



Mapping Research Trends in Public Services' Digital Archives: A Bibliometric Analysis

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Abstract. This study employs bibliometric methods to analyze the global development of digital archives in public services, examining 366 Scopus-indexed publications from 1983 to 2025. Data was processed using Scopus's analytical tools and visualized via VOSviewer to map subject distribution, publication trends, regional contributions, and keyword clusters. The findings reveal that social science (26.7%) and computer science (25.1%) dominate the field, highlighting an interdisciplinary intersection between social and technological frameworks. Although the publication volume grew modestly after 1995, it peaked in 2022. The United States leads the global output with 82 publications, followed by major European and Asian nations, reflecting widespread international interest. Keyword analysis identified “digital storage,” “information services,” and “digital libraries” as central themes, indicating a strategic shift towards enhancing information accessibility and management systems. Ultimately, these results underscore the vital role of digital archiving in driving efficiency and transparency in public services, providing a foundation for future policy development and scholarly inquiry.

Keywords: digital archives; public services; bibliometric; VOSviewer.

1 Introduction

Digitalization has emerged as a crucial component in the modern era's change of archives management and public services. By increasing efficiency, accessibility, and transparency, technological breakthroughs have spurred new developments in raising the standard of public services. Because digital archives management provides effective storage options, streamlines data collection, and makes archive tracking and monitoring easier, it has become an extremely important demand for many agencies, especially in public service sectors [1]. However, there are unique obstacles to this shift, including a lack of information and communication technology-savvy personnel, poor infrastructure, and the quick speed of technological advancement. The results of information technology mentoring at several public service organizations show that ongoing support is necessary to address infrastructure and human resource constraints to ensure effective and safe archival digitalization [2]. Digitalization has a big impact on archival preservation outside of public services. Because digital platforms and computerization

allow for quicker, simpler, and more economical storage and retrieval procedures, using digital media in archives management is an efficient way to address information governance [3]. This is evidenced by the implementation of the SRIKANDI digital archive application at the Office of the Ministry of Religious Affairs in Surabaya, which successfully accelerated document storage and distribution while simultaneously increasing the volume of Umrah registration service users from an average of 100 to 300 individuals per day [4].

By implementing a digital archive system, administrative processes in public services can be accelerated, red tape can be reduced, service accessibility can be expanded, and the overall quality of public service delivery can be enhanced [5]. The advantages of public services digitalization include the ease of public access to information and services, increase in governmental openness, and improvement of the efficiency and quality of the services offered [6]. This system can also promote more public involvement in technology-based community empowerment and development activities within the framework of the public sector. Therefore, the adaptation of digital archiving principles to public services produces great advantages such as improved productivity, financial efficiency and quality of service. In the field of digital archives in public services, it is important to pay great attention to the demands and expectations of the public, as well as to the building of public confidence and the clear understanding of archival digitization in the delivery of public services.

The development of public services in the digital era requires the implementation of user-centered design concepts [7]. In the context of digital archiving, a user-centered design approach helps institutions to discover the public needs and preferences about the usage of public services and also allows them to monitor the problems and difficulties faced by the public in accessing these services. Nevertheless, the implementation of this digitalization must carefully address its inherent challenges, including data security threats, technological access disparities, and regulatory adjustments, to ensure that the digital transformation of public services proceeds in an inclusive and sustainable manner [8].

This study employs bibliometric analysis, a method that facilitates the assessment of research productivity through publication trends, evaluates the impact of specific topics, and maps existing literature via network analysis [9]. This method is widely recognized as effective for providing a comprehensive overview of global publication trends, the geographical distribution of research, and the contributions of leading scholars within a particular field [10]. Furthermore, bibliometrics assists researchers in identifying research gaps in a more systematic and transparent manner. Concurrently, VOSviewer is utilized as a visualization tool due to its capability to import data directly from Scopus and Web of Science, as well as to display results in the form of network maps, density visualizations, and item clustering [11]. Leveraging these functionalities, VOSviewer enables researchers to analyze trend patterns, the distribution of countries and institutions, document types, and the most frequently discussed keywords within the domain of digital archiving for public services.

2 Method

This study utilizes data sourced from the Scopus database. The rationale for selecting Scopus lies in its rigorous pre-publication peer-review process and its esteemed reputation, making it a highly recommended platform among prolific scientific researchers. The use of Scopus as a main data source for bibliometric studies on digital-based public services is in line with previous research, such as a study on the e-government system in Ghana which was able to evaluate more than 2,700 documents from this database [12]. The data were collected on the 10th of November 2025, and a total of 366 articles published in Scopus were obtained. The search was performed with the key-words "Digital Archives for Public Services". Inclusion criteria were all languages and publications from 1983 to 2015. Additionally, the overall article analysis was executed using the "analyze results" feature in Scopus to examine distributions by year, author, country/region, subject area, and document type. Once all relevant articles matching the keyword criteria were compiled, the dataset was exported in Comma-Separated Values (CSV) format for further processing using VOSviewer software.

VOSviewer is a software tool specialized in constructing and visualizing network data, allowing for the comprehensive exploration of bibliometric maps [13]. It is employed to analyze network items through various analysis types, including co-authorship, co-occurrence, citation, bibliographic coupling, co-citation, and thematic analysis. Furthermore, VOSviewer is utilized to explore data, execute mapping, and cluster retrieved articles [14]. A bibliometric approach integrated with VOSviewer delivers rigorous quantitative data and in-depth insights, thereby generating empirically validated results. This aligns with the perspectives of a mathematics academic from Vietnam, Tong (2025), who notes that bibliometric studies analyzing scientific publications within specific domains have gained significant popularity recently due to their capacity to process massive datasets and deliver high-impact analytical insights. Consequently, the application of VOSviewer facilitates research mapping to gain a deeper understanding of digital archive systems and their impact on the effectiveness and efficiency of public services.

After collecting all the data, during the VOSviewer usage stage, the researcher imported files from 366 articles obtained from the Scopus database. Then, VOSviewer mapped the data using three visualizations: network visualisation, overlay visualization, and density visualisation.

3 Results and Discussion

3.1. Article Subject Area

Through bibliometric data analysis in the Digital Archive for Public Services topic, 11 subject uses were obtained in published documents. Social Science ranked first at 26.7%, followed by Computer Science at 25.1%. This proves that the trend of writing

about social science and computer science is becoming increasingly popular. Other subjects that are below 20%, namely, engineering at 10.7%, arts and humanities at 9.6%, mathematics at 4.9%, medicine at 4.1%, business management and accounting at 3.3%, earth and plane at 2.8%, decision sciences at 2.2%, materials science at 2.0%, and others at 8.6%.

This proportion indicates that the Digital Archive for Public Services topic focuses on social and technological aspects, whereas other areas tend to be supportive and complementary. This is supported by the statement that integrating technology, policy, and public participation, this IT-based archive reconstruction model can be an important foundation in strengthening bureaucratic reform, supporting the e-government agenda, and realizing more open and responsive governance to public needs [16].

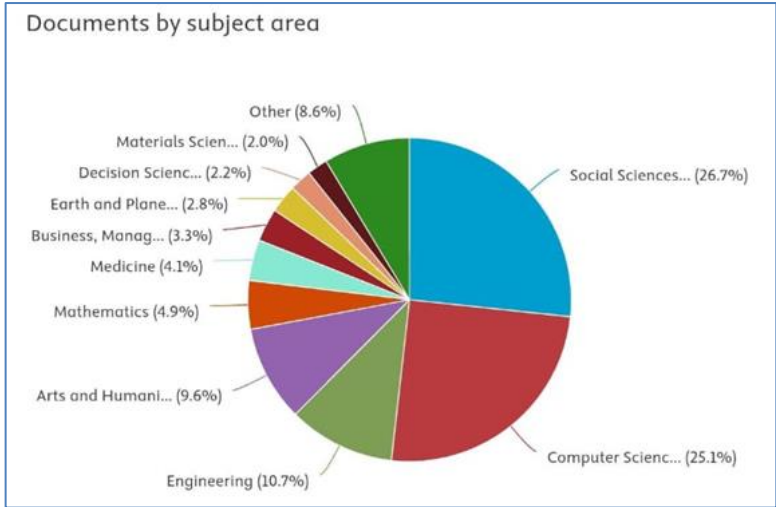


Fig. 1. Distribution of Digital Archive Subject Areas for Public Sectors

3.2. Trends in Annual Publication

The graph in Figure 2 displays the development trend of documents published annually with the theme "Digital Archive for Public Service." The number of documents found was 366 documents from 1983 to 2025. From the graph, it is clear that the trend on this topic is inconsistent each year, especially in the early years when the digital archiving system was still new and had not yet become the main focus of research studies. Only one document has been dealing with digital archiving systems since 1983. After then, no articles in Scopus dealt with this topic in 1984-1985. This suggests that the topic was not very popular in academia at that time. In 1986 there was a little uptick with two publications and none from 1987 to 1991. Between 1995 and 2021, there was a slow increase, which shows the interest in digital archives, especially in helping public services in the government. The pinnacle was reached in 2022 with 27 documents published. After that high, an inconsistent tendency happened again in 2023-25, with 18,

17, and 21 documents released respectively. They are not as many as in 2022, but the data indicate that the interest in the subject is still stable.

There is a gradual increase from 1995 to 2021, which suggests that the topic of digital archiving has attracted increasing scholarly attention due to its believed capacity to improve information accessibility, management efficiency and archival preservation [17]. Publication volume peaked in 2022, reaching 27 published documents. Following this peak, a fluctuating trend reoccurred between 2023 and 2025, with 18, 17, and 21 documents published, respectively. Although these figures do not match the 2022 peak, they demonstrate that scholarly interest in this domain remains sustained.

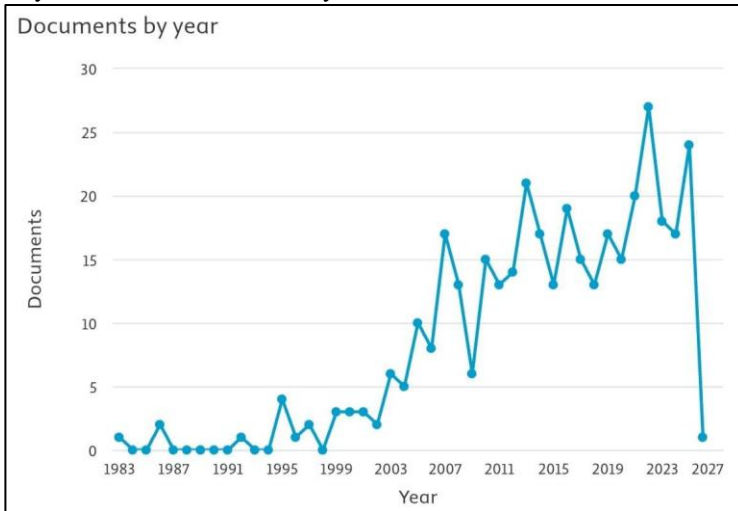


Fig. 2. Annual Publication Trend for Digital Archive for Public Services.

3.3. Country publication trends

Figure 3 shows data on countries conducting research on Digital Archives for Public Services from 1983 to 2025. According to the acquired data, the United States published the most documents on this topic, 82 and 31 documents in the Undefined category, respectively, largely in English. Please note that the first paragraph of a section or subsection is not indented. The first paragraphs that follows a table, figure, equation etc. does not have an indent, either. The United States disclosed the most documents among the 10 countries, with seven times more than South Africa, which had the least number shown in the graph. This shows that there is a lot of interest in DAM systems for public services in the US. The United States published the most documents in 2013, with eight publications. The U.S. National Archives and Records Administration, the Florida center for Library Automation, and the University of Illinois Urbana-Champaign were the top contributing publishers. These documents were mostly published as articles and conference papers, demonstrating a balance between theoretical research and academic findings.

Meanwhile, most documents in the Undefined category were published in the form of articles and conference reviews. In this category, the Scopus system does not specifically detect author data or country of origin. However, the presence of this category still indicates a contribution, even if not fully recorded. In addition to the United States and the undefined category, several other countries are also actively conducting research in this area, namely, the United Kingdom (24 documents), Italy (19 documents), Germany (17 documents), China (17 documents), Canada (15 documents), Finland (13 documents), Spain (12 documents), South Africa (11 documents), and Taiwan (11 documents). Although the number of published documents is not as large as in the United States, the diversity of countries recorded demonstrates that research on digital archiving systems for public services has grown and received global attention.

The geographical distribution of research within this domain is predominantly led by technologically advanced and sophisticated nations, particularly in the Americas and Europe. Within the evolution of archival research, the transformation toward digitalization, information infrastructure, and service innovation represents a powerful trend that has propelled growing academic attention to digital archives. Concurrently, emerging contributions from other nations in Asia and Africa indicate a shift toward global equilibrium in the development and adoption of digital archival systems.

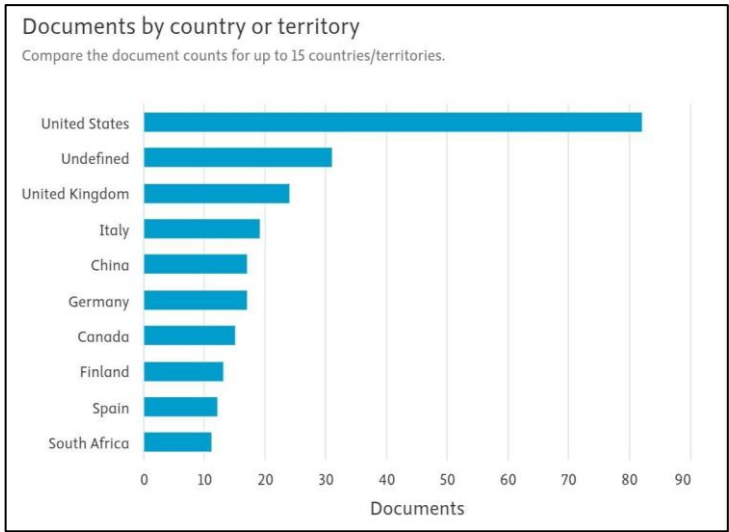


Fig. 3. Publication Trends by Country for Digital Archives for Public Services.

3.4. Analysis of the Distribution of Research Institutions

Figure 4 illustrates the data for the top ten affiliations conducting research on "Digital Archives for Public Services." In terms of the retrieved dataset, the main contributors of publications in this domain are the University of South Africa, the Instituto de Engen-

haria Electrónica e Telemática de Aveiro, Aalto University, and the South-Eastern Finland University of Applied Sciences, each with 11 publications. The data reveal that these institutions are highly focused on scholars in the development of digital archiving for public services. Subsequently, several institutions demonstrate an identical output volume of 4 documents each, including the Universidade de Aveiro, ETH Zürich, and The U.S. National Archives and Records Administration. These are followed by institutions with a contribution of 3 documents each, namely the Florida Center for Library Automation, Humboldt-Universität zu Berlin, and the Victoria University of Wellington.

In terms of institutional classification, the majority are universities and research institutes, demonstrating that research within this domain is heavily dominated by academic environments and associated research centers. Conversely, entities such as The U.S. National Archives and Records Administration play a critical role in studying the practical application of digital archival system concepts within the public administration sector. Figure 4 highlights a diverse array of affiliation types engaged with this topic, spanning higher education institutions, research centers, and national archival agencies. This also reflects the expanding scope of international collaboration in digital archiving, characterized by varied research priorities. Such a distribution pattern aligns with the nature of digital archives research, which continues to evolve dynamically, experience thematic diversification, and require the reinforcement of scholarly collaboration across institutions [18].

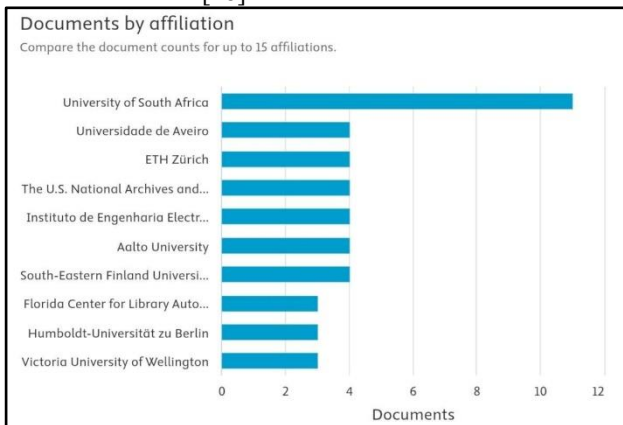


Fig. 4. Publication Trends by Institutions for Digital Archives for Public Services.

3.4. Document Type Trend Analysis

Based on the pie chart analysis, nine distinct document types were identified within the domain of "Digital Archive for Public Services" over a 42-year period since 1983. The article is the most dominating document type with 51.6% (189 documents). The second largest document type is the conference papers with 30.3% (111 documents). The proportion of the other document kinds is distributed throughout the rest. This finding is consistent with Mubarak and Istiana (2022) who reported that journals articles always become the most prevalent document type in bibliometric studies. Other categories are

Book Chapters (24 documents, 6.6 %), Reviews (17 documents, 4.6 %) and Conference Reviews (14 documents, 3.8 %). Lastly, document types representing less than 3% of the dataset comprise Books at 1.6% (6 documents), Notes at 0.8% (3 documents), alongside Short Surveys and Retracted papers, each at 0.3% (1 document). These results demonstrate that research on this topic has been widely published in scientific journals and frequently presented as proceedings across various conferences. This finding is further supported by Komalasari (2021), who observed that articles represent the most prevalent document type in Scopus-based bibliometric analyses.

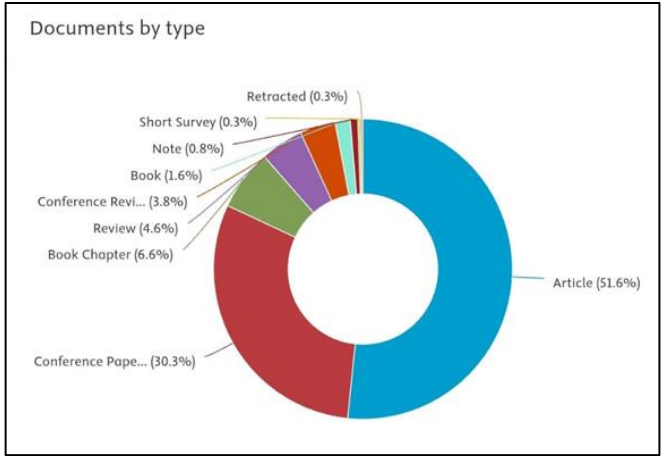


Fig. 5. Publication Trends by Type of Documents

3.6. Keyword Analysis

CSV data processing for Digital Archives for Public Services was analysed using the co-occurrence feature in VOSviewer software, with a minimum number of keyword occurrences set at 5. The analysis yielded 528 keywords, classified into 15 large groups (clusters), with digital storage (total link strength: 289), information services (total link strength: 283), and digital libraries (total link strength: 268) as the most commonly discussed keywords (Table 1).

Table 1. The most commonly discussed keywords.

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No	Key Words	Occurrences	Total Link Strength
1	Digital Storage	39	289
2	Information Services	35	283
3	Digital Libraries	39	268
4	Information Management	29	261
5	Internet	23	121
6	Human	20	207

7	Metadata	24	195
8	Digital Archive	22	193
9	Article	25	186
10	Archives	30	158

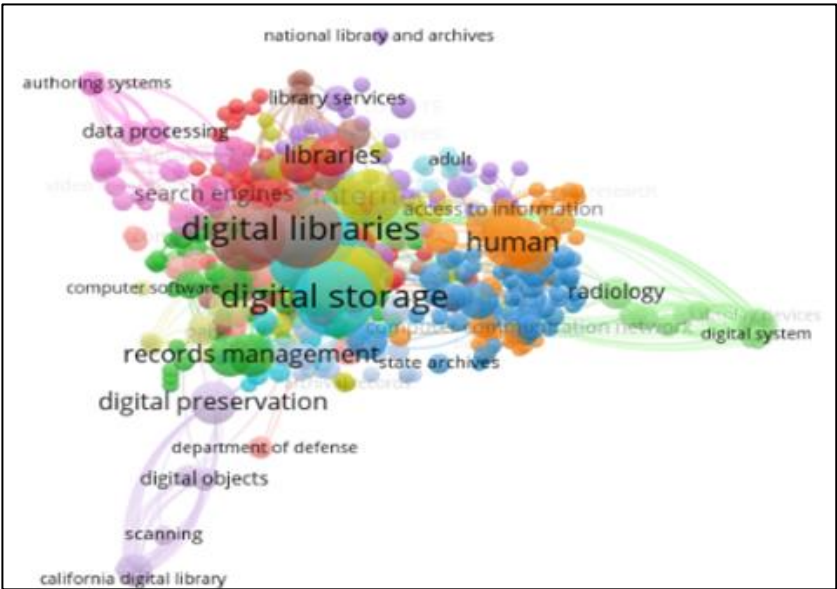


Fig. 6. VOSviewer Network Visualization of Keywords for Digital Archives for Public Services.

Based on the network visualization (Figure 6), using the keyword "Digital Archives for Public Services" reveals "digital storage" as the most dominant keyword and the primary hub within the research network. Co-occurrence analysis shows that “digital storage” is the most frequent appearing keyword with 39 occurrences and total link strength of 289, indicating a strong link with other keywords in the digital archiving field. Table 1 further highlights the preponderance of this keyword. The table results show that a number of other keywords have great popularity after “digital storage” both in number of occurrences and link strength. The keywords of this paper are information services, digital libraries, information management, internet, human, metadata, digital archives, articles and archives. In short, these keywords suggest that the research on digital archiving also includes information services, data governance, and archival accessibility in digital contexts beyond storage.

The overlay visualization (Figure 7) enables an analysis of the chronological development of digital archival research through the color gradients in the keyword network. In the blue colored areas you may see keywords like “data processing”, “authoring systems” and other words relating to basic technical procedures. The blue color indicates

that the research in the early time period concentrated on the fundamental aspects of digital data processing. The green-shaded areas highlight keywords such as “digital libraries,” “records management,” “digital preservation,” and “library services” reflecting a movement in research perspective towards the management of digital collections and the strengthening of archive infrastructure. Meanwhile, the bright green to yellow transition in specific parts of the visualization highlights contemporary research topics, which generally pertain to user experience, accessibility, and the enhancement of digital services.

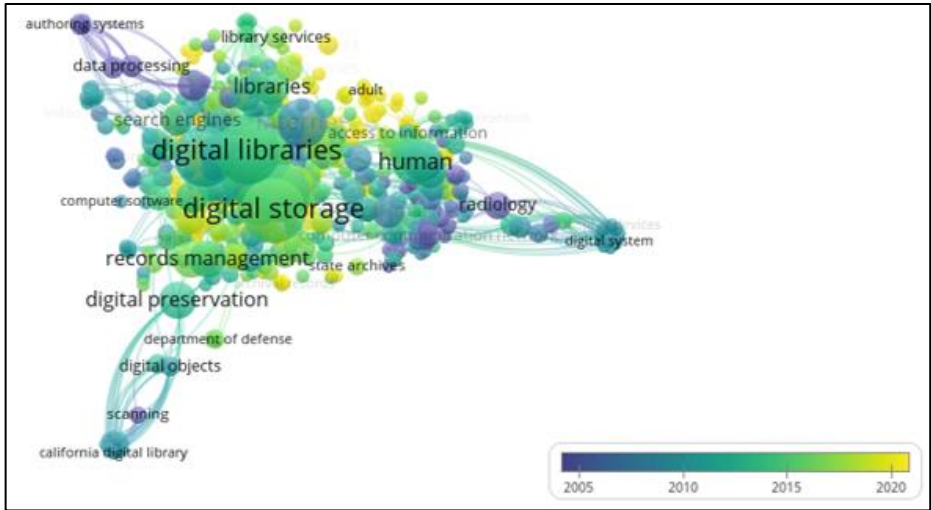


Fig. 7. VOSviewer Overlay Visualization of Keywords for Digital Archives for Public Services

Each dot in the keyword density visualization network map (Figure 8) is colored to indicate the density of discussion at that point [13]. Colors range from blue to green to yellow. The lighter (yellow) color in the dot area indicates that the keyword is frequently discussed in scientific studies. The darker (blue) color in the dot area indicates that the keyword is rarely or never discussed again Displayed equations are centered and set on a separate line.

Keywords with the brightest (yellow) density areas are digital libraries, digital storage, human resources, and information management. This indicates that in the digital age, researchers are highly interested in discussing the role of humans and how digital archival storage can significantly impact the realization of effective and efficient public services based on information management. The darker (green to blue) areas are represented by keywords such as national library and archive, digitalization, and AI. Although these keywords have not been widely discussed, they could become new and interesting studies if developed. This is due to the importance of digital transformation in the current era, especially for national archival institutions, one of which is the application of AI for effective and efficient public services in the future.

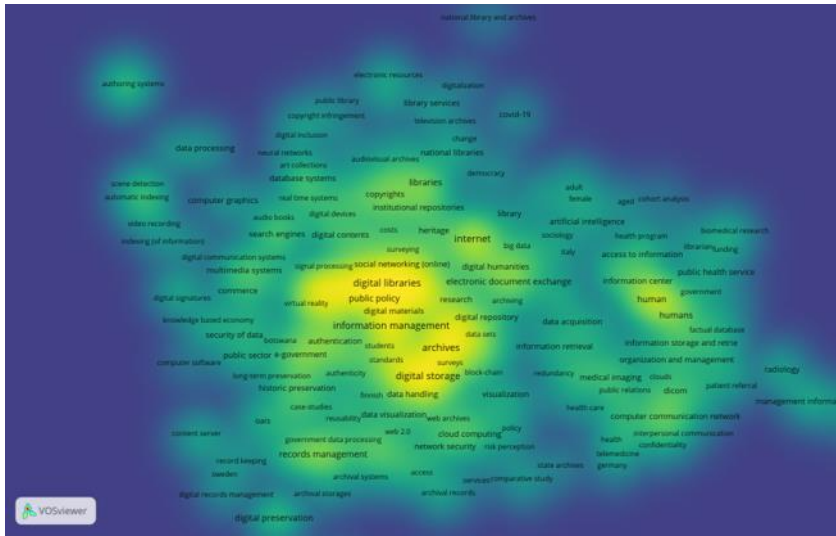


Fig. 8. VOSviewer Density Visualization of Keywords for Digital Archives for Public Services.

4 Conclusion

A bibliometric analysis of 366 publications on Digital Archives for Public Service shows that significant development has been achieved in this field. Social sciences and computer science dominate the study topics, demonstrating that digital archives management is not solely driven by technology but is also closely linked to the needs of organizations, users, and information governance. The number of publications from 1983 to 2025 shows a rise in interest in archive digitalization, peaking in 2022. Contributions from countries including the United States, the United Kingdom, Italy and China also show growing worldwide interest in digital archives. The VOSviewer keyword analysis shows that the main study topics are digital libraries, records management, digital preservation and library services, which means that there is a significant focus on the storage, access and management of digital material. Overall, the results confirm that digital archives play a vital role in improving public services' efficiency, transparency, and quality. These findings can serve as a basis for developing digital system policies, providing better information infrastructure, and innovating archives management to be more responsive to public needs in the digital era.

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Conceptualization, H.Y.O.; methodology, H.Y.O.; software, K.M.A.; validation, N.A.F.; formal analysis, A.K.D. and Q.K.Y.; MAB.; data curation, K.M.A.; writing—original draft preparation, A.K.D, N.A.F and Q.K.T.; writing—review and editing, H.Y.O.; visualization, M.A.B.; supervision, H.Y.O.; project administration, A.K.D.; funding acquisition, H.Y.O.

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