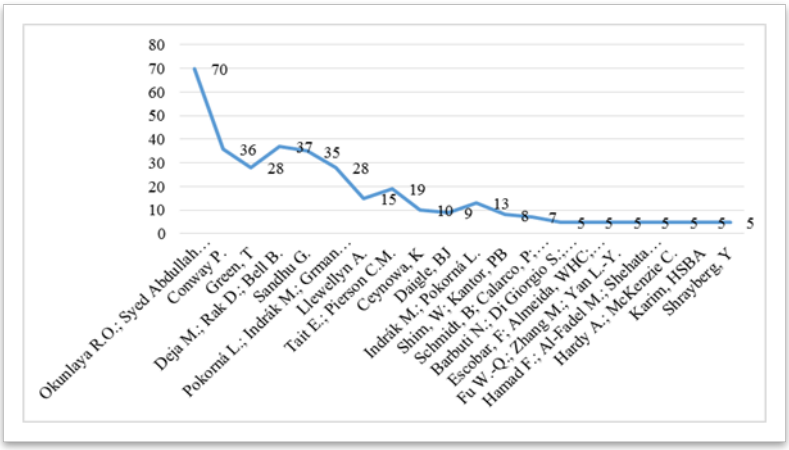
highlight the following: the most contributive and highly cited authors (Figures 3 and 4); the journals with the most publications on the topic (Figure 5); the affiliations associated with the largest number of documents and the authors' keywords (Figure 8).

Fig. 3. Top 20 authors with publications on digital transformation in the context of libraries in the Library and Information Sciences research field for WoS and Scopus in total



The most productive authors were registered with seven articles indexed in both databases, and they had three citations of their articles in WoS and five in Scopus. Nevertheless, it is interesting to note that among the most influential authors (with the most citations) were Okunlaya R.O., Syed Abdullah N. and Alias R.A., who had two articles but 60 citations (Figure 4).

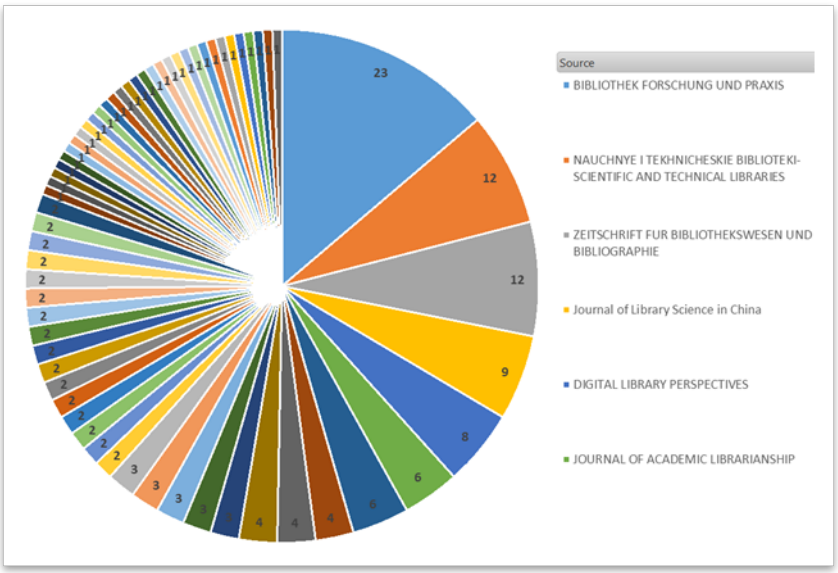
Fig. 4. Top 20 highly cited authors with publications on digital transformation in the context of libraries in the Library and Information Sciences research field for WoS and Scopus in total



The affiliation indicator showed that Universidad Carlos III de Madrid, Universidade de São Paulo and the University of Wollongong each had three papers in Scopus, whereas RUSSIAN NATL PUBL LIB SCI TECHNO had six and BAYER STAATSBIBLIOTHEK had five entries in WoS.

Within the 10 most productive journals, BIBLIOTHEK FORSCHUNG UND PRAXIS was distinguished by 23 publications and 20 citations, and Library Hi Tech had three publications but 70 citations (Figure 5).

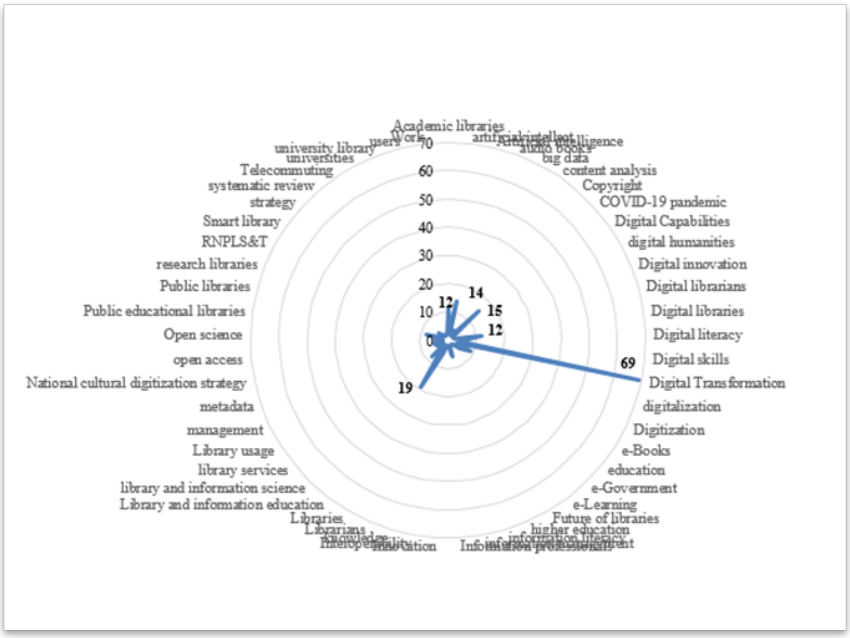
Fig. 5. Journals with publications on digital transformation in the context of libraries in the Library and Information Sciences research field for WoS and Scopus in total



The authors' keyword analysis, which 'identified the most popular topics covered by the bibliometric analysis and showed that multidisciplinary articles had the greatest impact' (Ellegaard and Wallin, 2015), could be used as an instrument to identify research concepts.

To clarify the terms based on the broader and narrower concepts and semantic relationships of the term 'digital transformation' in the hierarchy of terms (RO5), controlled vocabularies and thesauri were consulted. Three controlled vocabularies widely known and commonly used in document indexing and querying by information and library professionals and with broad, universal coverage of scholarly fields and document types were used for comparative analysis: the UNESCO Thesaurus, EuroVoc and LCSH.

Fig. 7. Authors' keywords from publications on digital transformation in the context of libraries in the Library and Information Sciences research field for WoS and Scopus in total



Authors' keywords (uncontrolled terms) were extracted from Scopus and WoS—145 unique and 20 duplicates—and those with a number of points >2 were used for analysis (Scopus: 37; WoS: 44).

Comparison of keywords with the controlled terms (Table 2) revealed the following observations:

- Only author keywords were used, free and uncontrolled.
- Variety in index and synonym selection was observed.
- Varied use of established terminology was noted (for example, library types).
- New, non-established terms borrowed from other scientific fields and current social events were observed.
- Difficulties were encountered in keyword searching in different information resources.

 The use of controlled vocabularies contributed to the uniformity of the applied indexes and to the establishment of standardised searches, which enhanced the efficiency of systems and the quality of information search.

Table 2. Comparative analysis of WoS and Scopus author keywords and controlled vocabularies: UNESCO Thesaurus, EuroVoc and LCSH

Author Keywords	*DB*		*Controlled term*		
	W.	*S.*	*UNESCO*	*EUROVOC*	*LCSH*
Digital Transformation	**35**	**34**	**Digitization**	**Digital Transformation**	**Technological innovations**
Libraries	7	12	Libraries	Library	Libraries
Digital libraries	4	8	Digital libraries	virtual library	Digital libraries
Artificial intelligence	7	7	Artificial intelligence	artificial intelligence	Artificial intelligence
artificial intellect	3		-	-	-
Academic libraries	6	6	Academic libraries	university library	Academic libraries
university library		2			
Coronavirus/ COVID-19	6		Pandemics	coronavirus disease	COVID-19 (Disease); Pandemics
COVID-19 pandemic	2	5			
digitisation	**4**		**Digitization**	**digitisation**	**Digitization**
Digitization		**5**			
digitalization	**3**		**-**	**-**	**-**
open access	5		Open access	open access publishing	Open access publishing
Open science		2	Open science	open science	Open scholarship
Public library	3	5	Public libraries	public library	Public libraries
information literacy	2	4	Information literacy	digital literacy	Information literacy
Digital literacy	3	3	Digital skills		Computer literacy
Digital skills	2	2			Digital skills
e-books	3	2	Books	book trade	Electronic books
information management	3	2	Information management	information	Information resources management
Librarians	2	3	Librarians	information profession	Librarians
Library science	2		Library science	information science	Library science
librarianship	3				
library and information science	3				
metadata	3	2	Cataloguing	metadata	metadata
Research libraries	3		Research libraries	scientific library	Research libraries

systematic review	3		-	-	Systematic reviews (Medical research)
audio books	2		-	-	-
big data	2		-	-	-
content analysis	2	2	Programme content	information analysis	Content analysis/ Communication
Copyright	2		Copyright	copyright	Copyright
Digital Capabilities	2	2	-	-	-
digital humanities		2	-	-	Digital humanities
Digital innovation		2	-	-	-
Digital librarians		2	-	-	-
education	2		Education	education	Education
e-Government	2		Electronic governance	electronic government	Electronic government
e-Learning	2		Electronic learning	distance learning	Distance education
Future of libraries	2		-	-	-
higher education	2		Higher education	higher education	Education, Higher
Information professionals	2		-	-	-
Innovation		2	Innovation	innovation	-
Interoperability		2	-	-	-
knowledge		2	Knowledge	knowledge management	Knowledge, Theory of
Library and information education	2		Library education	-	Library education
library services	2	2	Libraries	library	Public services (Libraries)
Library usage	2	2	-	-	-
Lockdown	2		-	-	-
management	2	2	Management	management	Management
National cultural digitization strategy		2	-	-	-
Public educational libraries		2	-	-	-
RNPLS&T	2		-	-	-
Smart library	2	2	-	-	-
strategy	2				Strategy
Telecommuting		2		teleworking	Telecommuting
universities	2		Universities	university	Universities and colleges
users	2		Consumers	-	
Work		2	-	work	Work

Quite logically, digital transformation was the leading keyword as it was the preferred one for all searches. However, an interesting finding was that this term

was not present in the established controlled vocabularies UNESCO Thesaurus and LCSH. It occurred only in EuroVoc as this thesaurus is used to index all resources of the EU institutions, and among them are several documents related to initiatives under the digital agenda. Another finding pertains to the term digitisation, which also did not exist in controlled vocabularies and for which the term digitisation was used as a synonym, although not entirely accurate.

Some keywords closely related to the research topic (digital capabilities, digital innovation and digital librarians) were also not developed in the thesauri. Therefore, the question of standardising terms in bibliographic databases and systems remains open as new concepts are yet to be introduced in controlled terminology.

4. Conclusions

Analysis of the results revealed that there were almost twice as many digital transformation documents in Scopus as in WoS. However, when filters were applied to the subject areas of LIS, the number was approximately equal, and the number of digital transformation documents for public libraries was quite limited.

The conceptualisation of the digital transformation in relation to libraries outlines public libraries as modern information, cultural and social institutions, occupying a key position in providing information for the needs of a wide range of users in the digital era. Its development is driven by the general trends of digital transformation to adapt to the contemporary digital environment and to be able to assume its new responsibilities in terms of information and knowledge management. The public library is, among other things, an organisation that, in the course of its modernisation, is influenced by the same factors that determine changes in other entities of the cultural, information and, more broadly, economic model.

When bibliometric methods are applied to institutions such as public libraries, considerable epistemological limitations are present. Typically used to quantitatively measure scholarly output, these methods may fail to capture the

specific dynamics and practices within these institutions that are not documented in peer-reviewed articles. Public libraries, for instance, play a crucial role in social interaction and access to information for communities, which may not be sufficiently reflected by bibliometric indicators such as citation counts or publications. As such, methods focused on quantitative data create a limited and one-dimensional view of the realities faced by these institutions.

Therefore, to more comprehensively understand phenomena and innovations in public libraries and similar institutions, a broader range of information sources must be incorporated. Furthermore, methods that account for the different forms of knowledge and practices outside the strict academic sphere must be applied. Such an approach would provide a richer and more nuanced picture of their activities and societal significance.

Acknowledgement

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