TIERS Information Technology Journal
Vol.3, No.1, June 2022, pp. 28~34
ISSN: 2723-4533 / E-ISSN: 2723-4541
DOI: 10.38043/tiers.v3i1.3706

A Bibliometric Analysis: Computer Science Research From Indonesia

Edi Supriyadi
edipmatematika@gmail.com
Teknik Industri, Sekolah Tinggi Teknologi Bandung

ABSTRACT

Bibliometric indicators originally counted ways to measure research quality. This endured for decades following the term's introduction. The purpose of this research is to carry out a bibliometric analysis of the present status and trends in computer science articles written by Indonesian authors that are included in the Scopus database. Bibliographic indicators were analyzed using SciVal (www.scival.com). Elsevier constructed SciVal using Collexis' semantic technology after buying it in 2010. SciVal evaluates scientific performance using Scopus and tracks funding. Between the years 1998 and 2022, the total number of indexed papers in Scopus that discuss the advancement of research outcomes in computer science has greatly expanded. This rise reached its highest point in 2019, with 121 publications. Santoso is the most prolific Indonesian researcher when it comes to releasing research results on computer science in Indonesia. The University of Indonesia has been the most helpful sponsor in terms of sponsoring computer science research.

Keywords: Bibliometric; Scival; Computer Science;

Article Info

Accepted : 20-05-2022
Revised : 01-05-2022
Published Online : 25-06-2022

Correspondence Author:

Edi Supriyadi
Teknik Industri,
Sekolah Tinggi Teknologi Bandung,
Jl. Soekarno Hatta No.378, Kb. Lega, Kec. Bojongloa Kidul, Kota Bandung, Jawa Barat 40235, Indonesia.
Email: edipmatematika@gmail.com

1. INTRODUCTION

The subject of data processing known as computer science is capable of both processing data and providing information to enable decision making [1]. The field of computer science has made significant contributions to many different aspects of human life. It causes research in the field of computer science to become increasingly intriguing to do as a result. Research, both theoretical and practical, that is carried out with the goal of advancing and broadening our understanding of computer science [2].

The Indonesian Ministry of Communication and Information has predicted that by the year 2020, Indonesia will be the region's digital economy player with the most market share [3]. The creation of a digital firm that is centered on the principles of technopreneurship in order to meet the requirements of digital citizens is one of the goals of the digital economy [4]. When it comes to accessing and making use of computer science, there are typically disparities between the wealthy and the less fortunate, between men and women, and between the basic sciences, engineering, and social sciences. In particular, there have been a variety of advancements in the use of computer science in terms of hardware, software, and brain-ware [5].

The Bibliometrics Analysis was used for this investigation. Researchers might benefit from using bibliometric analysis while doing research on bibliographic material and conducting citation analysis of each

article published in scientific journals and other types of scientific literature. Researchers can use a variety of information from bibliographies in their work, such as the publication's kind and language to aid in their bibliometric evaluations [13]. Bibliometrics is a statistical measure that was given its current name by [6] in 1969. It is applied to the study of the quality and quantity of published works. After the phrase was originally coined, bibliometric indicators mostly consisted of counting ways to evaluate the quality of research [7]. This lasted for the first few decades after the term was first used [7].

The first bibliometric assessment of post-communist Eastern European computer science research indexed in Web of Science was [8]. The authors analyzed 82,121 Web of Science computer science publications for publishing, citation, and collaboration tendencies [8]. In addition, [9] presents a bibliometric examination of 1.9 million computer science papers indexed in Web of Science from 1945 to 2014. AI is the most productive subfield of computer science, whereas IA has the largest relative effect [9]. Using Web of Science data, [10] analyzes author keywords to determine ASEAN countries' research focus during the last decade. Most ASEAN countries have diverse research priorities, which explains their varying ICT levels. Implications are then given [10]. In this piece, the author makes use of bibliometrics, which are statistics collected from scientific publications on the subject of the development of Computer Science in Indonesia that have previously been indexed in the Scopus database. Because of this, the purpose of this research is to carry out a bibliometric analysis of the present status and trends in computer science articles written by Indonesian authors that are included in the Scopus database.

2. RESEARCH METHOD

The information that was acquired for this study comes from global publications on computer science in Indonesia that were discovered on the Scopus website. Indonesia was the location where these items were found (www.scopus.com). There was no time constraint placed on the search that was conducted using the keywords AFFILCOUNTRY (Indonesia) KEY (“Computer Science”). Keywords associated with Indonesian researchers in the field of computer science. These terms are looked up in the abstract, keywords, and document's title. Data is not restricted to Articles, Conference Papers, Book Chapters or Books, and Reviews. The month of July 2022 was chosen for the conduct of this investigation.

SciVal (www.scival.com) was used to analyze bibliographic indicators. SciVal, built by Elsevier utilizing Collexis' semantic technology after being bought in 2010, is a subscription-based research performance assessment platform. SciVal is a Scopus-based scientific performance assessment tool [11]. SciVal develops researcher profiles based on Scopus and keeps publication and funding information [12]. This tool analyzed the number of publications, most productive institutions, most productive nations, type of collaboration (national, international, institutional, single authorship), most referenced papers, and most productive individuals. Each bibliometric indicator was summarized with frequencies and percentages.

As a result, the purpose of this research is to address this problem by requesting documentation of preceding researchers in the context of computer science from Indonesian researchers. More specifically, the following six research questions (RQs) will be looked into as part of this study:

RQ1. How is the development of research on computer science in Indonesia?

RQ2. What are the sources that produce a lot of publications on computer science in Indonesia?

RQ3. Where are the affiliations of writers from Indonesia in the field of computer science?

RQ4. Who are the writers from Indonesia who publish research on computer science?

RQ5. What are the subject areas of computer science research from Indonesian writers?

RQ6. What institutions fund research on computer science in Indonesia?

3. RESULTS AND DISCUSSION

RQ1. How is the development of research on computer science in Indonesia?

According to the findings of a search carried out on the Scopus database, the growth of research on computer science in Indonesia during the period 1998-2022 was characterized by periods of both expansion

and contraction. As can be seen in Table 1 and Figure 1, the rate of advancement in research related to computer science has been steadily climbing since 2011 and has reached its highest point in 2019.

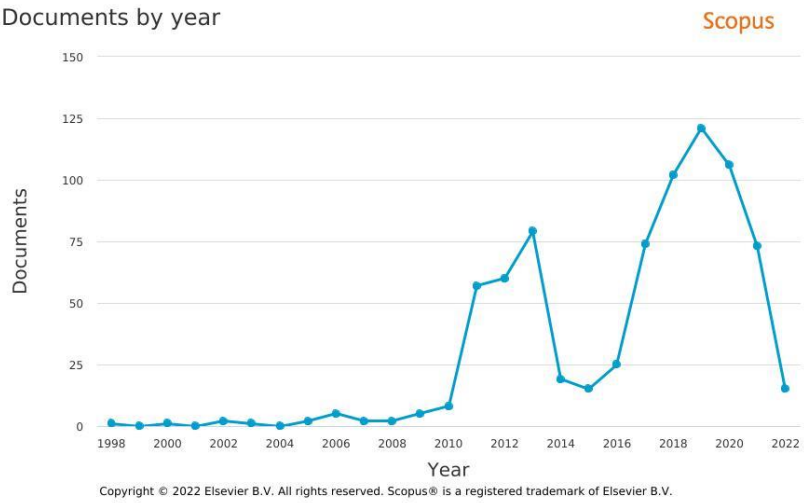

Figure 1. Documents by year

Table 1. Documents by year

Year	Frequency	Year	Frequency
2022	15	2011	57
2021	73	2010	8
2020	106	2009	5
2019	121	2008	2
2018	102	2007	2
2017	74	2006	5
2016	25	2005	2
2015	15	2003	1
2014	19	2002	2
2013	79	2000	1
2012	60	1998	1

Table 1 and Figure 1 show that, from 1998 to 2022, computer science research publications increased from 57 in 2011 to 121 in 2019, as can be observed from a rise in the number of publications since 2011. According to the Director General of Higher Education's Circular Letter No. 152 of 2012, students must publish their final projects in nationally authorized and worldwide journals in order to graduate (S1), Master (S2), and Doctoral (S3). As a result, a number of functional roles have been elevated in rank because of their ability to publish research and ideas in worldwide scientific publications.

RQ2. What are the sources that produce a lot of publications on computer science in Indonesia?

Among the 775 computer science research articles retrieved from the Scopus database, there were 56 journal titles. The Journal of Physics Conference Series, Lecture Notes In Computer Science Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics, and IOP Conference Series Materials Science And Engineering are the top three core journals in computer science publications at Scopus, as shown in Figure 2 of the 56 journals. Based on Figure 2, computer science research results are published most frequently in the Journal of Physics Conference Series (48 articles), Lecture Notes in Computer Science (23 articles), Iop Conference Series Materials Science and Engineering (Iop Conference Series MS&E) (15 articles), and Advances in Intelligent Systems and Computing (Advances in Intelligent Systems & Computing) (14 articles). While this was going on, 10 papers were published in the ACM International Conference Proceeding Series, Heliyon, Procedia Computer Science. Telkomnika Telecommunication Computing Electronics and Control, Iop Conference Series Earth and Environmental Science, and Journal of

Theoretical and Applied Information Technology all published 8 articles each. Journal Of Physics Conference Series has an SJR value of 0.21, Lecture Notes In Computer Science 0.41, and Agriculture Ecosystems and Environment 1879; Agricultural Systems 1275; Iop Conference Series Materials Science And Engineering have an SJR value of 0.25 in 2021.

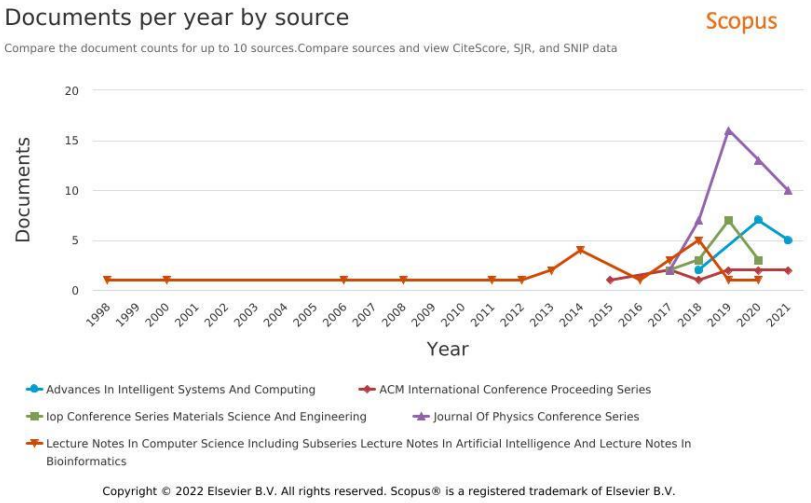

Figure 2. Documents per year by source

RQ3. Where are the affiliations of writers from Indonesia in the field of computer science?

Following the University of Indonesia as the institution in Indonesia that publishes the most research results on computer science is Bina Nusantara University, followed by the Sepuluh Nopember Institute of Technology and the Bandung Institute of Technology. These rankings are based on affiliations. See the Figure 3 below for further information on the organizations that publish research results related to computer science.

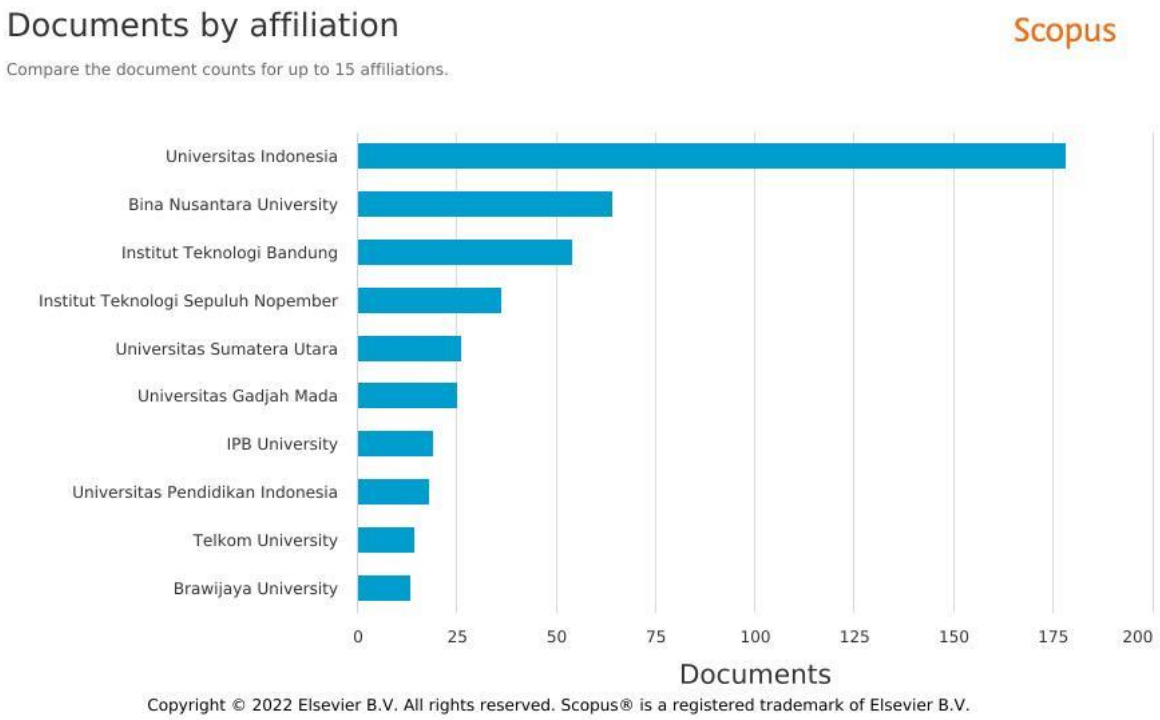

Figure 3. Documents by affiliation

With 178 articles published in international journals, the University of Indonesia holds the number one spot on Scopus's list of most productive academic institutions. Bina Nusantara University, a private

educational institution in Indonesia, currently holds the number two spot on this ranking with 64 publications. State universities such as the Bandung Institute of Technology, which has 54 articles, the Sepuluh Nopember Institute of Technology, which has 36 articles, and the University of North Sumatra, which has 26 articles, occupy positions three through five, respectively. What should be taken into consideration is Telkom University, which is a private university that is developing its publications in this subject and currently occupies the 9th position, moving Brawijaya University down to the 10th position, with a total of 14 papers that have been published.

RQ4. Who are the writers from Indonesia who publish research on computer science?

According to Figure 4, the most prolific researcher in the field of computer science in Indonesia is Santoso, who has published a total of 29 papers. He is followed in this category by Jatmiko, who has published 20, Purnomo, who has published 18, and Censuse, who has published 17. During this time, each of Arymurthy, Hasibuan, and Musranto authored a total of twelve articles. Harry Budi Santoso , a lecturer and researcher at Fasilkom UI, is widely recognized as the most prolific writer in the field of computer science. In addition to his work on campus, he is involved in a number of professional organizations, including the Association for Higher Education in Informatics and Computers, where he serves as Head of Lecturer Competence (APTIKOM). While Prof. Wisnu Jatmiko is a UI Professor in the field of Artificial Intelligence (AI) and Robotics who has been involved in the growth of science through research activities, Prof. Wisnu Jatmiko has also been involved in the development of the field of robotics.

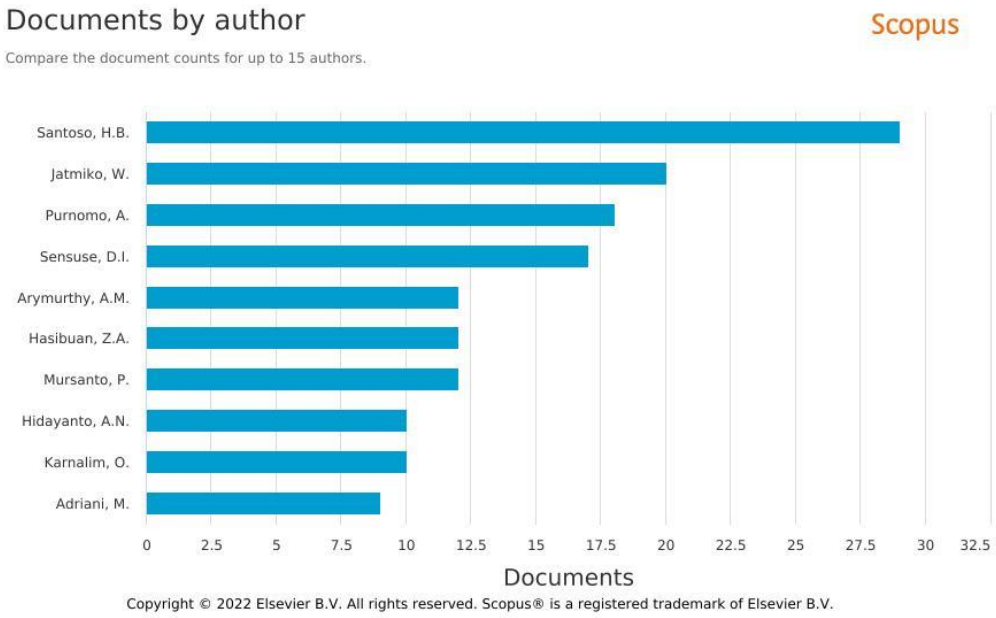

Figure 4. Documents by author

RQ5. What are the subject areas of computer science research from Indonesian writers?

According to the findings of the search, the areas of study that receive the most attention in the field of computer science are Engineering, Decision Sciences, Computer Science, Mathematics, Social Sciences, Physics and Astronomy, Business, Management and Accounting, Energy, Environmental Science, and Materials Science. This information is presented in Figure 6. According to Figure 6, the field of computer science itself generates the most research (614), followed by the fields of engineering (222), decision sciences (135), mathematics (97), social sciences (85), physics and astronomy (75), business, management, and accounting (52), energy (28), and environmental science (24). Immunology, microbiology, and psychology have only one subject area apiece, making them the least amount of subject areas.

.

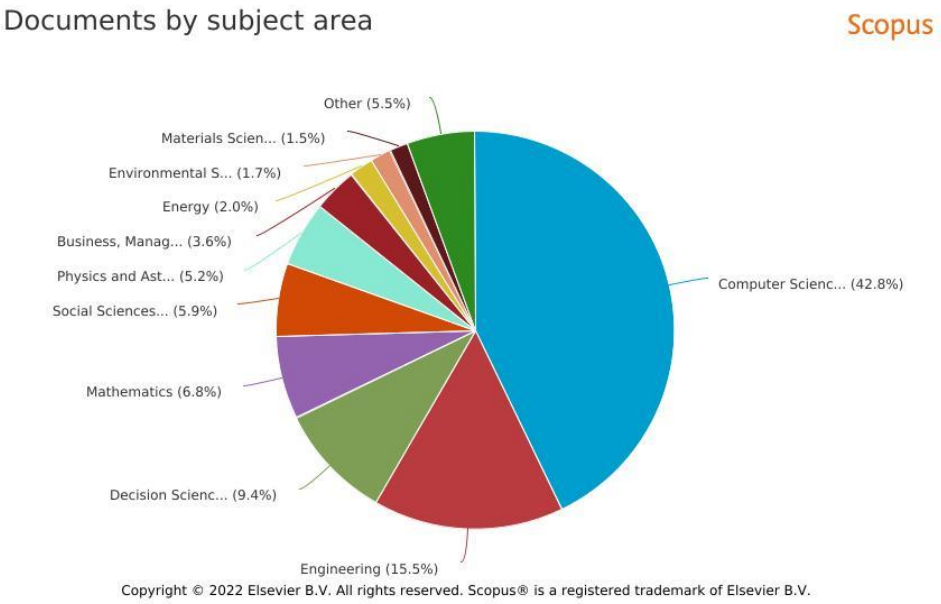

Figure 5. Documents by subject area

RQ6. What institutions fund research on computer science in Indonesia?

Using the Scopus database, 775 documents on the development of computer science research findings were retrieved, supported by a variety of institutions, including both affiliates and governmental agencies. The University of Indonesia was the first state university to sponsor 24 articles for publication on Scopus. Bina Nusantara University came in second with 10 publications. The Ministry of Research, Technology and Higher Education of the Republic of Indonesia supported seven articles, while the National Natural Science Foundation of China and the National Science Foundation generated four articles each that were indexed by Scopus.

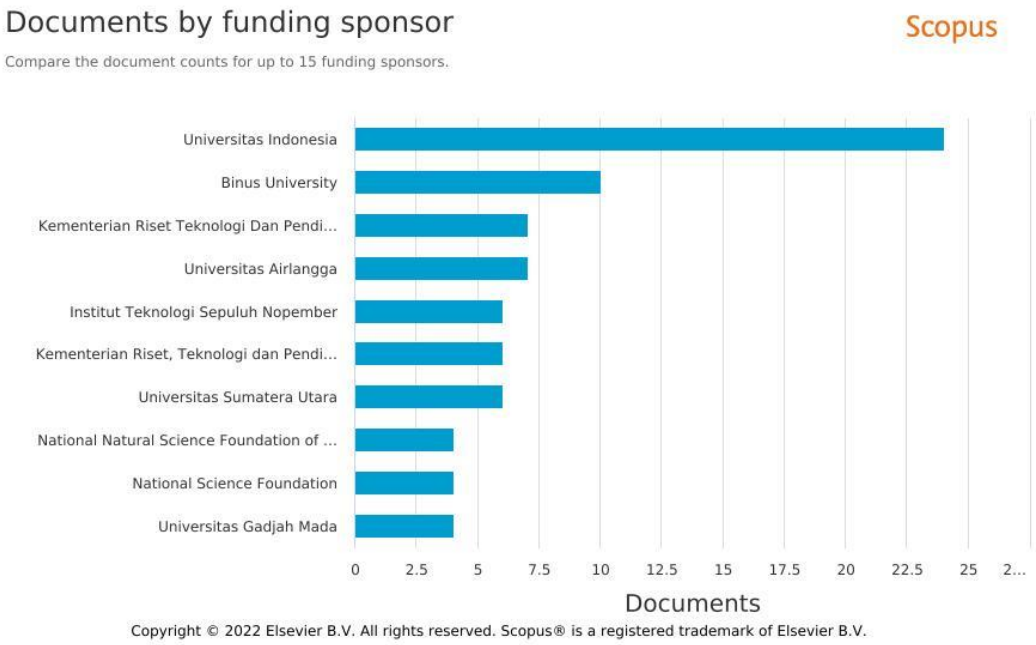

Figure 4. Documents by funding sponsor

4. CONCLUSION

The following is a reasonable inference that may be drawn from the aforementioned discussion and the outcomes. Between the years 1998 and 2022, the total number of indexed papers in Scopus that discuss the advancement of research outcomes in computer science has greatly expanded. This rise reached its highest point in 2019, with 121 publications. The Journal Of Physics Conference Series has a total of 48 articles, making it the kind of publication that publishes the most findings from research conducted in the field of computer science. The University of Indonesia is the institution that has contributed the most to the publication of research results on computer science in Indonesia that are indexed in Scopus. The university has a total of 178 articles. Santoso is the most prolific Indonesian researcher when it comes to releasing research results on computer science in Indonesia. He has 29 articles to his name. And finally, the University of Indonesia has been the most helpful sponsor in terms of sponsoring computer science research, as seen by the fact that it has funded 24 publications.

REFERENCES

[1] Mustabshiroh, R. Latuconsina, and T. W. Purboyo, "Data processing of laboratory recruitment using K-nearest neighbor algorithm," *J. Eng. Appl. Sci.*, vol. 14, no. 1, pp. 247–252, 2019.

[2] N. Sari, Suharjito, and A. Widodo, "Trend prediction for computer science research topics using extreme learning machine," in *2012 International Conference on Advances Science and Contemporary Engineering, ICASCE 2012*, 2012, vol. 50, pp. 871–881.

[3] M. A. Sahban and D. H. Syahchari, "Assessing the Entrepreneurial Orientation Model and Linking it with Entrepreneurial Inclination among Information Systems and Computer Science Students in Indonesia," in *4th International Conference on Information Management and Technology, ICIMTech 2019*, 2019, pp. 165–170.

[4] A. Purnomo, A. K. Sari, E. Mufidah, N. Asitah, and A. Aziz, "Digital business: A scientific publication positioning using scientometric analysis," in *5th International Conference on Information Management and Technology, ICIMTech 2020*, 2020, pp. 588–593.

[5] M. K. M. Nasution, R. Hidayat, and R. Syah, "Computer Science," *Int. J. Adv. Sci. Eng. Inf. Technol.*, vol. 12, no. 3, pp. 1142–1159, 2022.

[6] A. Pritchard, "Statistical Bibliography or Bibliometrics? Journal of Documentation. 25 (4) Dec." 1969.

[7] A. van Raan, "Advanced bibliometric methods for the evaluation of universities," *Scientometrics*. researchgate.net, 1999.

[8] D. Fiala and P. Willett, "Computer science in Eastern Europe 1989-2014: a bibliometric study," *Aslib J. Inf. Manag.*, vol. 67, no. 5, pp. 526–541, 2015.

[9] D. Fiala and G. Tutoky, "Computer science papers in web of science: A bibliometric analysis," *Publications*, vol. 5, no. 4, 2017.

[10] J.-J. Hew, V.-H. Lee, K.-B. Ooi, and B. Lin, "Computer Science in ASEAN: A Ten-Year Bibliometric Analysis (2009–2018)," *J. Comput. Inf. Syst.*, vol. 61, no. 3, pp. 247–255, 2021.

[11] M.-C. Yu, Y.-C. J. Wu, W. Alhalabi, H.-Y. Kao, and W.-H. Wu, "ResearchGate: An effective altmetric indicator for active researchers?," *Comput. Human Behav.*, vol. 55, pp. 1001–1006, 2016.

[12] E. Vardell, T. Feddern-Bekcan, and M. Moore, "SciVal experts: A collaborative tool," *Med. Ref. Serv. Q.*, vol. 30, no. 3, pp. 283–294, 2011.

[13] Hamidah I, Sriyono S, Hudha MN. A Bibliometric analysis of Covid-19 research using VOSviewer. Indonesian Journal of Science and Technology. 2020:34-41.

.