# MAPPING OF SCIENTIFIC PUBLICATIONS ON LIBRARIES AND THE SUSTAINABLE DEVELOPMENT GOALS (SDGs): A BIBLIOMETRIC ANALYSIS

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## **Abstract**

This study explores the scientific literature that examines the role of libraries in implementing the Sustainable Development Goals (SDGs). Using a bibliometric approach, the dataset comprises 1,152 publications indexed in Scopus from 2016 to 2024, analyzed with VOSviewer software. The results reveal a growing trend in publications, particularly between 2020 and 2024. The most productive countries are the United States, India, and Nigeria, while the most influential journals include Emerald Emerging Markets Case Studies, Sustainability (Switzerland), and Library Philosophy and Practice. The most frequently cited articles focus on themes such as cultural sustainability, public libraries, digital inclusion, and open access. Co-occurrence analysis produced seven thematic clusters, encompassing areas such as information management, academic innovation, and information literacy. Overlay and density visualizations indicate a thematic shift from digital infrastructure to more contextual topics, including green libraries and community engagement. These findings affirm the position of Library as a social science discipline that contributes to sustainable development. In addition, these findings are expected to provide an empirical foundation for future research agendas.

Keywords: Bibliometric, Co-occurrence analysis, Library, SDGs

#### Abstrak

Studi ini mengeksplorasi publikasi ilmiah yang menelaah peran perpustakaan terkait dengan Tujuan Pembangunan Berkelanjutan (SDGs). Dengan menggunakan pendekatan bibliometrik, kumpulan data terdiri dari 1.152 publikasi yang terindeks di Scopus selama periode 2016 hingga 2024, yang dianalisis menggunakan perangkat lunak VOSviewer. Hasil analisis menunjukkan tren publikasi yang terus meningkat, khususnya antara tahun 2020 dan 2024. Negara-

negara paling produktif dalam topik ini adalah Amerika Serikat, India, dan Nigeria, sedangkan jurnal paling berpengaruh meliputi Emerald Emerging Markets Case Studies, Sustainability (Switzerland), dan Library Philosophy and Practice. Artikel-artikel yang paling sering disitasi berfokus pada tema-tema seperti keberlanjutan budaya, perpustakaan umum, inklusi digital, dan akses terbuka. Analisis Co-occurrence menghasilkan tujuh klaster tematik yang mencakup bidang-bidang seperti manajemen informasi, inovasi akademik, dan literasi informasi. Visualisasi overlay dan density menunjukkan adanya pergeseran tematik dari infrastruktur digital menuju isu-isu yang lebih kontekstual, termasuk perpustakaan hijau dan keterlibatan komunitas. Temuan ini menegaskan posisi perpustakaan sebagai bagian dari disiplin ilmu sosial yang berkontribusi nyata terhadap pembangunan berkelanjutan. Selain itu, temuan-temuan ini diharapkan dapat memberikan landasan empiris bagi agenda-agenda penelitian di masa mendatang.

**Kata Kunci**: Analisis *Co-occurrence*, Bibliometrik, Perpustakaan, SDGs

### A. INTRODUCTION

The Sustainable Development Goals (SDGs), declared by the United Nations on January 1, 2016, represent a global initiative to address the multidimensional challenges threatening the survival of humanity and the planet. This agenda comprises 17 goals and 169 interlinked targets, reflecting a comprehensive effort to eradicate poverty, reduce inequality, promote inclusive growth, and ensure ecological sustainability (United Nations, 2015). Within this context, sustainable development is not solely understood as a technocratic process, but also as an ethical and normative principle integrating social, economic, and environmental sustainability (Guerra et al., 2022; Keitsch, 2018).

Amidst these global dynamics, libraries play a strategic role in supporting the achievement of the SDGs. As safe and inclusive spaces, libraries not only provide open access to information and knowledge but also function as centers for lifelong learning. Supported by professional staff, libraries are expected to enhance public literacy, expand the reach of educational services, and bridge information gaps, particularly among marginalized communities (Kosciejew, 2020; Wang & Si, 2024).

The International Federation of Library Associations and Institutions (IFLA), as the global umbrella organization for libraries,

has demonstrated a strong commitment to reinforcing the role of libraries in achieving the SDGs. Through a network spanning more than 150 countries, IFLA promotes collaboration among national institutions. professional associations. stakeholders to ensure their readiness to support this global agenda (Devi et al., 2024; Nhamo & Malan, 2021). Additionally, access to information has been recognized as a cross-sectoral issue and a fundamental prerequisite for the successful realization of the SDGs. Libraries are instrumental in promoting equitable and inclusive access to information (Anasi et al., 2018; Jaeger et al., 2015). Through information literacy campaigns, libraries help equip communities with the essential skills needed to participate actively in social, economic, and environmental sustainability (Taylor & Jaeger, 2021; Witt, 2024).

As global awareness increases, a number of studies have indicated that libraries across various countries are beginning to take an active role in supporting the implementation of the SDGs, although with varying forms and intensities. For instance, in Australia, SDG indicators have been integrated into institutional strategies and university sustainability reports, creating synergy between information services, educational policies, and global agendas (Missingham, 2025). In France, data-driven advocacy and intensive training programs have strengthened the role of librarians as actors in local and national development (Bats et al., 2017). Canada has developed various operational strategies to support SDG 4 (Quality Education), SDG 5 (Gender Equality), and SDG 16 (Peace, Justice, and Strong Institutions) through environmental education, digital training, and civic literacy initiatives (MacNeil, 2021).

In Indonesia, six priority programs have been launched by the National Library (Perpusnas, 2024), including the transformation of libraries through social inclusion-based services, the enhancement of literacy culture for public welfare, strengthening access to information via inclusive digital services, preservation of national cultural heritage, dissemination of cultural heritage at the global level, and multi-level library partnerships. These initiatives reflect a national commitment to positioning libraries as key drivers of sustainable development.

Nevertheless, systematic scientific mapping of library engagement with the SDGs remains relatively limited. Several bibliometric studies indicate that most sustainability-related publications originate from disciplines such as ecology, environmental studies, economics, and business (Martínez-Falcó et al., 2023). Prior research has highlighted the growing academic attention toward the contribution of libraries in supporting the

SDGs through bibliometric approaches. Sahu & Shivarama (2025) examined publication trends in higher education libraries and compared them with altmetric scores, yet did not address the social dimension of library contributions. Onyancha (2024) mapped the global contributions of Library and Information Science (LIS) to the SDGs, finding the share still minimal, with the analysis primarily statistical and lacking social reflection. Kalita et al. (2023) analyzed international collaboration networks and research trends but did not explore the social perspectives of libraries.

These three studies collectively suggest that research on the intersection between libraries and the SDGs is evolving, especially through bibliometric and scientific collaboration network approaches. However, few studies explicitly position Library and Information Science (LIS) as a field rooted in the social sciences. Emphasizing the social nature of LIS is crucial to ensure that research focus moves beyond mere publication quantification toward exploring the conceptual and transformative contributions of LIS as part of the social sciences.

This study aims to address this gap by presenting a comprehensive bibliometric analysis of scholarly literature discussing the role of libraries in supporting the SDG agenda. Utilizing data from the Scopus database under the social sciences subject area, this study analyzes publication growth trends and the main thematic foci emerging in the academic discourse. Consequently, the approach adopted in this research not only contributes academically to the body of literature in Library and Information Science (LIS) and sustainability studies but also provides an empirical foundation to inform strategic policymaking at the institutional level.

## B. RESEARCH METHOD

This study employs a quantitative bibliometric method to analyze scholarly literature related to the contribution of libraries to the achievement of the Sustainable Development Goals (SDGs). The bibliometric approach was selected for its ability to provide a comprehensive overview of publication trends, collaboration patterns, and emerging thematic focuses within a particular field of study (Donthu et al., 2021). Data were retrieved from the Scopus database, which is internationally recognized for its broad coverage and high-quality indexing of reputable scientific articles (Majidah & Rullyana, 2024).

The analysis in this study consists of two main components: (1) a mapping of research trends and (2) a co-authorship analysis of

dominant research themes to identify the knowledge structure. The analysis was conducted using the VOSviewer software, which enables the visualization of keyword networks and supports the interpretation of complex literature structures through overlay visualization and density mapping techniques (Rullyana et al., 2024).

Step 1	Step 2	Step 3	Step 4	Step 5
Defining	Initial	Refinement	Compiling	
Search	Search	of the	the Initial	Data
		Seacrh	Data	Analysis
Kerword	Results	Results	Statistics	

Figure 1. Bibliometric steps analysis (Johan et al., 2025)

# **Defining Search Kerword**

The initial step in the bibliometric analysis is to determine keywords that are both relevant and representative of the topic. The search was conducted in the Scopus database using the following combination of keywords: "Librar\*" AND "SDGs" OR "Agenda2030" OR "sustainab\*". Keywords were searched within the "article title," "abstract," and "keywords" fields in the Scopus document search feature.

### **Initial Search Results**

The initial search conducted in January 2025 yielded a total of 6,427 documents across various publication types, including journal articles, conference proceedings, book chapters, and reviews. These results served as the preliminary dataset prior to the application of further filtering and selection processes aimed at identifying documents with more specific relevance.

# **Search Result Screening**

To ensure the quality and relevance of the documents, the screening was conducted based on the following criteria: (1) published between 2016 and 2024; (2) classified under the social sciences subject area; (3) limited to articles and conference proceedings; (4) written in English; and (5) with final publication status. The screening process was carried out in four stages: identification, initial screening, eligibility assessment, and inclusion. Following this process, a total of 1,152 documents met the criteria and were included for further bibliometric analysis.

## Identification

A search using the keywords "Librar\*" AND ("SDGs" OR "Agenda2030" OR "sustainab\*") retrieved 6,427 documents across all publication years in the Scopus database.

# Screening

An examination of documents containing the terms "Librar\*" AND ("SDGs" OR "Agenda2030" OR "sustainab\*"), published between 2016 and 2024 and classified under the social sciences subject area, resulted in 1,619 documents being identified.

# **Eligibility**

Documents were selected based on the following criteria: article and conference proceeding types, sourced from journals and conference publications, written in English, published in final form, and classified under the social sciences subject area. A total of 1,152 documents were obtained after applying these criteria.

# Inclusion

A total of 1,152 eligible documents were included in this bibliometric analysis..

Figure 2. Steps in refining the search result of bibliometric analysis

## **Data Compilation and Export**

The bibliographic data from the selected documents were exported in two formats: Comma-Separated Values (CSV) and Research Information System (RIS). The CSV format was used for quantitative analysis and network visualization using VOSviewer software, whereas the RIS format was employed for metadata documentation and further reference management. The exported data included elements such as author names, institutional affiliations, article titles, keywords, journal sources, and publication years.

## **Data Analysis**

The bibliometric analysis was conducted through two main approaches: performance analysis and science mapping. Performance analysis involved the distribution of publications by year, country, institution, and most productive authors. Meanwhile, science mapping was conducted to identify keyword relationships using co-occurrence techniques. The results were visualized in the form of thematic network maps to provide insights into the

structure and dynamics of LIS research related to the SDGs from a social science perspective.

## C. RESULTS AND DISCUSSION

Figure 3 illustrates the growth in the number of publications related to the contribution of libraries to the Sustainable Development Goals (SDGs) during the period from 2016 to 2024. Overall, the publication trend shows a relatively steady increase from year to year, although minor fluctuations occurred in certain periods. In 2016, there were 95 publications, and this number declined slightly to 83 in 2017. However, from 2018 to 2020, a gradual increase is evident, rising from 104 to 134 publications.

A significant surge occurred in 2024, with the number of publications reaching 195 articles, the highest in the entire observation period. This spike indicates growing scholarly interest in the strategic role of libraries in supporting the sustainable development agenda, particularly in the post-pandemic era, when issues such as digital literacy, information access, and equity have become increasingly critical.

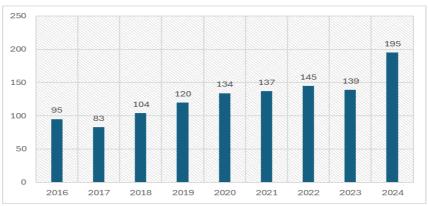


Figure 3. The development of publication of research

Overall, the average number of publications per year during the 2016–2024 period was 128, with a trend indicating positive growth, particularly in the last three years. This data suggests that the topic of the relationship between libraries and the SDGs is not only relevant but is also gaining increasing attention from the global academic community. These findings highlight the potential of Library and Information Science (LIS) as a recognized social science field contributing meaningfully to the discourse on global sustainable development.

To identify the most influential journals publishing articles on the contribution of libraries to the Sustainable Development Goals (SDGs), an analysis was conducted based on the number of publications issued by each journal. Out of a total of 1,152 articles, only ten sources met the criterion of publishing at least 15 articles on this topic during the 2016–2024 period.

As shown in Table 1, the most productive journal in this area is Emerald Emerging Markets Case Studies, with a total of 76 publications. This is followed by Sustainability (Switzerland), with 72 publications, and Library Philosophy and Practice, which contributed 64 articles.

**Tabel 1. Most Influential journals** 

Rank	Sources	N
1	Emerald Emerging Markets Case Studies	76
2	Sustainability Switzerland	72
3	Library Philosophy and Practice	64
4	Library Management	36
5	Proceedings of the Association for Information	28
	Science and Technology	
6	Journal of Academic Librarianship	23
7	Ifla Journal	20
	Journal of Librarianship and Information	17
8	Science	
9	Journal of Library Administration	16
10	Digital Library Perspectives	15

These findings indicate that the topic of library contributions to sustainable development has gained attention across journals situated at the intersection of information studies, library science, and development policy. They also suggest that *Emerald Emerging Markets Case Studies* holds the most prominent influence in publishing on this topic, reflecting the multidisciplinary nature of SDG-related research that incorporates perspectives from Library and Information Science as part of the social sciences.

Table 2 presents the distribution of publications based on the country affiliations of authors involved in articles discussing the role of libraries in supporting the Sustainable Development Goals (SDGs). Overall, publications in this area originate from 95 countries, reflecting the global and transboundary nature of sustainability issues and the evolving role of libraries as international actors. The United States is recorded as the leading

country in terms of publication output, contributing 308 documents. India ranks second with 87 publications, followed by Nigeria with 85. The United Kingdom holds the fourth position with 69 publications, and South Africa follows with 54 contributions.

**Tabel 2. Most Influential Journals** 

Rank	Country	N
1	United States	308
2	India	87
3	Nigeria	85
4	United Kingdom	69
5	South Africa	54
6	China	51
7	Australia	49
8	Indonesia	41
9	Iran	38
10	Canada	35

These findings suggest that the topic of the relationship between libraries and the SDGs has received considerable geographical attention, though it remains concentrated in high-income countries. This distribution also underscores the importance of encouraging greater participation from developing nations, including those in the Global South, to strengthen both scientific contributions and policy relevance in mainstreaming the role of libraries within the global sustainable development agenda.

According to Table 3, the five most cited articles in this study reflect the thematic diversity of library contributions to sustainability issues. Loach et al. (2017) emphasize the significance of cultural sustainability as the fourth pillar of development, highlighting the role of museums and libraries in preserving community heritage and social identity. Meanwhile, Hendricks et al. (2020) discuss the importance of open scholarly metadata, such as Crossref, as part of a sustainable scholarly communication infrastructure.

**Tabel 3. Most influential journals** 

Rank	Title	Authors	Cite
1	Cultural sustainability: strategy for	Loach et	128
	museums and libraries	al., 2017	

Rank	Title	Authors	Cite
2	Crossref: The sustainable source of	Hendricks	112
	community-owned scholarly	et al.,	
	metadata	2020	
3	Public libraries as an infrastructure	Audunson	71
	for a sustainable public sphere: A	et al.,	
	comprehensive review of research	2019	
4	Enhancing the Academic Library	Mckie &	67
	Experience with Chatbots: An	Narayan,	
	Exploration of Research and	(2019)	
	Implications for Practice		
5	Is open access affordable? Why	Green,	44
	current models do not work and	(2019	
	why we need internet-era		
	transformation of scholarly		
	communications		

A conceptual study by Audunson et al. (2019) positions public libraries as democratic and inclusive public spaces, drawing on Habermas's theory to emphasize their role in shaping civil society. McKie and Narayan (2019) offer an innovative perspective by integrating chatbots into academic library services to enhance efficiency and promote digital inclusion. Finally, Green (2019) critiques current open access models and proposes a transformation of the scholarly publishing system to achieve greater economic and social sustainability.

Figure 4 presents a keyword co-occurrence network visualization based on publication metadata analyzed using the VOSviewer software. This analysis generated seven major clusters representing the thematic structure of research on library contributions to sustainable development (SDGs). Each cluster reflects the association of specific topics that frequently appear together in the titles and abstracts of articles identified in the Scopus database.

Cluster 1 includes terms such as sustainable development, metadata, digitization, knowledge management, and decision making, indicating a focus on digital information management and data transformation to support development policy. Cluster 2 comprises terms such as academic libraries, innovation, social enterprise, and leadership, highlighting the strategic role of higher education libraries in institutional development and social entrepreneurship. Cluster 3 groups keywords such as education, student, software, systematic review, and librarian, which reflect the

contribution of libraries to the broader learning and research ecosystem.

Meanwhile, Cluster 4 highlights themes such as open access, publishing, information services, and social media, emphasizing the importance of information openness and scholarly communication in supporting the achievement of the SDGs. Cluster 5 includes terms such as curricula, e-learning, and higher education, indicating a focus on the integration of learning technologies into sustainable education. Clusters 6 and 7 reinforce the environmental and social dimensions through keywords such green as environmental sustainability, community engagement, and public libraries, illustrating the active involvement of libraries in ecological sustainability and community participation initiatives.

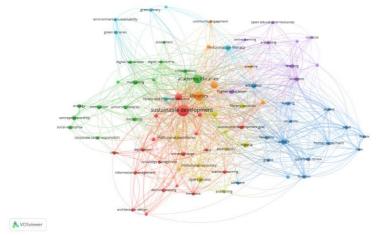


Figure 4. Network visualization map of keywords cooccurrence

Thus, this keyword map provides a comprehensive overview of the complexity and diversity of topics linking libraries to the sustainable development agenda, further reinforcing the position of Library and Information Science (LIS) as a multidimensional discipline within the global SDG research landscape.

The overlay visualization analysis generated using VOSviewer, as presented in Figure 5, enables the mapping of temporal dynamics in research concerning the relationship between libraries and the Sustainable Development Goals (SDGs). In this visualization, purple indicates topics that dominated early-stage research (2019–2020), while green to yellow represents newer and

emerging topics that gained prominence during the period from 2022 to 2024.

In general, keywords that appeared earlier tend to be associated with digital foundations and information systems, such as digitization, open access, metadata, and library services. These topics are visualized in purple to blue tones, indicating that, in the initial stages, LIS research related to the SDGs primarily emphasized digital infrastructure and open access to information as critical pillars of sustainable development.

Starting from 2021 onward, a thematic shift toward more contextual and social topics is evident. Keywords such as academic libraries, information literacy, and community engagement dominate the green spectrum, signaling the growing emphasis on information literacy and community collaboration within inclusive development approaches. This trend reflects increased awareness of libraries' roles as social actors in supporting equitable access, public participation, and community empowerment, all of which are core values of the SDGs.

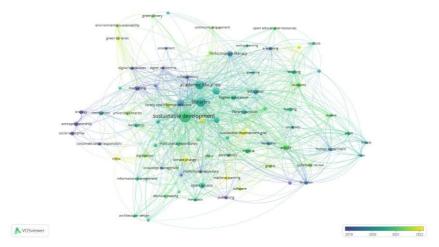


Figure 5. Overlay visualization map of keywords cooccurrence

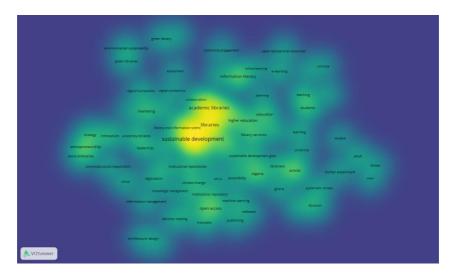
More recent research trends, represented by yellow nodes, show the emergence of terms such as green libraries, curricula, open educational resources, and environmental sustainability. The appearance of these keywords indicates a new trajectory in LIS literature that broadens the field's contribution to environmental concerns and open education. The focus on green libraries demonstrates the integration of ecological values into the

management and design of library services, while open educational resources represent a commitment to global educational equity through open access to learning materials.

Another important finding is the strengthened connectivity between the topics library and information science, higher education, and sustainable development, which appear at the center of the visualization, marked by large node sizes and bright green coloring. This suggests that these three elements serve as core anchors in the scientific discourse and represent a key site of multidisciplinary collaboration across education, information, and development policy.

The density visualization displayed in Figure 6 illustrates the variation in topic distribution within bibliometric studies on library contributions to sustainable development. This map shows differences in keyword density based on the degree of interconnectedness. Areas in bright yellow indicate keywords with high frequency, reflecting concentrated scholarly attention, while dark blue regions represent lower-frequency keywords that remain underexplored.

Some of the most prominent keywords, appearing in deep yellow, are sustainable development, libraries, and academic libraries. This confirms that the primary research focus in this domain is centered on the role of libraries, particularly academic libraries, in supporting the sustainable development agenda. The terms library and information science, information literacy, and higher education also show high density, suggesting that information literacy and higher education are two major sectors extensively studied within the SDG context.



## Figure 6. Density visualization map of keywords co-occurrence

Other terms such as digitization, knowledge management, climate change, institutional repositories, and open access appear in green to bluish-green tones, indicating a moderate level of connectivity within the bibliometric discourse. Although these terms do not reach the centrality of the primary keywords, their presence suggests the emergence of interdisciplinary topics that are beginning to be integrated into library and sustainability studies.

Interestingly, several keywords such as entrepreneurship, social enterprise, green library, digital humanities, and architectural design appear in dark blue and are located on the periphery of the network. This indicates that, despite their conceptual relevance to sustainability and the evolving role of libraries, these topics have not yet become dominant in the literature and hold considerable potential for further exploration. In other words, these areas represent relatively new or underexplored intellectual spaces within the intersection of library science and the SDGs.

Overall, this visualization does not merely reflect the density of terminology, but also serves as a strategic tool for understanding the dynamics and developmental trajectories of the literature. In this context, bibliometric analysis functions not only as a statistical method, but also as an epistemological compass, guiding information scientists in designing research agendas that are more responsive to societal needs and global challenges.

## D. CONCLUSION

This study presents a comprehensive bibliometric analysis aimed at mapping the scientific landscape concerning the contribution of libraries to the achievement of the Sustainable Development Goals (SDGs) within the domain of Library and Information Science (LIS). Based on publication data retrieved from the Scopus database and analyzed using VOSviewer software, the scientific literature in this field demonstrates stable growth, with a significant increase observed in recent years. Research hotspots have been identified around the themes of libraries, sustainable development, and academic libraries, indicating that the role of libraries in supporting sustainable development has emerged as a key focus within global scholarly discourse.

Thematic distribution reveals a strong emphasis on topics such as information literacy, higher education, and open access, while themes such as green libraries, social entrepreneurship, and digital humanities remain in peripheral zones. These underexplored

areas present valuable opportunities for future research. The overlay visualization further highlights temporal dynamics in keyword emergence, with new topics such as information literacy and online learning gaining momentum over the past three years.

From a methodological standpoint, this study demonstrates the strength of bibliometric analysis in systematically capturing publication patterns and thematic structures across the LIS research landscape. However, it also acknowledges certain limitations, including the exclusive reliance on a single data source (Scopus), the lack of detailed classification of document types, and the absence of integration with systematic reviews or meta-analytical methods.

To address these limitations, future studies are encouraged to adopt a mixed-method approach that combines bibliometric techniques with in-depth qualitative analysis. Such an approach would enable researchers not only to map the knowledge landscape but also to understand how libraries concretely intervene in social processes and contribute to the achievement of the SDGs within both regional and global contexts.

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