Khizanah al-Hikmah : Jurnal Ilmu Perpustakaan, Informasi, & Kearsipan
p-ISSN: 2354-9629
e-ISSN: 2549-1334
Volume 12 Issue 1, June, 2024

Evaluating the Efficiency of Indonesian Library and Information Science Journals: A Data Envelopment and Bibliometric Analysis

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Information

Submitted: 16-01-2024
Revised: 05-05-2024
Accepted: 07-05-2024

How to cite: Ansar, F., Ibrahim, C., Jaya, A., Fadhli, R., & Umasugi, M. (2024). Evaluating the Efficiency of Indonesian Library and Information Science Journals: A Data Envelopment and Bibliometric Analysis. Khizanah Al-Hikmah : Jurnal Ilmu Perpustakaan, Informasi, Dan Kearsipan, 12(1). https://doi.org/10.24252/kah.v12i1a12

DOI: 10.24252/kah.v12i1a11

ABSTRACT

This study evaluates the efficiency of Indonesian Library and Information Science journals indexed by SINTA by applying Data Envelopment Analysis (DEA) using a Variable Return to Scale (VRS) model. The primary aim is to assess the performance of these journals to identify areas of strength and inefficiency. The study encompasses twenty-one journals, which served as decision-making units (DMUs). The input variables considered include Article Processing Charges (APC), Editorial Team, Number of Authors, and Number of Publications, while the output variables were Number of Citations and H5-Index. Data were collected from journal websites and the Sinta database covering 2018 to 2022. The analysis was conducted using MaxDEA software. An efficiency score of 1 indicated an efficient journal, whereas scores below 1 denoted inefficiency. The study reveals six journals as efficient: Jurnal Kajian Informasi & Perpustakaan, Khizanah Al-Hikmah: Jurnal Ilmu Perpustakaan, Informasi, dan Kearsipan, IQRA': Jurnal Perpustakaan dan Informasi, Bibliotech: Jurnal Ilmu Perpustakaan dan Informasi, PUBLIS (Publication Library and Information Science), and Imam Bonjol Journal: Kajian Ilmu Informasi dan Perpustakaan. However, most journals were found to be inefficient, with an average efficiency score of 0.809. These findings are significant as they provide valuable insights for journal editors and policymakers. The results offer guidance on optimizing resource allocation and developing strategies to enhance the quality and impact of scholarly publications within the Library and Information Science field.

Keywords: Bibliometric; journal impact; academic journals; library and information science

1. INTRODUCTION

Research, innovation, and research activities are among tertiary institutions' mainstays of academic support. One of the elements influencing university rankings is the quality of research. To support this, research and information dissemination initiatives are required (Padlee et al., 2019). To support this, research and information dissemination activities are also necessary. The dissemination of research requires a forum for scientific publication in the form of a journal that accommodates the results of the thoughts of the academic community regarding the research they carry out. This has become a measure of the success of tertiary institutions or research organizations, namely by publishing scientific papers in national and international journals (Putri & Hertina, 2019). As an academic community, a lecturer, student, or researcher always considers which journal the research should be published in. This is because reputable journals support researchers in contributing to the scientific community and increase the professionalism of their writers (Nashihuddin & Aulianto, 2014). In looking at a reputable journal, two indicators can be observed, namely indicators of quantity and quality (Abramo & National, 2008) . The quantity indicator is in the form of evaluating a journal using a number and productivity approach. This can be seen through bibliometric indicators by knowing the number of articles and the number of citations (Devos, 2011). However, the magnitude of the quantity cannot be regarded as the primary basis for choosing the journal. A second signal that should not be overlooked is the quality indicator. Performance measurements from published research are included as quality indicators. This metric indicates how beneficial a study is to a community of scholars (Darmalaksana & Suryana, 2018).

In Indonesia, there is a platform that indexes a scientific journal named Sinta (Science and Technology Index), which is also used to measure research performance (Ibrahim, 2019). Sinta is an Indonesian Ministry of Education, Culture, Research, and Technology-sponsored webpage that offers data on scientific publications in Indonesia in the form of researcher performance, author performance, and journal performance (Saputra, 2020). SINTA indexes journals from various scientific domains by categorizing them into six levels of accreditation: Sinta 1, Sinta 2, Sinta 3, Sinta 4, Sinta 5, and Sinta 6. Because of its comprehensive web-based access, SINTA makes it easy to identify and analyze research strengths (Rahyudi et al., 2019). The field of Library and Information Science is one of the science subjects indexed by SINTA. There are 25 indexed journals in the subjects of Library Science, Information Science, and Documentation, according to data gathered from the SINTA portal (https://sinta.kemdikbud.go.id/). This suggests that library science, information science, and documentation research are progressing. According to observations, there is no single journal in the field of library science and information science that is ranked Sinta 1. Only four journals are indexed with the Sinta 2 rank, namely *BACA Journal* by the Indonesian Scientific Documentation Center-LIPI, *Khizanah Al-Hikmah: Jurnal Ilmu Perpustakaan, Informasi, dan Kearsipan* by UIN Alaudin Makassar, *Berkala Ilmu Perpustakaan dan Informasi* by Gajah Mada University, and *Jurnal Kajian Informasi & Perpustakaan* by Padjadjaran University. In this scenario, the performance of journals in Library and Information Science must be evaluated.

Journal performance measurement has actually been carried out in the form of the Impact Factor and H-Index. Impact Factor was first designed by Web of Science as a means to see the average citations that have been received by articles in a certain period issued in a Journal Citation Report (CJR). However, the use of the Impact Factor as the only journal performance measurement tool has been widely criticized by scientists. Therefore, the H-Index is also an alternative way of assessing journal performance based on the citations obtained by publication results. This measurement was coined by Hirsch (2005) and is based on the distribution of citations received by articles published in journals or written by researchers. Both of these metrics only consider journal performance in terms of article citation output. This means that the database conditions, whether Scopus, WoS, or Sinta, including H-Index and Impact Factors, cannot quantify the dynamics that occur in resource factors, which can also be

utilized as a basis for performance. This aligns with Todeschini & Baccini (2016), who argue that scientific output cannot be done with a single metric.

The efficiency of the journal is one of the metrics that may be used to assess its performance. Efficiency measurement is an example that researchers can use to describe the performance of a publication. A comparison between output produced and resources held can demonstrate efficient performance (Fitrah & Handayati, 2022). This parameter can be used to determine whether or not researchers should submit research articles to journals. In other words, efficiency measurement will explain a journal in empowering organizational inputs to produce maximum output so that it is recognized that resource (input) allocation is reasonable and can develop (Tian & Zhang, 2018). The data envelopment analysis (DEA) method is one method for measuring efficiency.

Several previous studies have tried to measure the efficiency of journals in various fields of scientific study. For example, research by Petridis et al., (2013) measures the efficiency of journals in the forestry sector by using bibliometric data with the DEA approach; Lee & Shin, (2014) also, measure efficiency in multidisciplinary journals by using the DEA approach; Halkos & Tzeremes (2011) measures the efficiency of journal citations in economics using the DEA approach; Chen et al., (2017) measured the performance of management science and operations research academic journals by using the DEA-Malmquist approach and Ortega & Gavilan (2013) measure efficiency in scientific journals in economics by using the stochastic frontier approach; Ibrahim's research (Ibrahim & Fadhli, 2021) measures the performance of world-class universities in Indonesia using a bibliometric and DEA approach. This research can be considered when selecting journals for article publication. The researchers are interested in conducting an efficiency analysis of journals in library and information science indexed by Sinta using the data envelopment analysis method because no research evaluates the effectiveness of journals in Indonesia, particularly in the library and information science field.

Efficiency Measurement

Efficiency measurement is carried out to determine whether the output produced is commensurate with the resources owned. Efficiency can be calculated by making a comparison between the output and input of a measuring unit (Rakhmawati, 2017). According to Yotopulos & Nugent, (1978) in Darmawan (2016) suggests that efficiency is the achievement of the maximum output from a predetermined set of resources. In line with this, Ozcan (2014) defines efficiency as a measurement of organizational performance by comparing the output produced with the input resources used. If the actual output and input ratios are equal to or higher than the typical input and output ratios, the measured decision-making unit (DMU) is said to be efficient. Efficiency measurement is also used in library science to gauge a library's effectiveness. According to Tian and Zhang (2018), efficiency is the library's ability to convert input resources into several outputs. From some of the definitions above, it can be concluded that efficiency is a method of measuring performance based on how much output is produced compared to how much input or resources are owned.

Data Envelopment Analysis (DEA)

Data Envelopment Analysis is a method of measuring efficiency by managing input variables to produce output variables in the context of decision-making and increasing efficiency levels (Darmawan, 2016). Meanwhile, according to Ramanathan (2003), DEA is a non-parametric method of measuring efficiency, i.e., it does not require the assumption of a functional relationship between input and output variables. The DEA method was first developed by (Charnes et al., 1978). DEA looks to be a method of accommodating efficiency measurements that incorporate many inputs into outputs with the same unit types (Rakhmawati, 2017). Furthermore, one or more decision-making units (DMUs) are relevant to the DMU technique. These findings can be compared to those of other organizations or DMUs because they are related. This makes it possible to determine which DMUs perform the best and worst.

The following is a comparison table of input and output variables used in several previous studies in Table 1.

Table 1. Input and output variables used in several previous studies

Author	Input Variable	Output Variable
Petridis, et al., (2013)	Frequency of publications and articles published per year	Eigenfactor score, H-Index, 5-Year Impact Factor
Lee & Shin (2014).	Number of Articles Published, Citation Density, Citation Dynamics	Total Citation, External Citation, Self-citation
Halkos (2011)	Converting journal volumes to journal issue numbers	The ratio of the number of Scopus database citations multiplied by the 5-year impact factor and the RePEc impact factor, the ratio of the number of SSCI database citations multiplied by the 5-year impact factor and the RePEc impact factor
Chen et al. (2017).	Article count, number of citations, citation density, and impact factor	Total Citation
Ortega & Gavilan (2013)	Number of citations, Number of articles, Impact Factor, Editorial Board	Total Citation
Ibrahim and Fadhli	Number of professors, associate professors, and assistant professors	Scientific Strenght

Bibliometrics

Bibliometrics is a quantitative analytical study that aims to measure the value and impact caused by scientific publications (Araujo et al., 2020). Bamel et al., (2021) defines bibliometrics as a quantitative method of looking at the structure of knowledge and research development through published bibliographic data. Bibliometric analyses undoubtedly contribute to evaluating the significance of previously published or disseminated knowledge. Any scientific study, regardless of its foundation in researchers, organizations, scientific fields, or nations, can be examined for patterns in research, productivity in research, and scientific rigor (Sweileh, 2020; Islam et al., 2022). Citation analysis, which measures how frequently one scientific article or researcher is cited by other scientific articles or researchers, is the method most frequently employed in bibliometric investigations (García-garcía et al., 2023). The calculation of citations as a measure of scientific journal performance can be seen through the impact factor, h-index, and scientific strange. These three measures use citation as the main factor in determining the impact of research. As stated by (Ibrahim & Fadhli, 2021) that citations are an important aspect of bibliometrics.

2. METHODS

This study's methodology employs a quantitative descriptive bibliometric technique and data envelopment analysis (DEA) for efficiency analysis. The DEA method is a non-parametric way to measure efficiency borrowed from economics. However, the application of data envelope analysis as a performance evaluation tool is not limited to business institutions; it has also been widely applied to non-profit institutions such as schools, hospitals, and colleges (Kuah & Wong, 2011). DEA measurement is actually a simple analysis, but it is very useful in knowing the relative efficiency of a homogeneous decision-making unit (DMU) (Kuah & Wong, 2011). Therefore, DEA is suitable for measuring the efficiency of research performance, including in scientific journals. In addition, DEA is a type of non-parametric measurement that can measure DMU with various variables without having a direct relationship. In order to interpret frontier efficiency with two inputs, Charnes created a mathematical formulation. Several steps are taken when conducting an efficiency analysis using the DEA method, including selecting the decision-making unit (DMU) or decision-making unit, input and output

variables, the DEA orientation, the DEA model, the data periods, data collection, and data analysis (Rakhmawati, 2017) see in Figure 1.

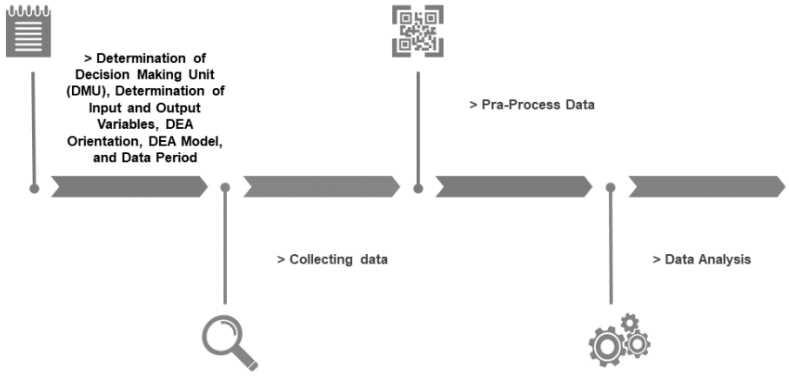

Figure 1. Stages of the research

The Determination of Decision-Making Unit (DMU), The Determination of Input and Output Variables, DEA Orientation, DEA Model, and Data Period. The decision-making unit (DMU) or units whose efficiency will be measured by the DEA method are selected according to the following criteria:

1) DMUs must be homogeneous, that is, have the same goals and have identical inputs and outputs (Ramanathan, 2003) .
2) The number of DMUs involved in the measurement must be at least three times the number of inputs and outputs (Caiwu and Weifeng, 2017) . This is done so that the DEA results are not discriminatory. Cooper et al., (2007) provide the following equation for determining the number of DMUs:

N ≥ max {3(m+s)}
N ≥ 3(4+2)
N ≥ 18
note:
n = Minimum number of DMUs
m = Number of entries
s = Number of outputs

The DMUs specified in this study are Journals in the Field of Library and Information Science that are indexed through the Science and Technology Index (Sinta). The number of DMUs used must be more than 18 journals according to the minimum DMU limit. The input and output variables in this study are as follows see Table 2.

Table 2. Input and output variables

Input Variables	Article Processing Charges Editorial Team Number of Authors Number of Publications
Output Variable	Total Citations H5-Index

The choice of article processing charges (APC) as an input variable is caused by the "APC Effect" resulting from a paradigm shift in scientific publications towards open access (Klebel & Ross-hellauer, 2021). Authors can be charged processing fees, sometimes called article

processing charges (APC), to help pay for scientific publications. The presence of APC can enable economic viability for open-access scientific journals (Pavan, 2018). Publication fees are one of the resources received by journal managers. With the APC variable, it will be known whether the resources in the form of publication fees received from authors can provide maximum output (Klebel & Ross-hellauer, 2021). Human resources in scientific publications are used to select the Editorial Team. The editor is an essential component of journal administration. The editor oversees the journal's editing, reviewing, and publishing. Furthermore, the editor is in charge of establishing issues, keeping the list of articles, and scheduling issues. Similarly, when using authors as input variables to represent the human resources of scientific journals, Human Resources as an input variable is critical since it is an asset that maintains and is involved in the DMU (Andersson & Sund, 2021). Publication total is used because it correlates with H-Index and citation frequency as output. Journals with many publications are more likely to be cited (Petridis et al., 2013).

The output in this study was derived from journal performance measures, specifically the resulting citations and the publication's h-index. This is done because these two variables are potential elements that can raise the journal's value. Total citations are crucial because seeing the frequency of article citations helps explain how productive scholars cite journal articles. Similarly, the H-Index was chosen because it can describe the distribution of citations while also combining the number of publications (total publications) and the effect of the journal (total citations) (Petridis et al., 2013). The H5-Index is defined as "A has n h-index if h of his/her P articles have received at least h citations each and the remaining researcher (Ph) articles have received no more than h citations each." (Hirsch, 2005). However, this study uses the H5-Index, not the H-Index. This is done because the period of data collected is only five years old.

The orientation used is input-oriented. The input selection is oriented because the input model represents a size that can be changed, so this analysis aims to maximize the input the DMU has. The DEA model used is the BCC model. Determining the data period is done to limit the scope of analysis. This study limits the period of journal data to the past five years, from 2018 to 2022.

Data Sources

In order to find a list of journals to be evaluated, the Science and Technology Index (Sinta) (https://sinta.kemdikbud.go.id/) was searched using the keywords "library," "library," "documentation," and "librarian," as well as a second check of the scope and focus provided on each journal's information page. Up to 25 articles in the topic of library and information science studies were located in the Sinta database. There are some journals where the necessary data cannot be found due to restrictions in the data collection method. The University of Indonesia *Jurnal Ilmu Informasi, Perpustakaan dan Kearsipan* website could not be accessible throughout the data gathering process. The publication fees for the *INFO BIBLIOTHECA, AL MAKTABAH*: *Jurnal Kajian Ilmu Perpustakaan*, and *Jurnal Ilmu Perpustakaan dan Kearsipan* (UNP) are unknown, so the four journals were excluded from the DMU. As a result, the DMUs under analysis included a total of 21 journals, which satisfied the requirements the DMU set over and above the 18 journals it had originally measured. The following journals were examined in Table 3.

Table 3. Decision-Making Units

DMU	Journal Name	Publisher	Sinta Rank
1	Jurnal Kajian Informasi & Perpustakaan	Fikom Unpad	Sinta 2
2	Khizanah Al-Hikmah: Jurnal Ilmu Perpustakaan, Informasi, dan Kearsipan	UIN Alauddin Makassar	Sinta 2
3	BACA: Jurnal Dokumentasi dan Informasi	LIPI/BRIN	Sinta 2

4	Jurnal Berkala Ilmu Perpustakaan dan Informasi	Universitas Gajah Mada	Sinta 2
5	Pustakaloka: Jurnal Kajian Informasi dan Perpustakaan	UIN Ponorogo	Sinta 3
6	Lentera Pustaka: Jurnal Kajian Ilmu Perpustakaan, Informasi, dan Kearsipan	Universitas Diponegoro	Sinta 3
7	EDULIB: Journal of Library and Information Science	Universitas Pendidikan Indonesia	Sinta 3
8	Record and Library Journal	Universitas Airlangga	Scopus
9	TIK ILMEU: Jurnal Ilmu Perpustakaan dan Informasi	IAIN Curup	Sinta 4
10	ANUVA: Jurnal Kajian Budaya, Perpustakaan, dan Informasi	Universitas Diponegoro	Sinta 4
11	IQRA': Jurnal Perpustakaan dan Informasi	Pusat Perpustakaan UIN Sumatera Utara	Sinta 4
12	LIBRARIA: Jurnal Perpustakaan	UPT Perpustakaan IAIN Kudus	Sinta 4
13	Bibliotech: Jurnal Ilmu Perpustakaan dan Informasi	Universitas Yarsi	Sinta 4
14	BIBLIOTIKA: Jurnal Kajian Perpustakaan dan Informasi	Universitas Negeri Malang	Sinta 4
15	JIPI (Jurnal Ilmu Perpustakaan dan Informasi	UIN Sumatera Utara	Sinta 4
16	PUBLIS (Publication Library and Information Science)	Universitas Muhammadiyah Ponorogo	Sinta 4
17	PUSTABIBLIA: Journal of Library and Information Science	IAIN Salatiga	Sinta 4
18	Jurnal Imam Bonjol: Kajian Ilmu Informasi dan Perpustakaan	UIN Imam Bonjol Padang	Sinta 5
19	Shaut Al-Maktabah: Jurnal Perpustakaan, Arsip dan Dokumentasi	UIN Imam Bonjol Padang	Sinta 5
20	Media Pustakawan	Perpusnas	Sinta 5
21	JPUA: Jurnal Perpustakaan Universitas Airlangga: Media Informasi dan Komunikasi Kepustakawanan	Universitas Airlangga	Sinta 5

Different data sources were used to gather data for each input and output variable. While the h5-Index variable and total citations were taken from the https://sinta.kemdikbud.go.id/ database, the editorial board variables (number of authors, number of publications, and APC) were obtained from the websites of each journal. The two-week data-gathering period ran from December 22, 2022, to January 3, 2023.

Pre-Process Data

The procedure of formatting and cleaning data is carried out at this step. The author variable's data gets cleaned. Author data is collected from each journal's website via the author data collecting procedure in each published volume and issue and then processed in Microsoft Excel using duplicate values and conditional formatting to eliminate author names written more than once in one journal. For additional variables, data tabulation is performed in a format that the MAXDEA software can read.

Data Analysis Technique

The data obtained in Microsoft Excel files is then analyzed using MAXDEA software to determine each decision-making unit's efficiency level. The DEA model employed is the DEA BCC model, and the formula is as follows.

$$\text{MAX Z} = \sum_{j=1}^{\text{j}} v_{jm}\ y_{jm}\ +\ v_m$$

Constraint:

$$\sum_{i=1}^{\text{i}} u_{im}\ x_{im}\ = 1$$

$$\sum_{j=1}^{\text{j}} v_{jm}\ y_{jm}\ - \sum_{i=1}^{\text{i}} u_{im}\ x_{im}\ +\ v_m\ \leq 0$$

$v_{jm}\,, u_{im}\,, \geq\ \varepsilon, v_m$ (free)unlimited

$$\text{MIN Z} = \sum_{i=1}^{\text{i}} u_{im}\ x_{im}\ +\ u_m$$

Constraint:

$$\sum_{j=1}^{\text{j}} v_{jm}\ y_{jm}\ = 1$$

$$\sum_{i=1}^{\text{i}} u_{im}\ x_{im}\ - \sum_{j=1}^{\text{j}} v_{jm}\ y_{jm}\ +\ u_m\ \geq 0$$

$v_{jm}\,, u_{im}\,, \geq\ \varepsilon, v_m$ (free)unlimited

note:

n	: DMU, n = 1, 2, 3, ..., N
i	: Input, i = 1, 2, 3, ..., I
j	: Output, j = 1, 2, 3, ..., J
m	: DMU that includes efficiency
y_{jm}	: The value of the jth output from the nth DMU
x_{in}	: Value of the ith input from the nth DMU
v_{jm}	: Weights for output j from the mth DMU
u_{im}	: Weights for input i of the mth DMU
ε	: small positive number

The linear programming solution technique will try to make the unit efficiency as large as possible. This search procedure will end when several efficiencies reach 1. An efficiency result with a value of 1 indicates the DMU being analyzed is said to be efficient, while a value of < 1 indicates the DMU being analyzed is inefficient (Stancheva & Angelova, 2004) .

3. RESULTS AND DISCUSSION

Results

The findings of the data collection process will be given in this section. Data was presented using descriptive statistics to see the data for each variable that had been collected.

Article Publication Fee

This research collects data on all APC costs from the website directly, as seen in Table 4.

Table 4. Article processing charges on each DMU

APCs	Frequency	DMU
IDR 750,000	1	DMU 4
IDR 500,000	2	DMU 1, DMU 18
IDR 300,000	1	DMU 9
IDR 150,000	1	DMU 19
Free	16	DMU 2, DMU 3, DMU 5, DMU 6, DMU 7, DMU 8, DMU 10, DMU 11, DMU 13, DMU 14, DMU 15, DMU 16, DMU 17, DMU 20, DMU 21

According to Table 4, the journal with the highest APC is the *Berkala Ilmu Perpustakaan dan Informasi* journal. Most journals in library science and information science domains are free or do not charge a publication fee. There are just four journals that charge publication fees. According to the nominal APC, journals in the subject of library science and information science in Indonesia have an APC that is lower than the average APC of journals in the medical science and technology category (Koong et al., 2023; Lin & Lin, 2021; Solomon & Björk, 2012; Tau et al., 2024; Vervoort et al., 2021).

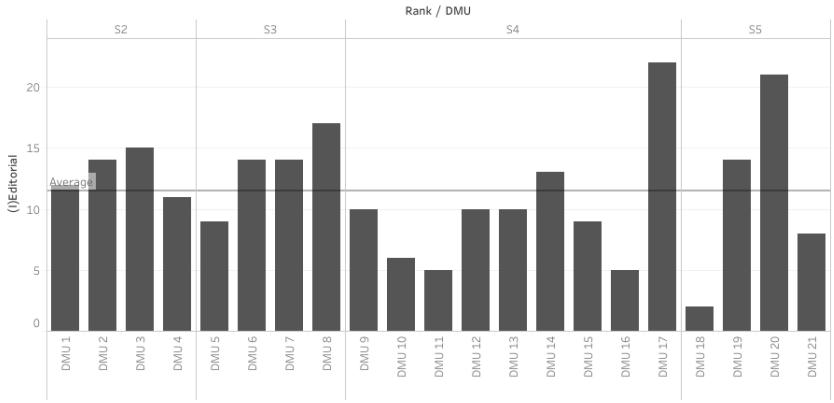

Figure 2. The distribution of the editor board (authors' work, 2023)

The journal with the most editorial team is PUSTABIBLIA (DMU 17), with an editorial team of 22, while the journal with the least editorial team is the Imam Bonjol Journal (DMU 18), with only 2 editors see Figure 2.

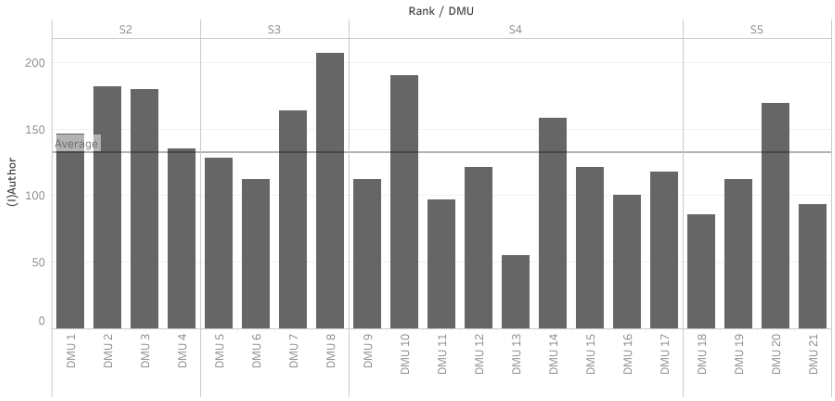

Figure 3. The distribution of author (authors' work, 2023)

The number of authors is heavily impacted by the number of journal publications. The more publications there are, the more authors there are. However, because multiple writers of pieces are authored by more than one person, the numbers of authors and publications differ. The record and library journal (DMU 8) has the most authors, while the Bibliotech journal (DMU 13) has the fewest see Figure 3.

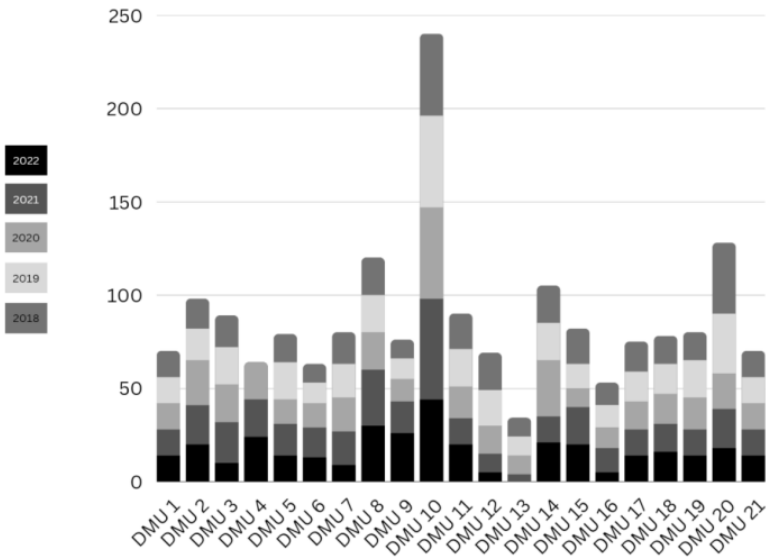

Figure 4. The distribution of the number of publications (authors' work, 2023)

The number of publications for each DMU is shown in Figure 4. *ANUVA: Jurnal Kajian Budaya, Perpustakaan, dan Informasi* is the journal with the most articles. The *ANUVA* journal is the most productive since its publication time is greater than other publications. The ANUVA journal comes out four times a year.

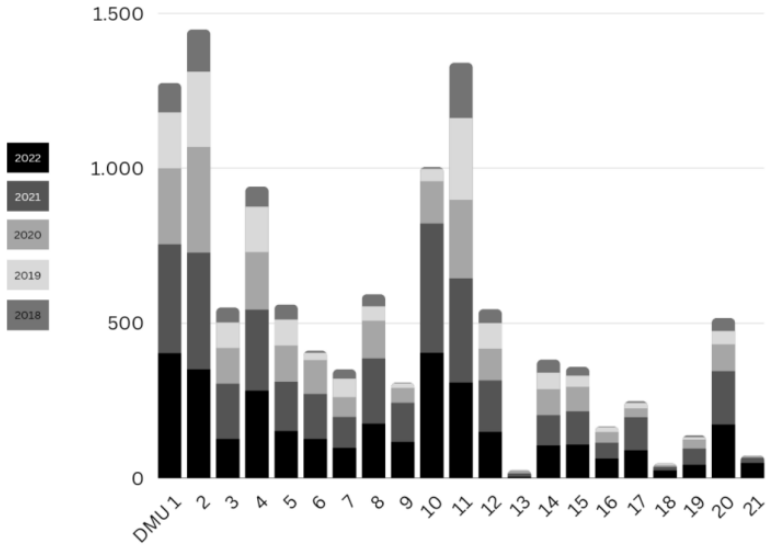

Figure 5. The distribution of citations (authors' work, 2023)

The diagram above in Figure 5 shows each DMU's total number of citations per year. The DMU with the highest number of citations was achieved by the *Khizanah al-Hikmah: Jurnal Ilmu Perpustakaan, Informasi, dan Kearsipan,* with 1446 citations for 5 years, see Figure 5.

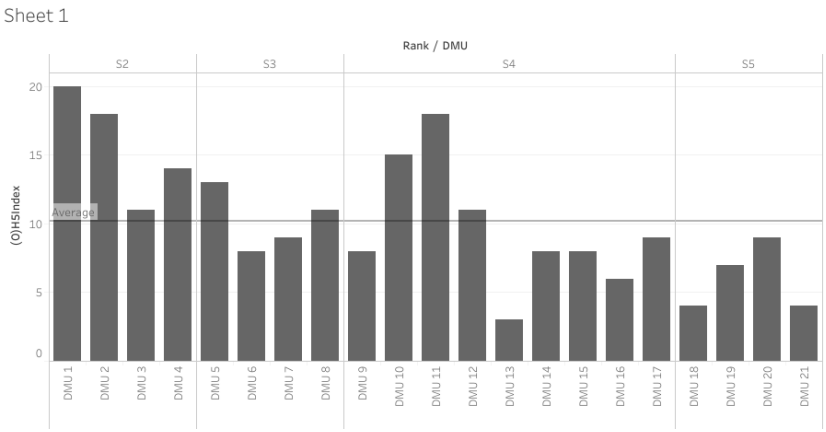

Figure 6. The distribution of the H5-Index (authors' work, 2023)

The H-5 Index data is gathered from Google Scholar via the dashboard displayed on SINTA and is based on the calculation of the H-Index for the last 5 years. *Jurnal Kajian Informasi & Perpustakaan* (DMU 1) had the greatest H5-Index, while the *Bibliotech* Journal (DMU 13) had the lowest H-Index see Figure 6.

DEA Analysis Results

MaxDEA software was used for the analysis. The acquired data is subsequently analyzed, coded, and tabulated in the format described in the MaxDEA program handbook. This data analysis process's decision-making unit (DMU) represents a goal or projected value. Changes in input variables are expressed adversely for an inefficient DMU, whereas changes in output variables are expressed positively. The original value is the value entered into the analysis program or the real status of the journal in the field. Meanwhile, data improvement for inefficient journals is split into proportionate and slack improvement values. Slack improvement is an increase in efficiency targets in the second stage so that the target value or projection is stronger, whereas proportional improvement is a general proportional increase in each input and output. As a result, the Projected Value is the original value plus the proportionate and slack improvement values (Cheng, 2014) .

The following is a graph of each variable's change (movement).

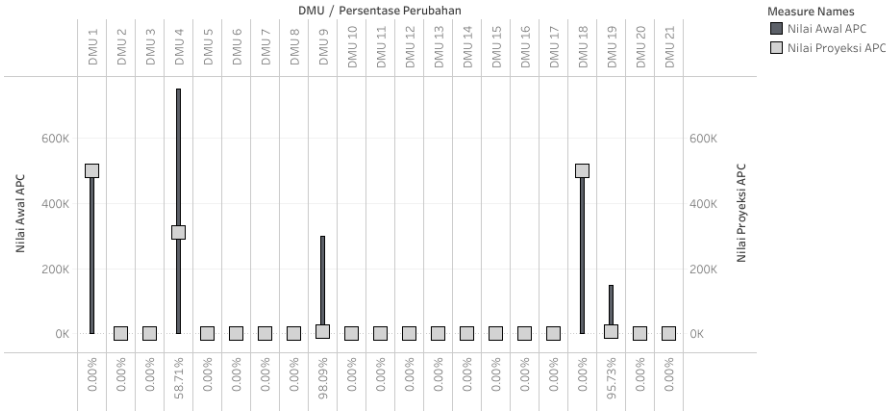

Figure 7. The movement of APC variables (authors' work, 2023)

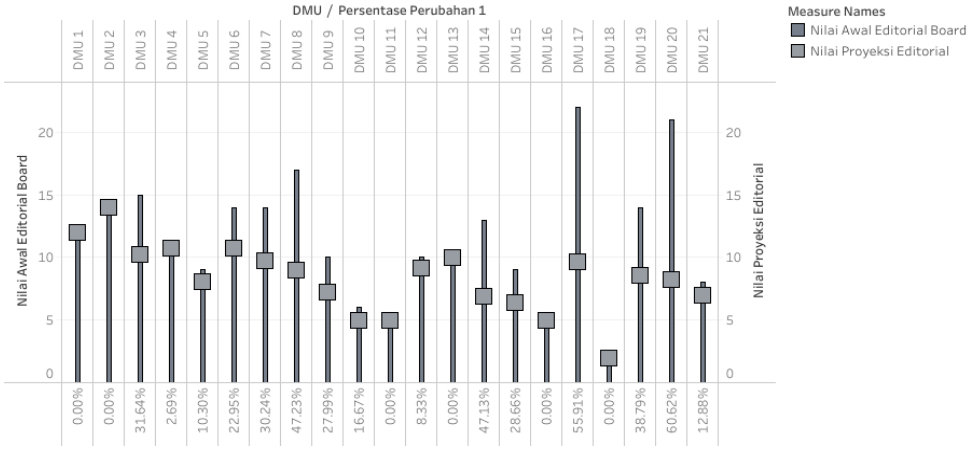

Figure 8. The movement of the editorial board variables (authors' work, 2023)

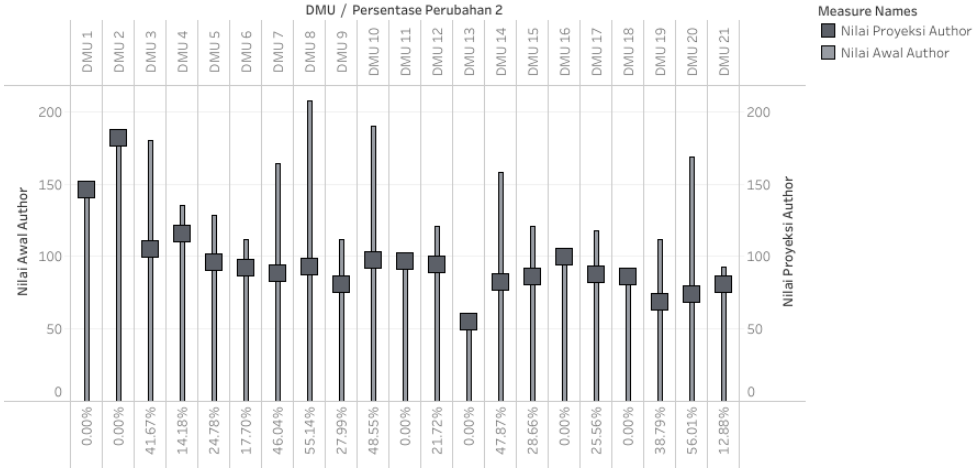

Figure 9. The movement of author variables (authors' work, 2023)

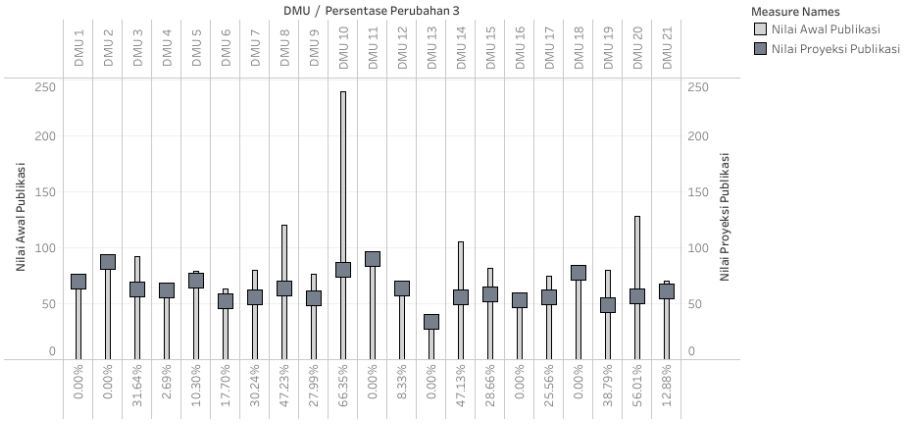

Figure 10. The movement of publication variables (authors' work, 2023)

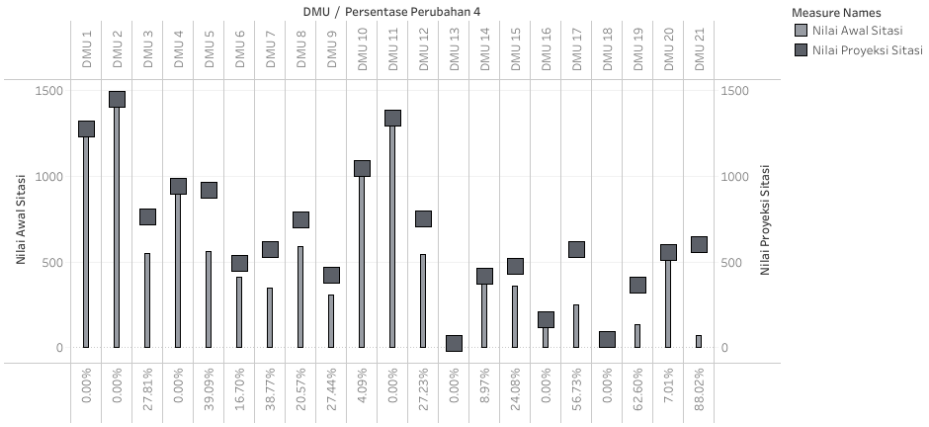

Figure 11. The Movement of visitation variables (authors' work, 2023)

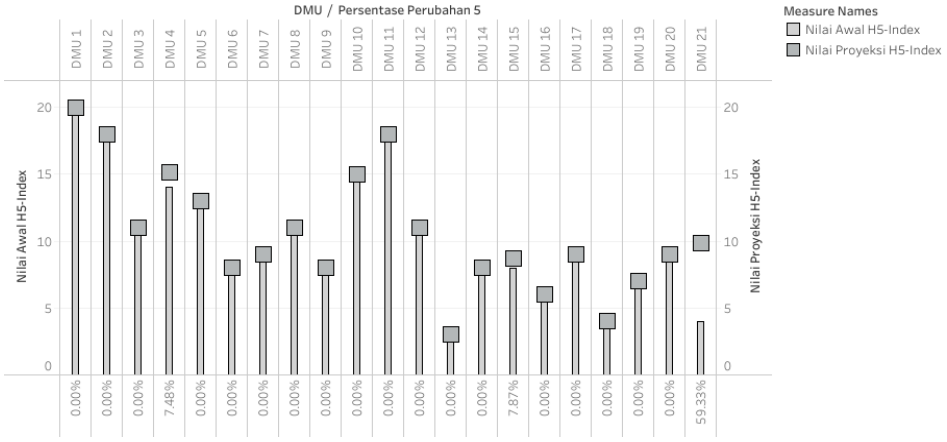

Figure 12. The movement of the H5-Index variable (authors' work, 2023)

The efficiency analysis of Sinta-indexed journals in the field of Library and Information Science reveals that only six journals achieve efficient scores: *Jurnal Kajian Informasi & Perpustakaan* (DMU 1), Khizanah Al-Hikmah: *Jurnal Ilmu Perpustakaan, Informasi dan Kearsipan* (DMU 2), IQRA': *Jurnal Perpustakaan dan Informasi* (DMU 11), Bibliotech: *Jurnal Ilmu Perpustakaan dan Informasi* (DMU 13), *PUBLIS* (Publication Library and Information Science) (DMU 16) and *Jurnal Imam Bonjol: Kajian Ilmu Informasi dan Perpustakaan* (DMU 18). Meanwhile, the journal with the lowest efficiency was Media Librarian, which had a score of 0.439. The graph shown in Figure 13 depicts the efficiency score received by each journal or decision-making unit.

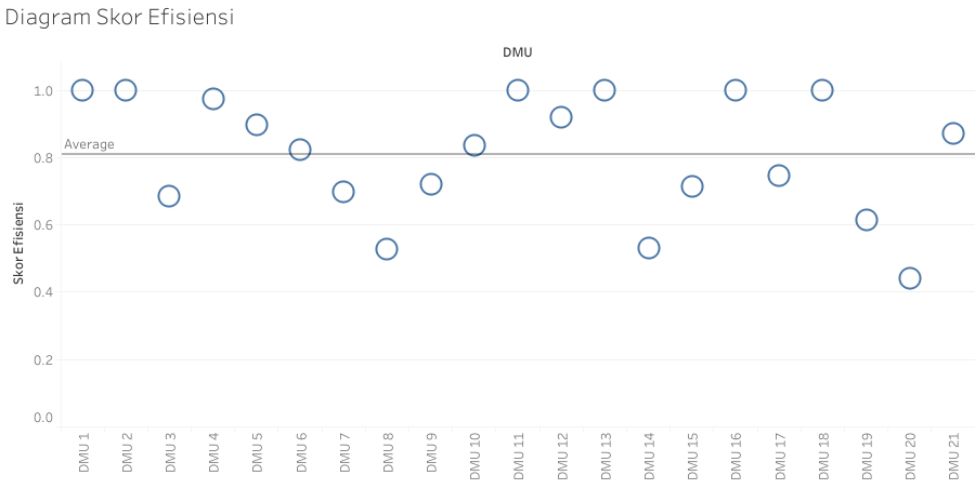

Figure 13. Journal efficiency scores in the field of library and information science

The average efficiency score given by the journals reviewed is 0.809. This figure is close to the efficient value, which is 1. This inefficiency results from the journal's failure to make full use of its input and output. This occurs for the input variables APC, editing team, author, and publications, as well as the output variables citations and H5-Index.

Petridis et al., (2013) divided the journal efficiency level into four levels based on the efficiency score obtained. The following is a table of efficiency intervals see Table 5.

Table 5. Efficiency score level

Group	Efficiency Score	Information
D	0 – 0.33	Inefficient with a low score
C	0.34 – 0.66	Inefficient with a moderate score
B	0.67 – 0.99	Inefficient with a high score
A	1	Efficient

Based on the efficiency analysis results using the data envelopment analysis method, the journals included in group A, or efficient, are the six efficient journals in Figure 13. Journals included in Group B are: *BACA: Jurnal Dokumentasi dan Informasi* (DMU 3), *Jurnal Berkala Ilmu Perpustakaan dan Informasi* (DMU 4), *Pustakaloka: Jurnal Kajian Informasi dan Perpustakaan* (DMU 5), *Lentera Pustaka: Jurnal Kajian Ilmu Perpustakaan, Informasi, dan Kearsipan* (DMU 6); *EDULIB: Journal of Library and Information Science* (DMU 7); *LIBRARIA: Jurnal Perpustakaan* (DMU 12); *JIPI: Jurnal Ilmu Perpustakaan dan Informasi* (DMU 15); *PUSTABIBLIA: Journal of Library and Information Science* (DMU 17); *JPUA: Jurnal Perpustakaan Universitas Erlangga: Media Informasi dan Komunikasi Kepustakawanan* (DMU 21). The journals included in group C include *Record and Library Journal* (DMU 8), *TIK ILMEU: Jurnal Ilmu Perpustakaan dan Informasi* (DMU 9), *ANUVA: Jurnal Kajian Budaya, Perpustakaan, dan Informasi* (DMU 10), *BIBLIOTIKA: Jurnal Kajian Perpustakaan dan Informasi* (DMU 14), *Shaut Al-Maktabah: Jurnal Perpustakaan, Arsip, dan Dokumentasi* (DMU 18), and *Media Pustakawan* (DMU 20). Based on the efficiency score obtained, no journals are included in group D or inefficient with a low score.

According to the BCC model of efficiency assessment, DEA efficiency analysis is carried out by maximizing the output to be achieved and minimizing the resources possessed or input. This is so because, contrary to the output variable, which is an achievement goal that must be attained to the greatest extent feasible, the input variables frequently fall under the control of the journal manager (Tien). As a result, the projections produced by the analysis above tend to

provide targets in the form of reducing excessive or inefficient input variables and providing projections to add output variables in order to increase productivity, in this case, as measured by citation productivity and the H5-Index.

4. CONCLUSION

The results of this study show that there are six journals whose journal management has been efficient, namely: Jurnal Kajian Informasi & Perpustakaan; Khizanah Al-Hikmah: Jurnal Ilmu Perpustakaan, Informasi, dan Kearsipan; IQRA': Jurnal Perpustakaan dan Informasi; Bibliotech: Jurnal Ilmu Perpustakaan dan Informasi; PUBLIS (Publication Library and Information Science), and the Imam Bonjol Journal: Kajian Ilmu Informasi dan Perpustakaan. The journal with the lowest efficiency is Media Librarian. However, based on the efficiency score obtained, no journals are included in group D or inefficient with a low score below 0.33. The target value or projected value can be used to detect input and output inefficiencies. Pruning is done on variables whose inputs are excessive and out of alignment with the target in order to address inefficiencies in the input variables. In the meantime, attempts can be made to overcome inefficiencies in the output variables by increasing or emphasizing them in order to reach the desired value. The motivation of researchers, lecturers, or students to submit their research and research results to a journal is determined by journal circumstances. The management of journals must be done effectively and professionally. Because of this, the journal manager needs to be able to assess whether all of their resources are sufficient to create the journal's output. Future studies may consider other decision-making unit objects, such as different decision-making units, databases, or fields. Future researchers might also modify research variables based on the inputs and results they will be studying, for instance, considering how the variables were used in this study. It is envisaged that the availability of bibliographic data will improve the accuracy of journal efficiency.

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