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Bibliometric analysis of publications trends in Indonesian research institutions: A comparison of pre-integration (2015–2021) and post-integration (2022–2023) periods

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Abstract

Background: Institutional transformation – integrating many disparate research institutes into the National Research and Innovation Agency (BRIN, for *Badan Riset dan Inovasi Nasional*) – was the most significant reform in the history of institutional governance in Indonesia. This integration policy aims to enable the state to strengthen the national research and innovation ecosystem and improve the performance of research institutions, one indicator of which is their output of publications reporting the results of research.

Objectives: To compare the published output of research institutes before and after the integration of research institutions into BRIN.

Methods: Relevant data retrieved through Scopus on 24 December 2023 and spanning the period between 2015 and 2023 were analysed using Microsoft Excel, and collaboration networks of authors and of countries were constructed using VOSviewer and examined for co-authors in different countries collaborating with first authors in Indonesia.

Results: The number of publications increased annually over the period 2015–2023. However, the annual rate of growth after (2021–2023) the integration of research institutions was higher (36%) than that before (2015–2021) the integration (30%). Conference papers (51%) dominated the pre-integration era, whereas articles (57%) dominated the post-integration era, and the number of reputable journals in which the research was published was greater after the integration.

Conclusions: The period after the integration of research institutions saw enhanced research output in terms of the number of research publications, annual rate of growth in that number, and the number of reputable journals in which the publications appeared.

Keywords:

Integration of research institutes, publications as research output, Scopus database

Introduction

The Indonesian government established the National Research and Innovation Agency (BRIN, for *Badan Riset dan Inovasi Nasional*) in 2019 through appropriate legislation (Law Number 11 of 2019 on the National System of Science and Technology). Initially, BRIN was part of the Ministry of Research and Technology (Kemenristek, *Kementerian Riset dan Teknologi*) but was separated from Kemenristek in April 2021 and eventually, in August 2021, became the sole state institution for the following tasks: organization of state-funded R&D, its assessment and application, promotion of invention and innovation, implementation of nuclear energy and of the national space programme, and monitoring, controlling, and evaluating the duties and functions of the Regional Research and Innovation Agency (BRIDA, *Badan Riset dan Inovasi Daerah*).

Institutional transformation integrating and consolidating the many diverse research units – 919 research units across 74 ministries and non-ministerial government institutions – into BRIN was the most significant reform in the history of institutional governance in Indonesia; currently, BRIN comprises 12 research organizations and 85 research centres.[1]

The government opted for this reform to overcome the problem of low critical mass, the roots of which lay in the scattered and overlapping between research units and the consequent low budget for all of them.[2] In addition, gross expenditure on R&D as a percentage of Indonesia's gross domestic product in 2020 was a measly 0.28%.[3] Of that meagre share, the public sector claimed as much as 84.6%, whereas the private sector accounted for only 7.3%.[4] Another problem was the clash of ego between different research institutions, which made collaborative research a challenge. The integration was meant to strengthen the country's research and innovation ecosystem and to improve the performance of its research institutions.

One widely adopted indicator of such performance is research output, typically quantified in the form of the number of research publications by Indonesian authors in globally reputable journals.[5] This is also a measure of the country's global competitiveness.[6]

Therefore, the research question we set to answer was this: what is the policy of integrating research institutions into BRIN that can improve research output? Unfortunately, the performance of Indonesian research institutes in terms of publication output before the integration has never been compared to that after the integration – a gap the present paper sought to bridge.

Methods

We used the Scopus database for bibliometric analysis of publications produced during the two periods, namely before and after the formation of BRIN. The Scopus database has extensive coverage of various scientific disciplines. In fact, it is mandatory for BRIN to use the number of Scopus-indexed publications as one of the measures of research performance: researchers can use published output to support their claims of achievements only if the publications feature in journals indexed by Scopus.[7]

We collected relevant data from the Scopus database on 24 December 2023 using the following criteria: the country of affiliation country had to be Indonesia; the language of the publication had to be English; and the year of publication had to be between 2015 and 2023 (inclusive of both the years). The data were collected in two stages: the first stage encompassed the pre-integration

period, namely 2015–2021, and the second, the post-integration period, namely 2022–2023.

We chose 2015 as the beginning because it marked the beginning of the era of integration of National Research and Innovation Systems, which promoted the integration of research institutions into BRIN,[8] which was formed by integrating research institutions in Indonesia. Before the integration, the following institutions were particularly productive in publishing in Scopus-indexed publications: Badan Penelitian dan Pengembangan Kesehatan, Lembaga Ilmu Pengetahuan Indonesia, Eijkman Institute for Molecular Biology, Badan Pengkajian dan Penerapan Teknologi, Badan Penelitian dan Pengembangan Pertanian, Badan Tenaga Nuklir Nasional Indonesia, and Lembaga Penerbangan dan Antariksa Nasional. These names were used in searching relevant affiliations in the Scopus database. The exact queries for the search are shown in Table 1.

The results of the search remained well below the limit of 20,000 documents imposed by the algorithm used by Scopus.

Next, the articles that met the search criteria and all their bibliometric details were exported to Microsoft Excel as a file of comma-separated values (.csv) from the Scopus website, separately for each of the two periods. The annual rate of growth in the number of publications was calculated from the following equations[9]

$$\text{Annual growth rate } (\text{AGR}) = \frac{EndValue - FirstValue}{FirstValue} \times 100$$

$$\text{Average annual growth rate } (\text{AAGR}) = \frac{AGR_{t1} + AGR_{t2} + \ldots + AGR_{tn}}{n}$$

where t represents a particular year and n, the total number of years.

The two periods were compared on the following parameters: the number of publications in each year, document type, source type, source title, subject area, and the funding agency. The network of collaboration between authors and countries was obtained using VOSviewer ver. 1.6.20 because VOSviewer can trawl data from various sources including Scopus database and can make bibliometric networks visible, for example, the network of co-authors affiliated with institutions across different countries.[10]

Table 1. Queries used in searching Scopus to obtain the number of publications publ ishedby the more productive research institutions in Indonesia before (2015–2021) and after (2021–2022) their integration into BRIN

Period	Search query	Total publications
2015–2021	(AFFILCOUNTRY(Indonesia) AND PUBYEAR > 2014 AND PUBYEAR < 2022 AND (LIMIT-TO (AF-ID,"Badan Penelitian Dan Pengembangan Kesehatan, Kementerian Kesehatan Republik Indonesia" 60069387) OR LIMIT-TO (AF-ID,"Lembaga Ilmu Pengetahuan Indonesia" 60069394) OR LIMIT-TO (AF-ID,"Eijkman Institute for Molecular Biology" 60069395) OR LIMIT-TO (AF-ID,"Badan Pengkajian dan Penerapan Teknologi" 60069407) OR LIMIT-TO (AF-ID,"Badan Penelitian dan Pengembangan Pertanian" 60087553) OR LIMIT-TO (AF-ID,"Badan Tenaga Nuklir Nasional Indonesia" 60089122) OR LIMIT-TO (AF-ID,"Badan Riset dan Inovasi Nasional" 60273350) OR LIMIT-TO (AF-ID,"Lembaga Penerbangan dan Antariksa Nasional" 60273477)) AND (LIMIT-TO (LANGUAGE,"English")))	12,209
2022–2023	(AFFILCOUNTRY(Indonesia) AND PUBYEAR > 2021 AND PUBYEAR < 2024 AND (LIMIT-TO [. . .] AND (LIMIT-TO (LANGUAGE,"English")))	8,081

Note The part of the query that relates to the names of institutions was identical in both periods and is indicated as [. . .] in the last row.

Results

Growth in the number of publications

The number of publications in each year was higher during the post-integration period (Figure 1): the pre-integration period showed a total of 12,209 documents at an average annual growth rate (AGR) of 30%, whereas the corresponding numbers for the post-integration period were 8081 and 36% (it must be noted that the second period comprised only two years whereas the first period comprised seven years.).

The AGR of the publications during the pre-integration period institutions declined over time: despite significant (56%) growth from 2016 to 2017, the AGR reached its nadir at 7% in 2020 – only to bounce back from 2020 to 2023 as the era of post-integration began (Figure 1).

Type of publications

More than half (51%) of the publications during the pre-integration period were conference papers, followed by articles (45%). The most cited conference paper was by Rusydi,[11] with 276 citations, and the most cited article was by James et al.,[12] with 7795 citations. Post-integration, articles were predominant (57%), whereas the share of conference papers declined to 35% in (Figure 2). The most cited article was by Song,[13] with 113 citations, and the most cited conference paper was by Kartini,[14] with 9 citations. Reviews ranked third during both periods: the most cited review during the pre-integration period was by Diaz et al.,[15] with 1525 citations, and that during the post-integration period was by Scaccabarozzi et al.,[16] with 125 citations.

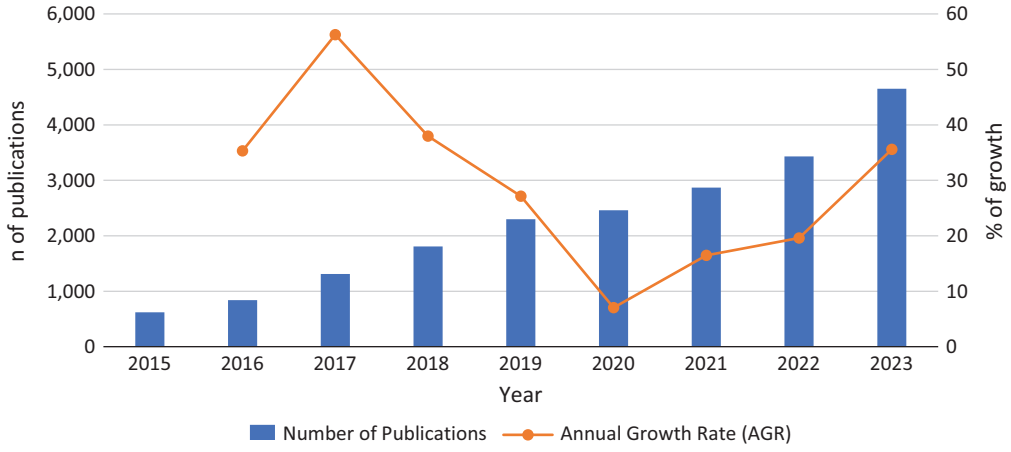

Figure 1. Increase in the number of Scopus-indexed publications before (2015–2021) and after (2022–2023) the integration of research institutions in Indonesia.

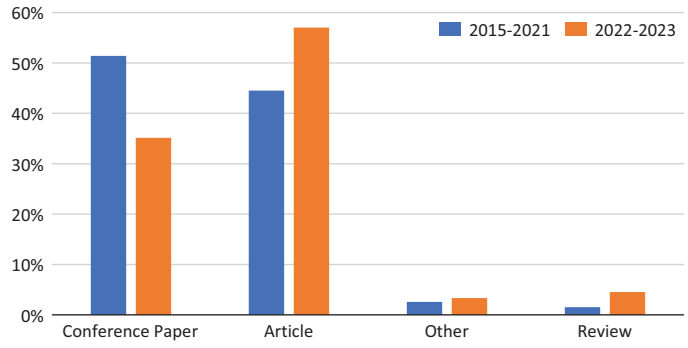

Figure 2. Publications by document type before (2015–2021) and after (2022–2023) the integration of research institutions in Indonesia.

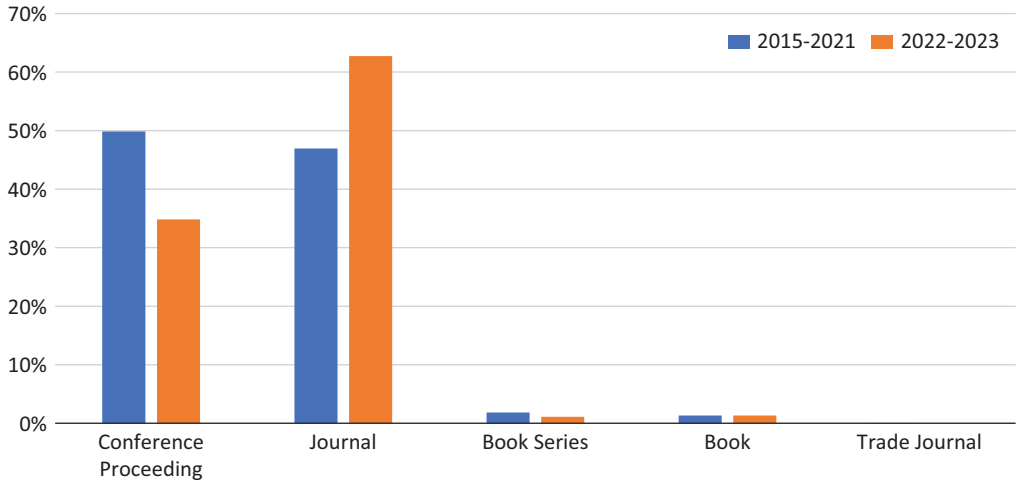

Figure 3. Sources of publications before (2015–2021) and after (2022–2023) the integration of research institutions in Indonesia.

Source of publication

In terms of the source of published output, conference proceedings accounted for 50%, or 6087 documents, during the pre-integration period (Figure 3), followed by journals (47%, or 5732 documents). Post-integration, journals overtook conference proceedings as the predominant source, with corresponding figures being 63%, or 5068 documents, and 35%, or 2815 documents.

During both periods, the most popular conference (in terms of the number of papers it attracted) was the IOP Conference Series Earth and Environmental Science, which topped the list (22%, or 1777 papers during the first period and 24%, or 1157 papers, during the second) (Table 2). The next most popular conference was the AIP Conference (1171 papers and 713 papers, respectively, the share being the same (15%) during both the periods.

Table 2. Top 10 sources of publications before (2015–2021) and after (2022–2023) the integration of research institutions in Indonesia

	2015–2021		2022–2023	
Rank	**Source title**	**Documents (numbers and %)**	**Source title**	**Documents (numbers and %)**
1	*IOP Conference Series Earth and Environmental Science*	1777 (22.27)	*IOP Conference Series Earth and Environmental Science*	1157 (23.98)
2	*AIP Conference Proceedings*	1171 (14.67)	*AIP Conference Proceedings*	713 (14.78)
3	*Journal of Physics Conference Series*	937 (11.74)	*E3s Web of Conferences*	220 (4.56)
4	*IOP Conference Series Materials Science and Engineering*	590 (7.39)	*Biodiversitas*	140 (2.90)
5	*Biodiversitas*	278 (3.48)	*Springer Proceedings in Physics*	127 (2.63)
6	*Atom Indonesia*	131 (1.64)	*Journal of Physics Conference Series*	100 (2.07)
7	*E3s Web of Conferences*	96 (1.20)	*Bio Web of Conferences*	85 (1.76)
8	*Materials Science Forum*	86 (1.08)	*Heliyon*	63 (1.31)
9	*Zootaxa*	76 (0.95)	*Sustainability Switzerland*	63 (1.31)
10	*International Journal of Technology*	65 (0.81)	*Evergreen*	57 (1.18)

When we limited the number of publications to journals, the most popular journal during both the periods was *Biodiversity*, which featured 278 documents and 140 documents, respectively, the share being constant at 3%. When the top 10 reputable journals were ranked by their SCImago Journal Rank (SJR), the two periods showed different results: during the pre-integration period, only five journals had been assigned an SJR – and all of them were placed in the third quartile; post-integration, not only all the 10 journals were those with an SJR but two of them were in the first quartile; one, in the second; three, in the third; and four, in the fourth (Table 3).

Subject area

The subject matter of the publications (Figure 4) also changed: the top three research subject areas before the integration were physics and astronomy (15% of the total publications), environmental science (13%), and engineering (12%); post integration, the areas were environmental science (17%), earth and planetary sciences (12%), and agricultural and biological sciences (11%).

The increase in the number of publications from the pre-integration period to the post-integration period was mainly in six subject areas: environmental sciences (3.7% increase), agricultural and biological sciences (2.6%), social sciences (1.4%), energy (1.0%), biochemistry, genetics, and molecular biology (0.5%), and earth and planetary sciences (0.4%).

Research topic

The specific topics of research (Figure 5) also changed: the dominant topics before the integration included taxonomy, new species, malaria, conservation, and radar; those after the integration were coronavirus disease 2019 (COVID-19), machine learning, antioxidants, conservation, and deep learning.

Funding agencies

Although the integration brought no major changes to the agency's funding research, their ranking did change, with Lembaga Ilmu Pengetahuan Indonesia being replaced by BRIN as the top sponsor (Table 4).

Table 3. Top 10 Scopus-indexed journals featuring papers by Indonesian authors before (2015–2021) and after (2022–2023) the integration of research institutions in Indonesia

	2015–2021		2022–2023	
Rank	**Journal**	**Quartile**	**Journal**	**Quartile**
1	*Biodiversitas*	Q3	*Biodiversitas*	Q3
2	*International Journal of Scientific and Technology Research*	-	*Bali Medical Journal*	Q4
3	*International Journal of Innovation, Creativity and Change*	-	*Sustainability* (Switzerland)	Q1
4	*Macedonian Journal of Medical Sciences*(open access)	-	*Malaysian Journal of Medicine and Health Sciences*	Q4
5	*Indian Journal of Public Health Research and Development*	-	*Heliyon*	Q1
6	*Advanced Science Letters*	-	*Aacl Bioflux*	Q3
7	*International Journal on Advanced Science Engineering and Information Technology*	Q3	*International Journal on Advanced Science Engineering and Information Technology*	Q3
8	*Aacl Bioflux*	Q3	*Journal of Theoretical and Applied Information Technology*	Q4
9	*Enfermeria Clinica*	Q3	*Research Journal of Pharmacy and Technology*	Q2
10	*Telkomnika Telecommunication Computing Electronics and Control*	Q3	*Quality Access to Success*	Q4

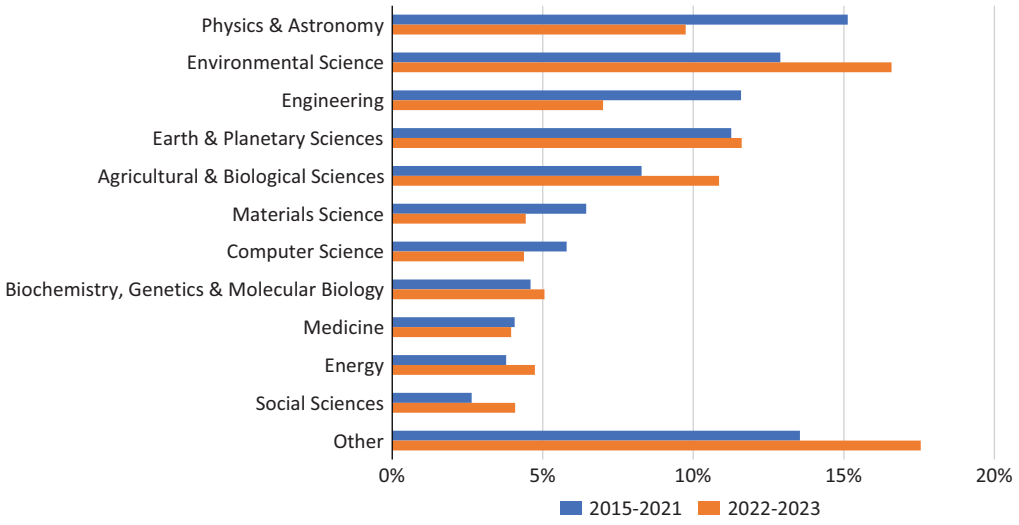

Figure 4. Shares of different subjects in publications before (2015–2021) and after (2022–2023) the integration of research institutions in Indonesia.

Network of collaborating countries

Lastly, the integration led to moderate changes to the network of countries in which foreign authors collaborating with Indonesian authors worked. The networks before the integration (Figure 6) and after it (Figure 7) differed in the number of countries, the number of clusters into which the countries could be grouped, and the minimum number of articles based on intercountry collaboration: before the integration, the network comprised 34 countries, which could be grouped into four clusters and resulted in 10 publications; after the integration, the number of publications remained unchanged at 10, but the number of countries increased to 37, and these could be grouped into six clusters. Japan led in the collaborations during both periods, and the countries were mostly from East Asia, South East Asia, and Western Europe.

Discussion

This increase in publications post integration can be attributed to publication being made mandatory and a major factor in career

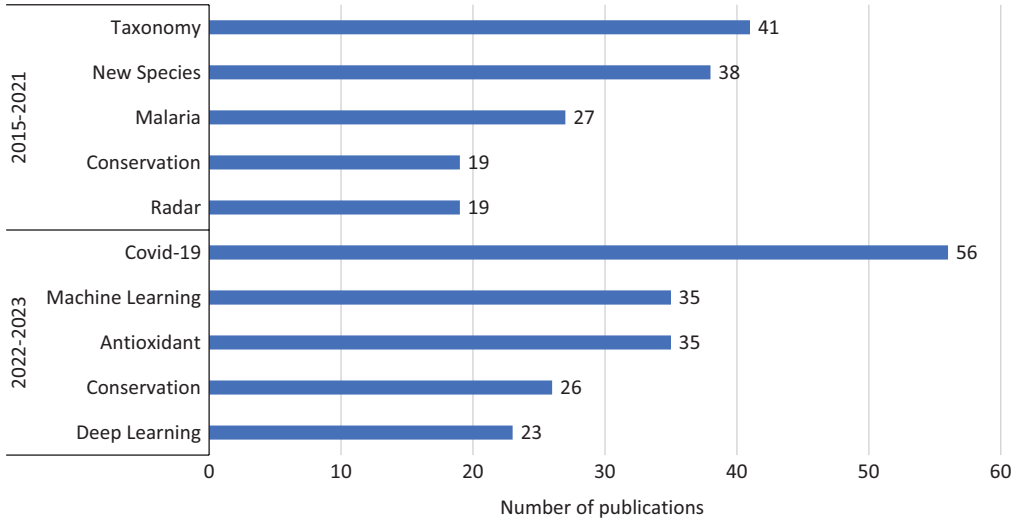

Figure 5. Predominant research topics before (2015–2021) and after (2022–2023) the integration of research institutions in Indonesia.

Table 4. Top 10 agencies funding research before (2015–2021) and after (2022–2023) the integration of research institutions in Indonesia

	2015–2021		2022–2023	
Rank	Funding agency	No. of publications from funded research	Funding agency	No. of publications from funded research
1	Lembaga Ilmu Pengetahuan Indonesia	978	Badan Riset dan Inovasi Nasional	1036
2	Kementerian Riset, Teknologi dan Pendidikan Tinggi	583	Lembaga Ilmu Pengetahuan Indonesia	267
3	Japan Society for the Promotion of Science	500	Japan Society for the Promotion of Science	203
4	Ministry of Education, Culture, Sports, Science, and Technology	325	Lembaga Pengelola Dana Pendidikan	193
5	Universitas Indonesia	248	Ministry of Education, Culture, Sports, Science, and Technology	143
6	National Science Foundation	217	Universitas Indonesia	136
7	National Natural Science Foundation of China	210	National Natural Science Foundation of China	105
8	Badan Tenaga Nuklir Nasional	204	National Research Foundation of Korea	104
9	Bundesministerium für Bildung und Forschung	195	Bundesministerium für Bildung und Forschung	99
10	National Research Foundation of Korea	186	Universitas Gadjah Mada	99

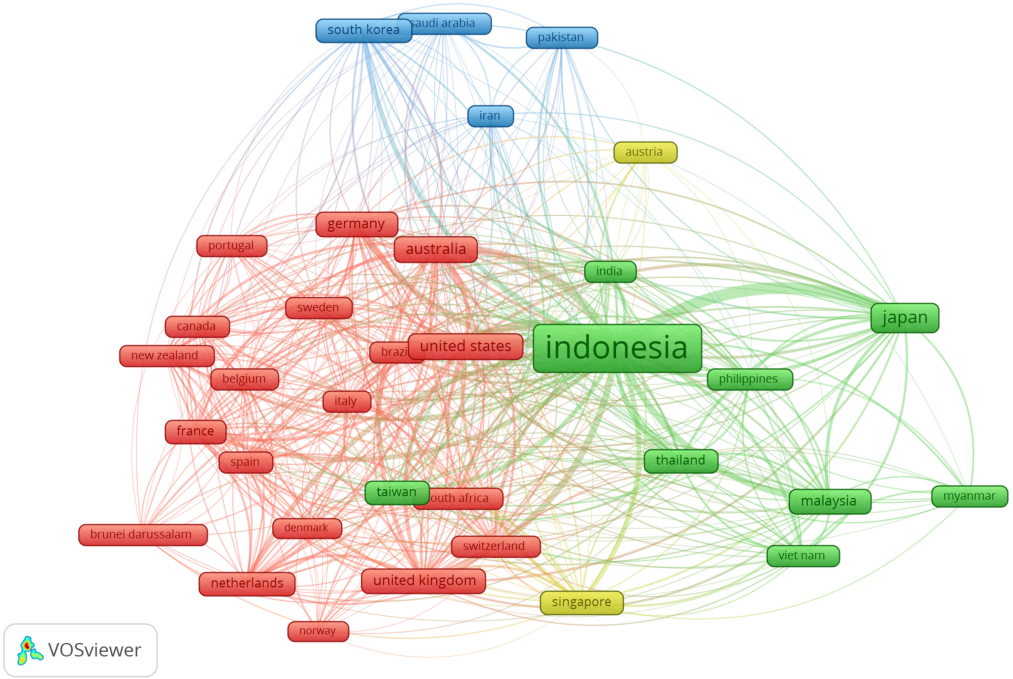

Figure 6. Network of countries collaborating with Indonesia before (2015–2021) the integration of research institutions in Indonesia.

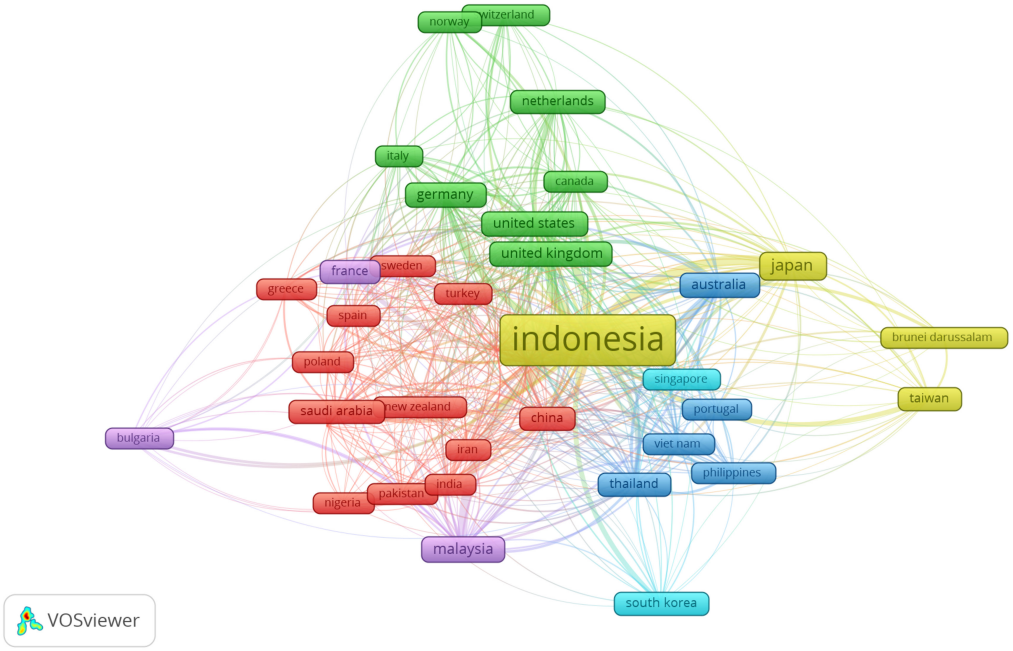

Figure 7. Network of countries collaborating with Indonesia before after (2022–2023) the integration of research institutions in Indonesia.

advancement. Furthermore, the significant decrease in conference papers from pre- to post-integration was probably due to limited budget for the expenses of participating in conferences: BRIN regulations[17,18] limit the budget for reimbursing such expenses only to those who have been invited as speakers. The high number of conference papers was also due to the COVID-19 pandemic, with researchers in all countries focusing on issues related to the pandemic: at the end of 2021, the Scopus database showed a total of 296,148 documents on COVID-19 worldwide,[19] including conference papers. Restrictions on travel and the mandatory social distancing introduced during the pandemic forced researchers to present the results of their work online, as part of various virtual conferences. Participation in virtual conferences also makes minimal demands on the budget.

The increase in the quality of publications – as reflected in being indexed in Scopus and the quartile in which a given journal is placed – was driven by the policy that made it mandatory for researchers to publish the results of their research only in reputable journals (indexing by Scopus serving as a handy proxy for quality or reputation). This policy also reduced the risk of a journal being discounted –publication in such journals does not qualify as part of the Minimum Work Results[7].

Post integration, physics and astronomy, which had held the first rank in terms of their share in total publications, descended to the fourth rank, probably the result of the policy of placing research infrastructure centrally in a few science and technology parks or science parks, which meant laboratories that may have been close by for some researchers were no longer so. The open-platform policy for research infrastructure also influences the topics of research. The centralization also introduced queuing for access to research infrastructure, including some laboratory instruments, leading to longer wait times for items in greater demand.[20]

The analysis of research topics also showed the continuing popularity of conservation as a topic of research.

It is noteworthy that the Indonesia Endowment Fund for Education Agency (LPDP, for *Lembaga Pengelola Dana Pendidikan*) – which did not even feature in the top 10 funding agencies before integration – moved to the fourth place post integration. The increasing role of LPDP is inseparable from the collaboration between BRIN and LPDP, which jointly execute 'Research and Innovation for Advanced Indonesia' (RIIM, for *Riset dan Inovasi untuk Indonesia Maju*), a scheme to search for novel ideas with potential in science and technology, which are then developed further by the relevant stakeholders.

Overall, the post-integration period was marked by a greater quantity as well as higher quality of published output as evident in the increased number of publications, a higher rate of growth in annual output, and publications in journals of higher standing. These findings offer useful insights to those entities who design appropriate strategies to improve research performance.

Some limitations of the research reported here should be kept in mind so that its findings can be complemented by further research. For instance, future research should analyse the amount of funding allocated by each funding agency to identify the priorities of individual agencies. Secondly, it should be ascertained whether the published output is indeed based on research activities before and after the integration. Lastly, the bibliometric analysis needs to be extended to other databases and other software packages such as CiteSpace and SciMAT need to be deployed for the analysis.

References

1. Badan Riset dan Inovasi Nasional [12 OR dan 85 PR (in Indonesia)]. *Finalisasi Penetapan*. Available at: https://www.brin.go.id/news/98693/finalisasi-penetapan-12-or-dan-85-pr; 2022.

2. *The BRIN Regulation Number 6 of 2023 on the National Research and Innovation Agency Strategic Plan for 2022-2024 (Peraturan BRIN Nomor 6 Tahun 2023 Tentang Rencana Strategis Badan Riset dan Inovasi Nasional Tahun 2022-2024)*.

3. UIS. Science, technology and innovation: GERD by sector of performance. *Diakses Tanggal 16 Desember 2023*. Available at: http://data.uis.unesco.org/index.aspx?queryid=74#; 2023.

4. Asian Development Bank (ADB). Sector assessment (summary): education (tertiary). Available at: https://www.adb.org/sites/default/files/linked-documents/55063-001-ssa.pdf; 2022.

5. Abodunde O, Jegede O. R & D productivity for science, technology and innovation policy development in Nigeria: A scientometric analysis of academic literature. *Afr J Sci Technol Innov Dev*. 2020;12(7):787-795. [CrossRef]

6. Cornell University, INSEAD, world intellectual property organization. The Global Innovation Index 2019: creating Healthy Lives—the Future of Medical Innovation (S. Dutta, B. Lanvin, & S. Wunsch-Vincent (eds.); 12th Edition). *Cornell University, INSEAD, and WIPO*. Available at: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2019.pdf; 2019.

7. *The BRIN Decree Number 1 of 2023 on the Main Performance Indicators Manual for the National Research and Innovation Agency for 2022-2024 (Keputusan Kepala BRIN Nomor 1 Tahun 2023 Tentang Manual Indikator Kinerja Utama Badan Riset dan Inovasi Nasional Tahun 2022-2024)*.

8. Putera PB, Widianingsih I, Ningrum S, Suryanto S, Rianto Y. The dynamics of research output by Indonesian scientist, period of 1945-2021. *Asian J Innov Policy*. 2022;11(3):397-420. [CrossRef]

9. Santha kumar R, Kaliyaperumal K. A scientometric analysis of mobile technology publications. *Scientometrics*. 2015;105(2):921-939. [CrossRef]

10. Van Eck NJ, Waltman L. *VOSviewer Manual: Manual for VOSviewer Version 1.6.20*. Leiden: Univeristeit Leiden; 2023:1-54.

11. Rusydi AF. Correlation between conductivity and total dissolved solid in various type of water: a review. *IOP Conf S Earth Environ Sci*. 2018;118(1):012019. [CrossRef]

12. GBD 2017 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 354 Diseases and Injuries for 195 countries and territories, 1990-2017: A systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2018;392(10159):1789-1858. [CrossRef]

13. Song L, Zhang F, Chen Y, et al. Multifunctional SiC@SiO2 nanofiber aerogel with ultrabroadband electromagnetic wave absorption. *Nano Micro Lett*. 2022;14(1):152. [CrossRef]

14. Kartini E, Fakhrudin M, Astuti W, Sumardi S, Mubarok MZ. The study of (Ni,Mn,Co)SO4as raw material for NMC precursor in lithium ion battery. *AIP Conf Proc*. 2022;2708:070001. [CrossRef]

15. Díaz S, Demissew S, Carabias J, et al. The IPBES Conceptual Framework - connecting nature and people. *Curr Opin Environ Sustain*. 2015;14:1-16. [CrossRef]

16. Scaccabarozzi AD, Basu A, Aniés F, et al. Doping approaches for organic semiconductors. *Chem Rev*. 2022;122(4):4420-4492. [CrossRef]

17. *The BRIN Decree Number 2/I/HK/2023 on the Budget Implementation Cost Standards for the National Research and Innovation Agency for Budget Year 2023 (Keputusan Kepala BRIN Nomor 2/I/HK/2023 Tentang Standar Biaya Pelaksanaan Anggaran Badan Riset dan Inovasi Nasional Tahun Anggaran 2023)*.

18. *The BRIN Decree Number 202/I/HK/2022 on International Keynote Scientific Speaker Funding Program Guidelines* [*Keputusan Kepala BRIN Nomor 202/I/HK/2022 Tentang Pedoman Program Pendanaan Pembicara Ilmiah Utama Internasional*].

19. Nguyen VL, Luong D, Pham H. Publications on COVID-19 from Vietnam during 2020 and 2021: A bibliometric analysis. *Sci Ed*. 2022;48:e83724. [CrossRef]

20. Sulistami YN, et al. Policy. *Penguatan Tata Kelola Koordinasi Layanan Riset dan Inovasi Terpusat. Badan Riset dan Inovasi Nasional* [unpublished manuscript]; 2023.

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