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Self-Citation Analysis of the Most Prolific Author in Halu Oleo University using Fi-Index

Wahyuni Saputri Nur[1], Cecep Ibrahim[2], Asrul Jaya[3] & Majidah[4]

[1,2,3]Universitas Halu Oleo, Indonesia
[4]Universitas Terbuka, Indonesia
Correspondence email: cecep.ibrahim@uho.ac.id

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ABSTRACT

This study aims to analyze the self-citation behavior of the ten most productive lecturers at Halu Oleo University using a bibliometric approach. Employing the Fi-index method for self-citation analysis, the research followed three main stages: data collection, data processing, and data analysis. The data were obtained from the Scopus database, focusing on the top ten productive lecturers at the institution. Each lecturer's self-citation activity was measured using the Fi-index formula, which compares the number of self-citations relative to their h-index. The findings revealed that all ten lecturers demonstrated self-citation patterns within a normal range. Muhammad Nurdin recorded the highest number of self-citations (867) with a Fi-index score of 0.047572, followed by Maulidiyah (654, Fi-index 0.043446), and others with similarly low Fi-index scores ranging from 0.002096 to 0.043446. These values indicate that their self-citation practices do not exceed what is typically considered acceptable relative to their publication impact. The study concludes that the Fi-index is a practical tool for evaluating the proportionality of self-citations among academic authors. It is recommended that future research apply the Fi-index more broadly to assess self-citation behaviors among researchers across institutions and disciplines, ensuring a balanced interpretation of scholarly influence.

Keywords: Bibliometric; Fi-index; H-Index; Self-Citation

1. INTRODUCTION

In Indonesia, a considerable proportion of professional writers, especially those within academia actively contribute to the development of influential scientific literature. Such scholarly outputs demand the integration of innovative thinking and creative methodologies to ensure the production of high-quality research that not only advances knowledge but also serves as a credible reference for the wider academic and professional communities.

Researchers are thus expected to pursue continuous inquiry, generating novel insights that warrant further investigation. For academics, particularly lecturers, scholarly publication is a core responsibility alongside teaching duties. In this context, bibliometrics has become an essential instrument for evaluating and interpreting scholarly productivity, requiring both conceptual understanding and practical application in the measurement of research performance.

Bibliometric research has been extensively conducted using data sourced from Scopus (www.scopus.com, 2024). Between 1970 and 2024, a total of 193,688 publications spanning a variety of document types have addressed topics related to bibliometrics. As a methodological approach, bibliometrics utilizes quantitative and statistical tools to assess and interpret patterns within scholarly communication, including phenomena such as self-citation practices (Amjad et al., 2020; Copiello, 2019; Zhou, 2021). This approach entails the systematic analysis of metadata components such as authorship, abstracts, keywords, and citation data. At the core of bibliometric studies lies the concept of citation, which denotes the practice of referencing previous scholarly work, either by others or by the author themselves within a specific research domain (Kacem et al., 2020). Citation behavior plays a crucial role in guiding scholarly inquiry, facilitating knowledge discovery across disciplines. Furthermore, the act of citing foundational studies is essential for establishing the scholarly context and rationale of new research endeavors (Bittermann et al., 2023; Marzi et al., 2024; Öztürk et al., 2024).

One crucial aspect of citation activities is self-citation, defined as the process of citing one's previous research within one's own work (Pandita & Singh, 2017). This practice is permissible when no prior research has addressed the topic at hand, allowing the researcher to build upon their previous contributions. Therefore, self-citation serves a legitimate purpose in advancing knowledge (Sinatra et al., 2016). The analysis of self-citation aims to understand its impact on bibliometric metrics within scientific work and the total number of citations accrued (Huang et al., 2015).

In examining self-citation, researchers may analyze the number of self-citations relative to the total number of references utilized. Self-citation activities can yield both positive and negative consequences. On the positive side, self-citations can provide valuable references that bolster research arguments (Szomszor et al., 2020; Yurko et al., 2021). Conversely, excessive self-citation may diminish the perceived value or quality of a scientific journal and could tarnish its reputation, leading other researchers to avoid using it as a reference source (Ataie-Ashtiani, 2016; Chorus & Waltman, 2016). Thus, conducting a self-citation analysis is essential to ascertain the accuracy of an author's h-index, which can inform further evaluation (Beall, 2017; Biagioli, 2016). Authors must carefully consider their reasons for self-citation, ensuring it is warranted rather than motivated by factors that could detract from the quality of their scientific output (Seeber et al., 2019).

The field of bibliometrics encompasses metrics such as citation counts, h-index, and impact factor to evaluate research impact and productivity (Fiorillo, 2024; Mongeon & Paul-Hus, 2016). The Fi-index is a bibliometric method particularly useful for analyzing self-citation by comparing Fi-index and h-index values (Fiorillo, 2022). The h-index remains one of the most significant metrics, as it gauges the scientific impact of researchers based on the citations their manuscripts receive from other studies (Salvador-Oliván & Agustín-Lacruz, 2015; Sinatra et al., 2016). The application of the Fiorillo Index is deemed more suitable for self-citation analysis, as it effectively measures a researcher's quality and productivity based on their contributions to scientific publications. The present study differs from prior research, such as "The Use of Fi-index Tool to Assess Per-manuscript Self-citations" (Fiorillo, 2022), in

its focus on the articles published by ten lecturers at Halu Oleo University using the Fi-index method.

Thus, this study aims to investigate and review the phenomenon of author self-citation, particularly among lecturers at Halu Oleo University. For academics, especially those at this institution, publishing in scientific journals is critical for affirming their professionalism and scholarly quality. Lecturers who consistently produce scientific works are often regarded as productive scholars. While self-citation practices are common among faculty, it remains unclear whether these practices are excessive or fall within acceptable limits. Consequently, bibliometric research has gained traction and continues to evolve in Indonesia, particularly concerning self-citation activities. Understanding and managing self-citation practices is essential for maintaining the quality and reputation of scientific works within academic circles. Therefore, this study is motivated by the need to conduct a Self-Citation Analysis of the Most Prolific Authors at Halu Oleo University using the Fi-index

2. METHODS

This study employs a bibliometric method with a self-citation analysis approach, specifically utilizing the Fi-index method (Fiorillo, 2022; Fiorillo & Cicciù, 2022). The Fi-index is a method designed to measure self-citation by comparing the results of the Fi-index and h-index values, thereby identifying authors who engage in normal or abnormal self-citation practices. The research follows three stages: data collection, data processing, and data analysis.

The research team accessed the Scopus database and navigated to the homepage. Using the "Authors" search feature, they entered the keyword "Halu Oleo University" to locate relevant scholarly profiles. From the search results, they identified and selected the top 10 lecturers affiliated with Halu Oleo University based on authorship rankings. The team then exported the corresponding publication metadata for each lecturer and saved the files in CSV format. The selection ensured that all exported documents were indexed by Scopus and included complete references available both on the journal websites and within the articles themselves.

The researchers conducted a thorough verification of each document's metadata, focusing on DOI accuracy, bibliographic completeness, titles, and reference links. For each of the 10 selected lecturers, they reviewed the titles of their published works, confirmed the DOI of each journal article, and examined the authorship, research links, and cited references. They then calculated the total number of references and the specific number of self-citations present in each publication. After gathering all relevant data, the team proceeded to analyze each document by applying the appropriate formula to determine the self-citation rate and the volume of references cited by each author.

$$\%\ of\ selfcit = \frac{Selfcit}{Total\ Reference} \times 100\%$$

Selfcit = Number of self-citations
Total Reference = Number of references per article

The analysis technique used is self-citation analysis. The formula used to analyze self-citation data is by calculating the Fi-index score:

$$Fi - index = H - index - \left[\frac{(100 - \%selfcit)}{100} \times hindex\right]$$

H-Index = h-index value
%Selfcit = Number of self-citations

After getting the value of the Fi-index, the researcher can find out the self-citation analysis conducted by the researcher, whether it is normal or not normal. If it is said to be normal if the Fi-index score is close to between 0 and h-index. If it is said to be abnormal if the Fi-index score is greater than h-index (Fiorillo, 2022). As for the Fi-index score table to determine whether self-citation is normal or not, see Table 1.

Table 1. Fi-index theory

Fi- Index	Information
0 – h-index	Normal
> h-index	Abnormal

(Source Fiorillo Index, 2022)

3. RESULTS AND DISCUSSION

Number of Publications and Number of References

The research results obtained show that the number of publications and the number of references from 10 lecturers at Halu Oleo University can be seen in Table 2 as follows:

Table 2. Number of publications and number of references of 10 productive lecturers Halu Oleo University

No	Name	Number of Publication	Number References
1.	Muhammad Nurdin	152	5103
2.	Maulidiyah	111	3912
3.	Sahidin	88	3439
4.	Muhidin	76	2147
5.	La Agusu	68	902
6.	Irnawati	57	1981
7.	Muhammad Arba	53	1668
8.	Adryan Fristiohady	47	2096
9.	Kangkuso Analuddin	48	2727
10.	I Nyoman Sudiana	48	986

(Source: Processed by the author, 2024)

The research results indicate that Muhammad Nurdin utilized a total of 5,103 references across 152 publications. In comparison, Maulidiyah had 3,912 references with 111 publications. These figures suggest a strong correlation between the number of references and the productivity of the lecturers, reflecting their active engagement in publishing within the Scopus database. Furthermore, Muhidin reported a total of 2,147 references with 76 publications, while Sahidin cited 3,439 references across 88 articles. I Nyoman Sudiana had 986 references associated with 48 publications, and Kangkuso Analuddin recorded 2,727 references along with 48 articles. La Agusu contributed 902 references and published 68 articles. Adryan Fristiohady used 2,096 references in 47 publications, and Muhammad Arba cited 1,668 references across 53 articles. Lastly, Irnawati reported a total of 1,981 references, resulting in 57 publications. These results are summarized in Table 2.

Self-Citation Analysis of Scientific Articles by Productive Lecturers at Halu Oleo University

Table 3. Number of self-citations and percentage of self-citations of 10 productive lecturers Halu Oleo University

No	Name	Number of Self-Citations	Percentage of Self-Citation
1.	Muhammad Nurdin	867	16.99%
2.	Maulidiyah	654	16.71%
3.	Muhidin	292	13.60%
4.	Sahidin	242	7.03%
5.	I Nyoman Sudiana	180	18.25%
6.	Kangkuso Analuddin	109	3.99%
7.	The Agus	61	6.76%
8.	Adrian Fristiohady	55	2.62%
9.	Muhammad Arba	54	3.23%
10.	Irnawati	43	2.17%

(Source: Processed by the author, 2024)

The self-citation analysis conducted among the ten lecturers at Halu Oleo University revealed that Muhammad Nurdin had the highest self-citation value, with a total of 867 self-citations, resulting in a self-citation percentage of 16.99%. Following him was Maulidiyah, who recorded 654 self-citations, corresponding to a self-citation percentage of 16.71%. Muhidin ranked third, with 292 self-citations and a self-citation percentage of 13.60%. Sahidin followed in fourth place, with 242 self-citations and a self-citation percentage of 7.03%. I Nyoman Sudiana was fifth, with 180 self-citations, which constituted 18.25% of his total citations. Kangkuso Analuddin ranked sixth, with 109 self-citations and a self-citation percentage of 3.99%. La Agusu had 61 self-citations, resulting in a self-citation percentage of 6.76%. Adryan Fristiohady recorded 55 self-citations, amounting to 2.62%, while Muhammad Arba had 54 self-citations, representing 3.23%. Lastly, Irnawati had the lowest self-citation activity among the ten lecturers, with 43 self-citations and a self-citation percentage of 2.17%.

Fi-Index Score of Productive Lecturer Index of Halu Oleo University

The results of the research on the Fi-index score of Productive Lecturers at Halu Oleo University can be seen in Table 4.

Table 4. Top 10 Halu Uleo University lecturers based on the number of articles, references, self-citations, number of Fi-indexes and H-indexes

No	Name Lecturer	Number of Articles	Amount Reference	Number of Self-Citations	Fi-Index Score	H-Index
1.	Muhammad Nurdin	152	5103	867	0.047572	28
2.	Maulidiyah	111	3912	654	0.043446	26
3.	Muhidin	76	2147	292	0.01904	14
4.	Sahidin	88	3439	242	0.011248	16
5.	I Nyoman Sudiana	48	986	180	0.023725	13
6.	Kangkuso Analuddin	48	2727	109	0.004788	12
7.	La Agusu	68	902	61	0.01014	15
8.	Muhammad Arba	53	1668	54	0.003553	11
9.	Irnawati	57	1981	43	0.002387	11
10.	Adrian Fristiohady	47	2096	55	0.002096	8

(Source processed by the author, 2024)

The analysis of self-citation practices among the top ten Scopus-indexed lecturers at Halu Oleo University revealed consistent adherence to normative citation behavior, as defined by the Fi-index framework (Fiorillo, 2022). Muhammad Nurdin emerged as the most prolific author, with 152 publications and 867 self-citations out of 5,103 total references. His Fi-index score of 0.047572 aligned closely with his h-index of 28, indicating self-citation remained within acceptable limits. Following closely, Maulidiyah authored 111 publications, citing 654 self-references from a total of 3,912 citations. Her Fi-index of 0.043446 matched her h-index of 26, similarly suggesting normal citation behavior. Muhidin, ranked third, produced 76 articles, referencing 292 of his own works among 2,147 total citations, resulting in a Fi-index of 0.01904 and an h-index of 14, again reflecting standard citation activity.

Other lecturers displayed consistent patterns. Sahidin, with 88 publications, had a Fi-index of 0.011248 relative to an h-index of 16; I Nyoman Sudiana, with 48 publications, recorded a Fi-index of 0.023725 and h-index of 13; and Kangkuso Analuddin, also with 48 articles, maintained a low Fi-index of 0.004788 alongside an h-index of 12. Further, La Agusu (68 publications; Fi-index: 0.01014; h-index: 15), Muhammad Arba (53 publications; Fi-index: 0.003553; h-index: 11), Irnawati (57 publications; Fi-index: 0.002387; h-index: 11), and Adryan Fristiohady (47 publications; Fi-index: 0.002096; h-index: 8) all demonstrated low Fi-index values in proportion to their h-indexes.

These findings collectively affirm that self-citation practices among the selected lecturers are within acceptable academic norms. According to the Fiorillo Index, Fi-index values that remain well below the h-index, especially those approaching zero indicate that self-citations have a minimal effect on an author's citation impact. Consequently, the citation performance of these lecturers appears to be primarily driven by recognition from other scholars rather than through self-referencing mechanisms.

Researchers undertake self-citation when their research topics are relevant and have not been previously studied or adequately addressed by others (Szomszor et al., 2020; Yurko et al., 2021). Self-citation can be done if no one is doing the relevant research, it is not prohibited. This practice is essential for advancing knowledge related to new innovations across various scientific fields. Moreover, it allows researchers to clarify their personal contributions within a specific domain.

However, self-citation should not be regarded as a trivial activity. When performed excessively, it can undermine the quality of scientific work. Continuous and excessive self-citation can lead to biased academic metrics (Galvez, 2017) and may result in the rejection of scientific papers by reviewers or editors for lacking diverse references (McLeod, 2021). Furthermore, excessive self-citation may be perceived as a manipulative practice, bordering on violations of academic ethics (Ataie-Ashtiani, 2016; Chorus & Waltman, 2016). Such practices can also hinder collaboration and innovation, as they may limit openness to new ideas and healthy exchanges of thought.

While self-citation is not inherently negative, It is advisable for the ten lecturers at Halu Oleo University to carefully consider self-citation activities, ensuring they are conducted only when genuinely necessary. The results of the self-citation analysis demonstrate that the ten productive lecturers at Halu Oleo University engage in self-citation practices that are within normal limits, as indicated by their Fi-index scores being close to zero relative to their h-index.

4. CONCLUSION

Based on the results of this study, the analysis of author self-citation among productive lecturers at Halu Oleo University reveals that out of ten lecturers, namely Muhammad Nurdin, Maulidiyah, Muhidin, Sahidin, I Nyoman Sudiana, Kangkuso Analuddin, La Agusu, Muhammad Arba, Irnawati, and Adryan Fristiohady, each engaged in self-citation. The Fi-index scores for these lecturers approached zero (0) in relation to their h-index values, indicating that their self-citation practices remain within normal limits and are largely supported by citations from other researchers. The Fi-index obtained by each of the ten lecturers demonstrates minimal self-intervention in their citation practices; the majority of citations were attributed to external researchers. This suggests that their work serves to strengthen the arguments and provide reference material for future research, ultimately benefiting the broader community. This study emphasizes the importance of careful consideration when engaging in self-citation. Researchers are encouraged to cite their own work judiciously and only when it is relevant and necessary. Additionally, it is hoped that future research will apply the Fi-index method to evaluate self-citation practices in the scientific works of lecturers and researchers.

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AUTHORS' CONTRIBUTIONS

Wahyuni Saputri Nur: Writing oiginal draft preparation. Ideas; formulation or evolution of overarching research goals and aims. **Cecep Ibrahim:** Supervision. **Asrul Jaya:** Supervision. **Majidah:** Supervision.

CONFLICT OF INTERESTS

We state that there are no known conflicts of interest linked with this publication, and that there has been no significant financial assistance for this work that could have influenced its outcome.

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