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30-year bibliometric analysis of digital library studies

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ABSTRACT

The purpose of this study is to analyse and map the metadata and keywords associated with existing research publications in digital library studies during the last 30 years. This is a quantitative descriptive study that employs bibliometric analysis approaches namely co-authorship analysis, citation analysis, and text data mapping with a help of VOSviewer computer application. The dimensions.ai, an international article indexing service, was used as the source to collect samples in this study. A total of 1,185 documents discussing digital library studies were analysed during 1991 – 2021.

The analysis discovered that Edward A. Fox is the most prolific author in the field of digital library studies, the University of Strathclyde is the most productive university, and the United States is the most prolific country. This study also found that an article entitled “Automatic recognition of multi-word terms: the c-value/ nc-value method” is the most cited article within the dataset with 390 citations, and the most productive journal publishing cited articles is d-lib magazine with 201 published documents. In addition, several interesting terms like “academic library”, “university library”, “challenge”, “problem”, “india”, “digital resources”, and “evaluation” appeared to be the most discussed keywords within all publications.

Academics and librarians from many countries have spent years researching digital libraries. This work demonstrated the importance of digital libraries for all countries, particularly when it comes to providing students and ordinary readers with access to e-books and other digital materials.

Keywords: *bibliometric analysis, citation analysis, co-authorship analysis, digital library, digital resources, text data mapping, university library*

INTRODUCTION

The use of the term “digital library” is very broad. A digital library can be defined as an assemblage of digital computing, storage, and communication hardware and software that replicates, emulates, and extends the services provided by traditional libraries that rely on paper and other material means of collecting, storing, cataloguing, finding, and disseminating information (Gladney et al., 1994). In other definition, A digital library is a collection of organized digital material. They combine the organization and collection of data that libraries and archives have always done with the digital representation made feasible by computers (Lesk, 1997).

Dimensions.ai is a database of linked data that provides a more detailed picture of the research life cycle than prior systems (Herzog et al., 2019). Dimensions now has 9 million datasets and 121 million articles, indicating the database's comprehensiveness as a repository for research and publishing material.

Dimensions.ai reports that research on digital library studies does not exceed 100 publications per year. The year with the fewest publications in this subject is 1993 with only one document, while the year with the most, as noted by this indexing site, is 2005 with 85 published papers.

This study was conducted to investigate bibliometric data of published articles in digital library studies indexed in dimensions.ai during the period of 1991 to 2021. It may help researchers to find out the discussion among published papers in this field during the last 30 years.

LITERATURE REVIEW

Numerous studies have been undertaken to identify and map the metadata of research papers throughout a certain time period utilizing bibliometric analysis techniques. Handoko (2020) discovered that halal tourism has been a current focus in recent years, and it is a potential area for future studies.

Aminy et al. (2021a) conducted a study to analyse metadata from publications deposited to university's institutional repository in Indonesia during the pandemic period. They found that education and COVID-19 is two terms which have been the most occurring words within all observed items.

In his other article, Aminy et al. (2021b) discovered that the theme of Islamic banking is the most discussed Islamic economic research subject within all papers indexed in SINTA, the official Indonesian indexing website. Several

general keywords of banking industry, such as: efficiency, profitability, liquidity, and Non-Performing Financing (NPF) appeared to be the most frequently occurring terms in this study. In addition, this study found that Al-Iqtishad: Jurnal Ilmu Ekonomi Syariah was the most prolific journal among others to produce cited articles, SINTA-Indexed Islamic economic papers in this context.

Citation analysis is a type of bibliometric analysis which has been carried out to analyse metadata of observed articles, specifically in terms of their cited literatures. [Aminy et al. \(2021c\)](#) conducted a study using this kind of analysis technique to seek the most cited author, article, journal, and institution within all Islamic economic papers indexed in dimensions.ai as indexing provider. In this study, the findings showed that Hafas Furqani was the most cited author, a paper entitled “Corporate social responsibility, waqf system, and zakat system as faith-based model for poverty reduction” was the most cited article, Jurnal Ekonomi Syariah (JES) was the most cited journal, and Airlangga University in Indonesia was the most cited institution.

[Sithas and Surangi \(2021\)](#) conducted research on 174 publications between 2010 and 2020 on ethnic minority business. Citation analysis was used to examine research publications in order to identify and categorize the primary areas of ethnic minority entrepreneurship on which the academic community is currently focusing and investigating.

[Hota et al. \(2020\)](#) used citation analysis, document co-citation analysis, and social network analysis to decipher the structure, or intellectual foundation, of social entrepreneurship research. They classify social entrepreneurship research into nine distinct groups that describe the field's conceptual structure. The findings provide a comprehensive view of social entrepreneurship by identifying significant publications and assessing scholarly communication between these works.

[Saikia and Saikia \(2020\)](#) examined 13,057 citations associated with 34 Doctoral theses in Chemistry submitted between 2015 and 2019 to Dibrugarh University, Assam for a PhD degree. According to the study's findings, more than three authors accounted for 44.93 percent of the total 10,446 journal citations and 22.83 percent by two authors.

RESEARCH METHOD

This study employs bibliometric analysis as the analysis technique with a help of one computer application namely VOSviewer. Bibliometric analysis benefits

the majority of research for a variety of reasons, including providing an overview of a subject area and analysing scholars (Bjork et al., 2014). Bibliometrics is a statistical technique used to quantitatively examine research publications on a certain subject using mathematical techniques (Chen et al., 2014). Recently developed bibliometric software enables scientists to examine journals visually in order to analyze and determine the best articles, authors, institutions, and nations (Saber et al., 2019).

This kind of analysis is used with a purpose to map and identify the trend of all metadata (articles title, year of publications, authors name, articles' sources, authors' affiliations or institutions, and their countries of origin) within the observed papers. All documents were obtained from an indexing provider namely dimensions.ai with the following filters applied:

- a. Keyword within title and abstract is "digital library"
- b. Publication type is "article"
- c. Field of research is "Library and information studies"

By categorizing the articles based on these criteria, I found approximately 1,185 documents since 1991 – 2021 and used them as research samples in this study.

There were three type of analysis which will be used in this study, namely co-authorship analysis, citation analysis, and text data mapping. Co-authorship analysis is employed to analyse relatedness based on co-authored documents. Citation analysis is used to examine relatedness based on the numbers the documents cite each other. Text data mapping has a function to map and visualize the conversation and keywords used among all observed publications.

RESULT AND DISCUSSION

Co-authorship analysis

Co-authorship analysis is an analysis conducted based on the number of co-authored documents. There are three units in this kind of analysis, namely analysis on authors, organizations, and countries of articles authors.

Edward A. Fox, with 11 documents, is the most productive researcher among the 1,773 authors within the 1,187 papers included in this study. The following is a co-authorship map built using the VOSviewer tool with a minimum of five documents from a single author.

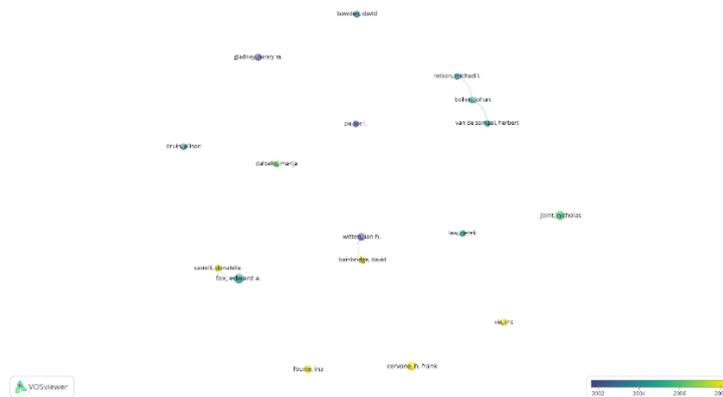


Figure 1. Co-authorship analysis map based on authors names
source: processed data with VOSviewer (2022)

According to Figure 1 above, I discovered that there were several authors collaborating to produce an article. The first cluster of co-authorship was Michael L. Nelson, Johan Bollen, and Herbert Van de Sompel, followed by David Bainbridge and Ian H. Witten as the second, and Donatella Castelli and Edward A. Fox as the last.

With 20 documents, University of Strathclyde was the most popular institution among the writers' 434 organizations for publishing in digital library studies. At least five articles are co-authored by four institutions. Nanyang Technological University, Penn State University, Louisiana State University, and the University of North Carolina at Chapel Hill are among them. The following graphic presents the analysis of co-authorship map by author institutions.



Figure 2. Co-authorship analysis map based on author institutions
source: processed data with VOSviewer (2022)

The United States was the most productive country in this analysis, with 251 papers published between 1991 and 2021, followed by the United Kingdom with 70 documents and China with 30 publications. Several countries are seen to be in collaboration to produce at least five documents, namely China, India, Malaysia, Pakistan, South Korea, Australia, Canada, Germany, United States, Greece, Italy, Netherlands, New Zealand, United Kingdom, and Singapore. The

following figure shows the map of co-authorship analysis based on author countries.

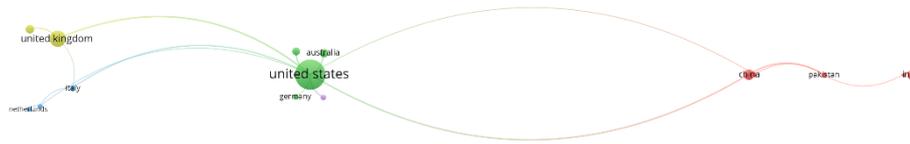


Figure 3. Co-authorship analysis map based on country of origin of the authors
 source: processed data with VOSviewer (2022)

Citation analysis

The purpose of citation analysis in this study is to map and to rank metadata of publications based on the number they have been cited within the dataset. Metadata of documents that I used are articles title and the publishing journals.

Of 1,185 documents, three most cited articles are publications authored by Frantzi et al (2000) entitled “Automatic recognition of multi-word terms: the c-value/ nc-value method” with 390 citations, Bollen et al (2006) entitled “Journal status” with 293 citations, and the third is an article authored by Sidiropoulos et al (2007) entitled “Generalized hirsch h-index for disclosing latent facts in citation networks” with 251 citations. The following is the map of citation analysis based on the cited documents.

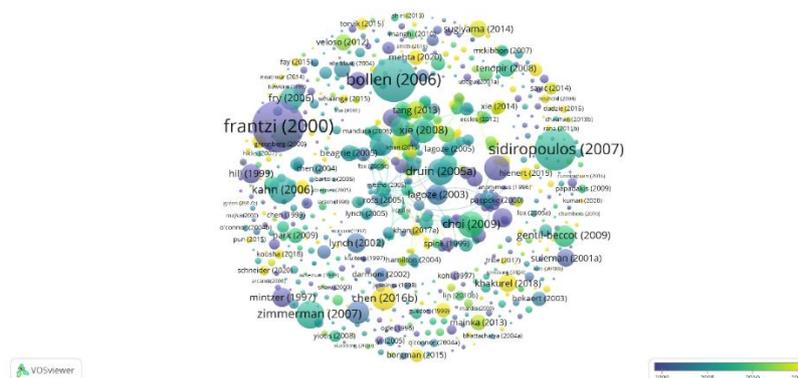


Figure 4. Citation analysis map based on cited documents
 source: processed data with VOSviewer (2022)

Articles in this study are published by journals owned by organizations or institutions throughout the world. The most productive journal publishing

Here are 34 keywords divided into four clusters:

- Cluster 1 : academic library, case study, challenge, collection, context, librarian, library, part, practice, project, role, service, university library
- Cluster 2 : article, author, digital libraries, india, journal, literature, number, researcher, review, study, year
- Cluster 3 : digital resources, internet, resources, student, use
- Cluster 4 : digital library, evaluation, problem, type, user

Discussion

Keyword “india” was the only country name appeared in the findings. It indicated that digital library most studied in this country. Since 1995 India has been researching digital libraries with [Rajashekar \(1997\)](#) conducting one of the early studies, providing an overview of Indian digital libraries. The article covers the numerous benefits of digital libraries and the challenges associated with their establishment.

The other keywords in this study were “academic library” and “university library”. These two terms referred to the library which is placed and located inside a school or university. [Kuh and Gonyea \(2003\)](#) conducted study on the academic library's function in fostering student participation in the learning process. This study emphasized that the academic library is a significant predictor of students developing information literacy, and hence librarians at all universities should assist in creating possibilities for students by providing superior library services. The study discovered that students who utilize the library more regularly demonstrate a studious work ethic and participate in academically hard tasks that need higher-order thinking.

One interesting term in our findings was “digital resources”. Digital resources usually contain both rich media assets (maps, video, photos, and simulations) and text. These digital resources may be placed in or outside of digital libraries and may have been created by individual scholars or other organizations ([Harley et al., 2007](#)).

As with other areas, digital library development has "challenges" and "problems." These two terms appeared within all publications for more than 50 co-occurrences. The very first challenge and problem is how to develop and apply new modelling concepts to be implemented in a digital library ([Kibirige & DePalo, 2001](#)).

One last interesting keyword in our research is “evaluation” which refers to digital library evaluation. Zhang (2010) conducted a study in regard to this issue by developing a holistic model. To develop this model, the author applied a three-stage research approach, namely exploration, confirmation, and verification. The study discovered that this model addresses two gaps in the domain of digital library: (a) the absence of a comprehensive and flexible framework for guiding and benchmarking evaluation, and (b) the uncertainty regarding the degree of divergence among heterogeneous digital library stakeholders, including general users.

CONCLUSION

This study was conducted with an observation period between 1991 to 2021. By conducting co-authorship analysis, I discovered that Edward A. Fox was the most prolific author in digital library research topic, University of Strathclyde was the most productive institution generating research in this field, and the United States was the most productive country. By conducting citation analysis, I found that a paper entitled “Automatic recognition of multi-word terms: the c-value/ nc-value method” was the most cited article, and d-lib magazine was the most productive journal publishing cited articles in digital library studies. By conducting text data mapping, I discovered 34 keywords with a minimum of 50 co-occurrences within the dataset divided into four big clusters.

Academics and librarians from many countries have spent years researching digital libraries. This work demonstrated the importance of digital libraries for all countries, particularly when it comes to providing students and ordinary readers with access to e-books and other digital materials.

As numerous publications discussed academic and university library, it is important to build a better digital library in a school or institution. The objective is to increase awareness of digital resources among users and other stakeholders who wish to use the library via laptops or cellphones.

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REFERENCES

- Aminy, M. M., Azhar, A., & Ariawan, S. (2021a). Visualizing lecturers' publications submitted to institutional repository during the COVID-19 pandemic: a case of Mataram State Islamic University, Indonesia. *Library Philosophy and Practice*, 0_1-10.
- Aminy, M. M., Fahdiansyah, R., & Hasanah, S. M. (2021c). Citation analysis of 10-year Islamic economic research papers indexed in dimensions.ai. *Al-Amwal: Jurnal Ekonomi dan Perbankan Syariah*, 13(2), 153-170
- Aminy, M. M., Syapriatama, I., Fahdiansyah, R., Suhirman, G., & Salahuddin, M. (2021b). Mapping the Trend of Islamic Economic Studies Indexed in Sinta Website: A Bibliometric Analysis. *Share: Jurnal Ekonomi dan Keuangan Islam*, 10(2), 311-328.
- Bjork, S., Offer, A., & Söderberg, G. (2014). Time series citation data: The Nobel Prize in economics. *Scientometrics*, 98(1), 185-196.
<https://doi.org/10.1007/s11192-013-0989-5>
- Chen, C., Dubin, R., & Kim, M. C. (2014). Emerging trends and new developments in regenerative medicine: a scientometric update (2000-2014). *Expert opinion on biological therapy*, 14(9), 1295-1317.
<https://doi.org/10.1517/14712598.2014.920813>
- Gladney, H. E. N. R. Y., Fox, E. A., Ahmed, Z., Ashany, R., Belkin, N. J., & Zemankova, M. (1994, June). Digital library: Gross structure and requirements: Report from a March 1994 workshop. In *Proc. 1st Annual Conf. on the Theory and Practice of Digital Libraries* (pp. 101-107).
- Handoko, L. H. (2020). Bibliometric analysis and visualization of Islamic economics and finance articles indexed in Scopus by Indonesian authors. *Science Editing*, 7(2), 169-176.
- Harley, D., Henke, J., Lawrence, S., & Perciali, I. (2007). Use and users of digital resources. *Educause Quarterly*, 30(4), 12.
- Herzog C., Hook D., dan Konkiel S., 2020. Dimensions: Bringing down barriers between scientometricians and data. *Quantitative Science Studies*. Vol. 1, No.1, 387-395. doi: <https://doi.org/10.1162/qss a 00020>
- Hota, P. K., Subramanian, B., & Narayanamurthy, G. (2020). Mapping the intellectual structure of social entrepreneurship research: A citation/co-citation analysis. *Journal of Business Ethics*, 166(1), 89-114.

- Kibirige, H. M., & DePalo, L. (2001). The education function in a digital library environment: a challenge for college and research libraries. *The Electronic Library*.
- Kuh, G. D., & Gonyea, R. M. (2003). The role of the academic library in promoting student engagement in learning. *College & Research Libraries*, 64(4), 256-282.
- Lesk, M. E. (1997). *Practical digital libraries: Books, bytes, and bucks*. San Francisco: Morgan Kaufman.
- Rajashekar, T.B. (1997). What's new in computers? *Digital Libraries. Resonance*, 2(4), 60-73.
- Saberi, M. K., Barkhan, S., & Hamzehei, R. (2019). A bibliometric study and visualization of Library Philosophy and Practice during 1998-2018. *Library Philosophy and Practice*, 2019. <https://digitalcommons.unl.edu/libphilprac/2565>
- Saikia AS, A., & Saikia US, U. (2020). Citation analysis of doctoral theses submitted to The Department of Chemistry, Dibrugarh University, Assam, India. *Library Philosophy and Practice (e-journal)*. 4525.
- Sithas, M. T. M., & Surangi, H. A. K. N. S. (2021). Systematic Literature Review on Ethnic Minority Entrepreneurship: Citation and Thematic Analysis. *Journal of Ethnic and Cultural Studies*, 8(3), 183-202.
- Zhang, Y. (2010). Developing a holistic model for digital library evaluation. *Journal of the American Society for Information Science and Technology*, 61(1), 88-110.