

Role of The National Research And Innovation Agency (BRIN) on The Indonesia Research Funding: Challenges and Opportunities

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ABSTRACT – The development of human resources and mastery of science and technology is the target of the Indonesian government, especially in supporting Indonesia's vision of advancing in 2045. Indonesia aspires to master research and technology that has economic value as a support for the strength of national development as is done by other countries. For this reason, a conducive research ecosystem is absolutely necessary and supported by effective and sustainable research funding. Empirically, various studies show that the weakness of research funding sources in Indonesia, which are only dominated by the government, including patterns of use that are not on target, need to be addressed appropriately. This research is a type of policy research with the main data source being secondary data on preliminary studies related to the analysis of research funding in Indonesia. The fundamental problem in research is in the form of mapping the various challenges and opportunities faced by The National Research and Innovation Agency (BRIN) as the competent authority in coordinating research and technology activities in Indonesia, especially in managing the research budget. Various challenges have arisen, such as: optimizing the network of research collaboration partners; increasing the competence of researchers; as well as the need for research output required by industry and the market. In order to overcome these challenges, BRIN can take advantage of various opportunities as a research and technology authority in Indonesia, such as: governance of the use of appropriate research support facilities; determination of research focus in favor of real problems with the full support of stakeholders; management of access to the use of research budgets that are right on target and lead to research results as evidence base policies for research and innovation policies in Indonesia.

Keywords – BRIN, Research Funding, Research Ecosystem

Introduction

President Joko Widodo (2019) in his second presidential inauguration speech stated that Indonesia would enter a new era of national development. During the 2014-2019 period, national development focused more on infrastructure, but for his second term, it will be focused on developing human resources and mastering science and technology [1]. Science technology policy and knowledge innovation for developed countries according to Ermanullah (2022) is indeed one of the main actors in accelerating national development programs, especially knowledge-based economic development. However, in developing countries, such as Indonesia, science and technology policies are still not a priority for stakeholders [2].

Zuhal (2013) stated that Indonesia's entry into the G20 group seemed to be a very positive prediction of Indonesia's economic future. However, the grim fact is that innovation capacity is still low, research funding is minimal, innovation ecosystems are not yet established, adequate human resources are not available, and there is no synergy between the science and business sectors, which are the markers for the still low contribution of total factor productivity (TFP) in drive engine of growth. As is well known, TFP is a factor that is closely related to the mastery, progress, and application of knowledge technology [3].

The Knowledge Sector Initiative study (2021) also states that research for industry in Indonesia is considered less attractive because of its nature which requires a large investment value with a high degree of uncertainty about

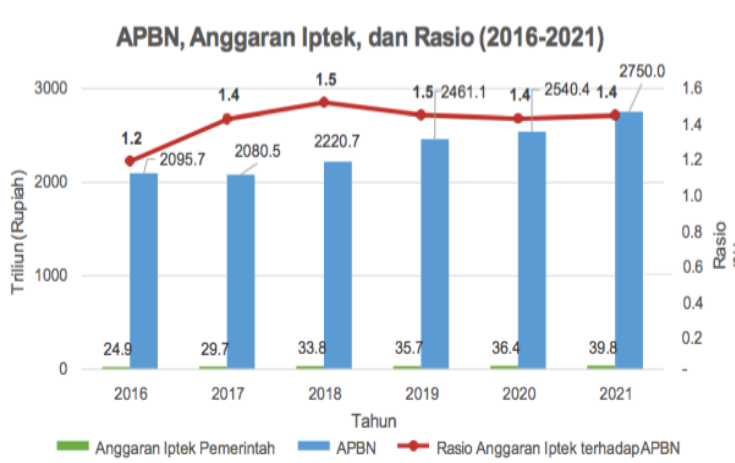
its success in the market. On the other hand, various innovative products that have been tested in the market, regardless of whether they were born from research activities or not, are still the main choice for industry players to develop their business. This is not surprising, given the main motive of the industry players themselves who hope to get the maximum profit by somehow reducing costs and business risks to as small as possible [4].

Aminullah (2015: 70) also stated that the challenges of developing innovation in developing countries are indeed very complex and require high costs to meet various targets, such as: 1) efforts to catch up with technology which is difficult to achieve; 2) government policies in supporting innovation are considered weak; 3) weak ability of private entities in supporting investment and commercialization of existing products [5].

Regarding research investment needs, especially funding, Sörlin (2007) states that one of the most tangible and impactful manifestations of research and innovation policies is the design of funding systems and funding instruments. In other words, research funding can be seen as operationalizing the rationale for policy and as a direct link between policy on the one hand and actual research activities, outputs, and impacts on the other. In this respect, the funding reflects the policy ambitions the government holds for publicly funded research [6].

As for research funding in Indonesia, according to Australian National University (ANU) Professor of Law and Regulation, Veronica Taylor (2020) the Indonesian government has not yet viewed research and development as an investment for the state. Its development is still constrained by minimal budget and funding management

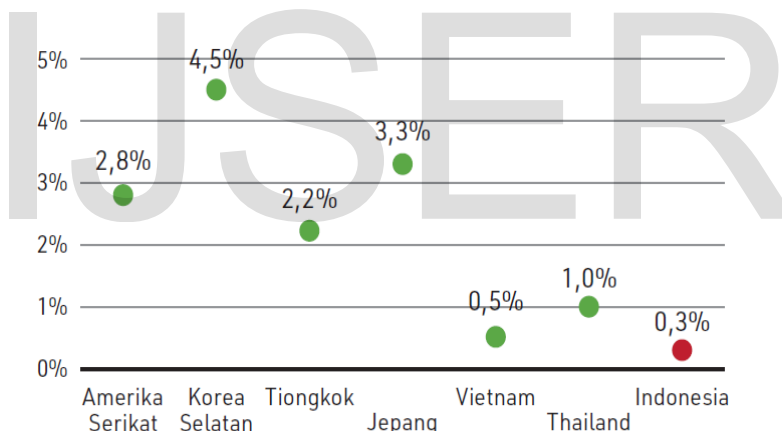
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Graph 1. Government Research Budget 2016-2021
Source: Pusdatin, BRIN (2022)[8]

Referring to graph 1. Haryono (2022) in the STI Policy Series II 2022 webinar sessions explained that in the 2016-2021 period, Indonesia's science and technology budget tends to increase every year, in line with the

increase in the State Revenue and Expenditure Budget. However, the ratio of the science and technology budget to the APBN has not changed much, namely around 1.4-1.5% annually[8].



Graph 2. Comparison of Indonesian GERD with other countries
Source: Cornell University, INSEAD, and WIPO, 2020[9]

Graph 2 shows a comparison of Indonesia's GERD scores compared to several other countries. This value is very low compared to other countries such as Thailand (1.0%), or Vietnam (0.5%) [9]. Dalilah and Pratama (2020) in their study also admit that Indonesia's research funding is indeed very minimal. Since 2016 the budget allocation has only reached 0.25% of GDP (Gross Domestic Product). This figure continues to increase, although not significantly. In 2017 it increased to 0.27%, and in 2018 it increased to 0.28% [10]. Studies The Corruption Eradication Commission (2018) even provides a note for usage research funds only 43.74% of the IDR 24.93 trillion allocated for research activities. The remainder was actually used for operational expenditure (30.68%), science and technology services expenditure (13.17%), capital expenditure (6.65%),

education and training expenditure (5.77%) [11].

Burhani (2021) cites the statement of President Joko Widodo while meets Indonesian scientists in Busan, South Korea (25 November 2019) that Indonesia has a large total budget for research and innovation, around IDR 26 trillion or US\$ 69 million per year. However, these funds are "spread" or distributed among several ministries and research institutions which sometimes conduct overlapping research [12]. Formation of the National Research and Innovation Agency through Presidential Decree Number 78 of 2021 is indeed expected to be a catalyst in integrating the research and innovation ecosystem in Indonesia. Science and technology development efforts in Indonesia are expected to contribute to producing research with economic value to support national development. This

paper describes the challenges and opportunities of BRIN in efforts to build a research ecosystem that is conducive to producing research outcomes of economic value in supporting national development.

Research Funding Problems in Indonesia

Dalilah and Pratama (2020) state that GERD is an indicator of how much a country allocates a research budget by calculating the amount spent on research and development activities carried out by local companies, government R&D institutions, universities, and others within a country, including those funded by foreign countries, will but does not take into account R&D funding by non-domestic economic entities. the definition refers to Frascati's manual published by the OECD (2015) regarding research budget, which is implemented in the calculation of a country's Gross Expenditure on Research and Development (GERD) [10].

Dalilah and Pratama (2020) state that central government research and development budget is a budget allocated to ministries/agencies to carry out activities using scientific principles and methods systematically to increase knowledge (stock of knowledge), and utilize knowledge to design new applications (to devise new applications), including educational activities and scientific and technological training and services carried out in work

units that have R&D duties and functions. Some activities that can be funded with research and development budgets include [10]:

- Education and training activities, covering all activities in non-university higher education and all university education and scientific and technological training organized for researchers (scientists) and engineers;
- Scientific and technological services fund, which includes activities related to scientific research and experimental development and contributes to the generation, dissemination and application of scientific and technical knowledge;
- Expenditures consisting of employee salaries and other operational expenses (such as electricity, water, etc.-not capital expenditures), which are used for research and development activities; and
- Capital expenditures, which are used continuously in research and development activities, namely expenditures for land and buildings, machinery and equipment, software, other property products.

Meanwhile in the Frascati manual (OECD, 2015) it is defined that research expenditure includes internal research and development labor costs, other research and development costs (external research and development personnel, service expenditures, equipment expenditures, operational expenditures), and capital expenditures.

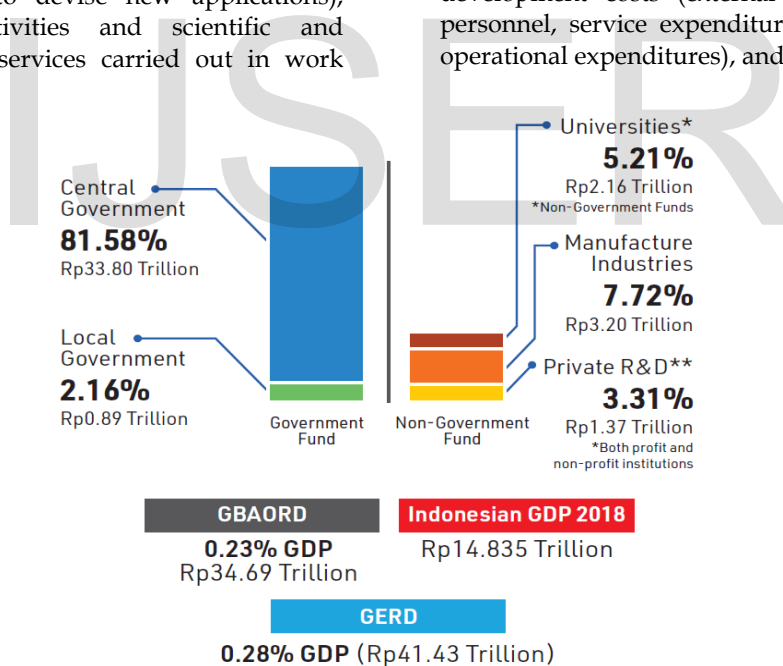


Figure 1. Gross Expenditure on Research and Development (GERD) 2018
Source : Ministry of Research and Higher Education, 2019[9]

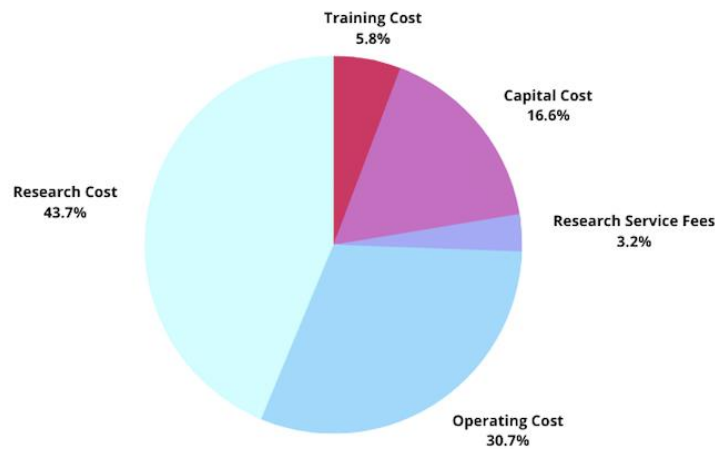
Referring to the composition of the research budget in Indonesia in Figure 1, it is known that if the allocation for R & D spending is carried out by the Central Government in 2018 it will reach IDR 33.80 trillion or around 81.58% percent, while the Regional Government is only IDR 0.89 trillion or IDR 2. 16 percent. So the total Government Budget Appropriations or Outlays for R & D

(GBAORD) reaches 34.69 trillion. The GBAORD calculation is based on spending on research activities which refers to the type of budget allocation, such as: education and training expenditures, capital expenditures, science and technology services expenditures, operational expenditures and research expenditures. Other R&D organizers are dominated by the Manufacturing Industry with 3.20 trillion

or 7.72 percent, private R&D reaching 1.37 trillion or 3.31 percent, and Higher Education only around 2.16 trillion or 5.21 percent. When compared with Indonesia's GDP as reported by the Central Bureau of Statistics in 2018, which is 14,835 trillion, the GBAORD is only 34.69 trillion or 0.23 percent. While Indonesia's GERD value is still so low, namely 0.28 percent of GDP, of course this is still a long way to go to achieve the 2 percent GERD target as the

target for achieving the vision of advanced Indonesia in 2045.

Dalilah and Pratama (2020) write that sIn addition to the lack of budget, the use of research funds is considered not on target. Due to the use of research funds, it is dominated by operational costs compared to the costs of research activities (Graph 3). Other problems also occur in the irregular use of research funds.



Graph 3 Allocation of Research Funds in 2016
Source: The Corruption Eradication Committee, 2018[11]

Data at the Directorate of Public Complaints at the Corruption Eradication Committee shows that fictitious research has taken place, research overlap, research funding has been deducted by 10%-50%, the giving and use of research funds is not in accordance with the regulations, and the deposition of research funds [10].

Regarding the allocation of the use of research funds, the Minister of Finance, Sri Mulyani stated that the research budget in Indonesia was actually combined with the education budget, for example in 2019 the research budget ranged from IDR 35.7 trillion and these funds are part of the education budget which amounts to approx IDR 492.5 trillion. The research budget is allocated to 45 government Ministries/Institutions, meaning that the budget is very small and the benefits are not felt. Furthermore, related to the developing conditions in the community in contributing to research activities, it is still low and dominated by the government, 66% of the total research spending in Indonesia. In terms of its usage, only around 43.7% or below 50% of the research budget is actually used for research. The rest of the budget is used for operational expenditures such as employee salaries, allocation of science and technology services and capital expenditures and even for education and training. This illustrates that a sizable portion of the use of the research budget is in research support activities rather than in the research activities themselves [13].

BRIN Research and Innovation Funding Scheme

BRIN is non-ministerial government agencies who is under and responsible to president of Indonesia through the minister in charge of government affairs in the field of research and technology. This institution was first formed by the President Joko Widodo through Presidential Regulation Number 74 of 2019 attached to Ministry of Research and Technology so that Minister of Research and Technology also act as Head of BRIN. Currently, BRIN has a Chairman of the Steering Committee from the Pancasila Development Ideology Agency (BPIP) that is Megawati Sukarnoputri. On April 28, 2021, based on Presidential Regulation Number 33 of 2021 concerning the National Research and Innovation Agency, BRIN becomes an independent institution by integrating Ministry of Research and Technology and 4 (four) non-ministerial government institutions : Agency for the Assessment and Application of Technology (BPPT), National Nuclear Energy Agency (BATAN), National Institute of Aeronautics and Space (LAPAN), and Indonesian Institute of Sciences (LIPI). Presidential Regulation Number 33 of 2021 concerning the National Research and Innovation Agency was then repealed and replaced by Presidential Regulation Number 78 of 2021 concerning the National Research and Innovation Agency (BRIN) [14].

Based on Presidential Regulation Number 78 of 2021 concerning the National Research and Innovation

Agency (BRIN), the task of BRIN is to assist the President in carrying out governmental tasks in the fields of research, development, study, and application as well as inventions and innovations, implementation of nuclear, and integrated national space administration, as well as monitoring, controlling, and evaluating the implementation of BRIDA's duties and functions in accordance with the provisions of the legislation. In carrying out these tasks, BRIN carries out the following functions:

- a. carrying out research, development, study and application as well as inventions and innovations in the framework of preparing recommendations for national development planning based on the results of scientific studies guided by the values of Pancasila;
- b. formulation and determination of policies in the field of research and innovation which include a master plan for the advancement of science and technology, and a roadmap for research, development, study, application, as well as invention and innovation, nuclear operations, and space operations;
- c. formulating, stipulating, and implementing policies in the field of coaching, competency development, professional development, talent management, and supervision and control of science and technology human resources, research and innovation infrastructure, research and innovation facilitation, and utilization of research and innovation;
- d. integration of planning, program, budget, institutional and research, development, study and application, invention and innovation planning, nuclear management, and space management management systems;
- e. carrying out research, development, study, and application, as well as inventions and innovations, implementing nuclear, and implementing outer space;
- f. supervision and control of research, development, study, and application, as well as inventions and innovations, nuclear operations, and space administration in a comprehensive and sustainable manner;
- g. implementing coordination of community service based on research, development, study, and application, as well as inventions and innovations produced by science and technology institutions;
- h. carrying out the construction, management and development of information systems for research, development, study and application, as well as inventions and innovations, nuclear operations and space operations;
- i. carrying out research, development, invention, and policy innovation that recognizes, respects, develops and preserves the diversity of traditional knowledge, local wisdom, living and non-living natural resources, and culture as part of national identity;
- j. provision of facilitation, technical guidance, guidance, and supervision as well as monitoring and evaluation

- in the fields of research, development, study, and application, as well as inventions and innovations, nuclear operations, and space operations;
- k. monitoring, controlling, and evaluating the implementation of BRIDA's duties and functions;
- l. coaching and providing administrative and technical support to all elements of the organization within BRIN;
- m. supervising the implementation of tasks within BRIN; and
- n. implementation of other functions given by the President.

BRIN's role in managing research funding in Indonesia as part of the above functions is carried out in an integrated manner. Press Release National Research and Innovation Agency No: 202/SP/HM/BKPUK/XII/2021 explained that the position is intended to create a research ecosystem according to global standards that is inclusive and collaborative for all parties, the National Research and Innovation Agency (BRIN) has several funding and facilitation schemes for research and innovation that are competitive and open to all researchers in research institutions/universities, and industry [15].

Head of BRIN, Laksana Tri Handoko in the press release stated that private involvement in Indonesia's research world was still very small, unlike developed countries where the dominance of research involvement in Indonesia was still with the government, namely 80% and the private sector only 20%. Meanwhile, global research conditions are the opposite, namely 80% of the role of the private sector and the rest is the role of the government. BRIN comes with the big target of changing the composition of research engagement in Indonesia. BRIN's efforts to integrate five research institution/ministerial entities namely LIPI, BATAN, LAPAN, BPPT, and the Ministry of Research and Technology since September 1 2021 to carry out improvements to the Research and Innovation Ecosystem. This aims to solve the fundamental problem of Indonesian research, namely the critical mass which is still low, related to human resources, infrastructure, and budget. This must be done because the research sector is a sector that requires high costs and has high risks [15]. The integration of these resources is expected to attract the interest of the private sector to be involved in research and innovation activities in Indonesia. One of the obstacles causing the private sector's low interest in research in Indonesia is the high cost of research and the high risk of failure occurring. That's where the government must be present to facilitate the private sector to get involved in research with risks.¹⁸

Agus Haryono, Deputy for Facilitation of Research and Innovation at BRIN, stated that there are several BRIN funding schemes to support creation research and innovation ecosystem according to global standards that are inclusive and collaborative for all parties (figure.2)

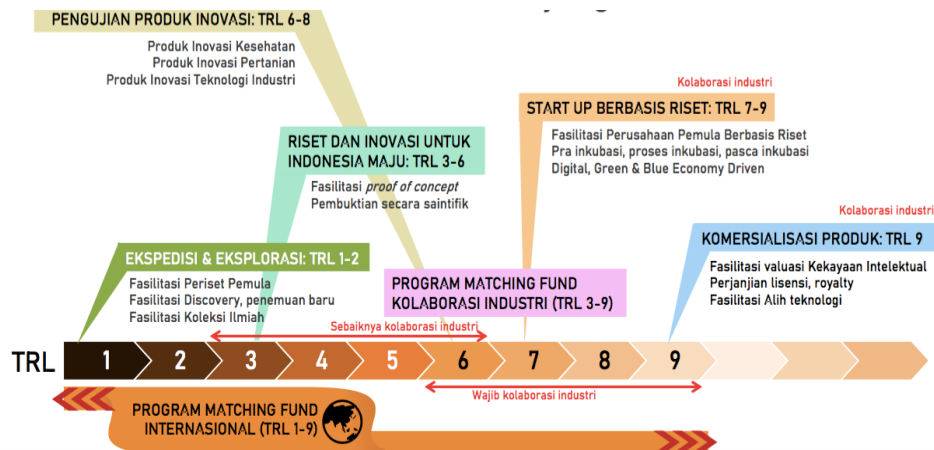


Figure 2. BRIN Funding Scheme

Source: Haryono, 2022[8]

The research and innovation funding and facilitation scheme as shown in Figure 2 is competitive and open to all researchers in research institutions/universities, and industry. Referring to Presidential Decree No. 78/2021 concerning BRIN, the outline of the mandate of the laws and regulations regarding the formation of this organization is:

- Consolidating science and technology resources covering the consolidation of human resources, infrastructure and budget to increase Indonesia's critical mass, capacity and research competence
- Building a global standard research and innovation ecosystem open/ inclusive and collaborative for all parties (academicians, industry, community and government)
- Strengthening research-based economic foundations in the form of strong and sustainable foundation, focus on digital, green & blue economy.

The three things mentioned above were carried out through the pentahelix collaboration, namely: academia, business, government, community and media.

Factually, through the formation of BRIN, at least the Indonesian government has research resource assets in the form of researchers and various supporting facilities for research activities originating from various entities that joined the BRIN organization which were previously spread out in various government research units. This integration is expected to increase effectiveness in the implementation of the research process to produce previously determined outputs and outcomes at a more efficient cost of implementing activities. BRIN opens facilities both human resources and infrastructure to be shared by all parties who will conduct research. Thus, those who will conduct research do not have to have their own facilities. The beneficiaries of the implementation of this

activity are all researchers in research institutions/universities,

Method

This research is included in the category of policy research, according to Danim (1997) this research was conducted to support policy [16]. The same meaning is also conveyed Dalilah and Primary (2020) that policy research provides recommendations to decision makers to overcome the problems faced when a policy is implemented. The resulting recommendations will become the basis for the government in determining evidence-based decision making and will have a positive and broad impact on people's lives [10].

Analysis

It is known that research activities have a very high risk of failure and this is assumed to be the main trigger for the low contribution of the private sector in research funding in Indonesia so that in practice research funding sources are only carried out by the government. Meanwhile, Taufik in Pawennei (2022) states that funding instruments are one of the determining elements of research and development productivity. Within the framework of the national innovation system, funding is one of the key elements in the development of prototype products towards downstream and commercialization [17].

The previous description describes the use of research and development budgets in Indonesia as follows:

- The central government through funds from the state revenue and expenditure budget still dominates research and development funding in Indonesia compared to other funding sources, such as: regional revenue and expenditure budgets, perpetual, business entity, and other legal and non-binding sources;
- The majority of the R&D expenditure budget in Indonesia comes from government funding sources.

Likewise, research budget allocations are still dominated by non-research expenditures (56%);

- c. As of the latest data for 2019, it is known that the management of research and development funds is not carried out centrally, but is spread across various institutions, such as universities, ministries/agencies, and local governments.

In accordance with the mandate of Presidential Decree No. 78 of 2021 concerning BRIN, this organization is indeed designed to improve the research and innovation ecosystem by improving the critical mass level. Critical mass research in the form of the number of human resources, facilities, and budget needed to support the professional activities of research institutions. Integrating various research implementing institutions and resources to strengthen BRIN's assets if the percentage is at least as follows: 70% in the form of scientific and technological resources (researchers, engineers, nuclear institutions, etc.); 20% in the form of ownership of various research supporting infrastructure (laboratories, science and technology areas, botanical gardens, nuclear research reactors,

Through the integration of various research activities it is also expected to build a higher quality research culture. In the previous condition, government research activities were carried out spread across around 45 ministries/institutions and even with overlapping/duplication target outputs/achievements. As a result, research results are not of high quality and cannot achieve research outcomes of economic value to support national development. Under these conditions, budgetary support from the government is also quite dominant (56%) so that the contribution of non-government parties is relatively small. Research collaboration is BRIN's tag line in the form of an open funding platform for various BRIN schemes.

Collaboration allows various parties, both domestic and foreign partners, to join in a global research network, both in private industry groups (domestic/foreign) and scientific groups (lecturers and scholars). BRIN's research collaboration in the form of an open platform seeks to attract research support, especially funding outside of central government research funds. BRIN offers its research resource assets and facilities and hopes that a joint funding process can be carried out with both domestic and foreign partners.

Nevertheless, the government's efforts are also faced with various challenges that have the potential to cause failure, so the solutions need to be considered carefully. Various positive opportunities also need to be developed further as a driving force to achieve the target of establishing a quality and sustainable research and innovation ecosystem in Indonesia.

First, various challenges in building a research and innovation ecosystem in Indonesia by taking into account the growing trend, especially related to research funding, it

is necessary to seek solutions from all parties involved in research development, such as:

- a. Expand research networks to obtain research funding support. Regarding the position of inequality in supporting research and development funding in Indonesia so far, Aryani, et.all (2021) stated that this has the potential to result in Indonesia's research and innovation productivity being too dependent on the availability of a budget from the government. This concern was also conveyed by researchers at LPNK, K/L, as well as public and private universities, who stated that there was a high dependence on research funding from the government and a lack of information about research funding opportunities. In fact, every increase in GERD by 1% of GDP is considered to encourage an increase in economic growth by 1% in developed countries or 0.3-0.62% in developing countries. So, to achieve the Vision of Indonesia Forward 2045, the ability to adapt technology and innovation is important to have. In particular, if you want to increase the GERD value to 2% of GDP, like it or not, Indonesia needs to increase research and innovation funding sources from actors other than the government.

There are two sources of non-government funding that can be further studied, namely philanthropic funds and business entities. The PIRAC study (2016) states, of the available philanthropic funds in Indonesia, only 2.5% is used for research (CIPG, 2017). Therefore, the government can explore the potential for collaboration/coordination with philanthropic institutions to increase funding for research and innovation in Indonesia. There are two sources of non-government funding that can be further studied, namely philanthropic funds and business entities. The PIRAC study (2016) states, of the available philanthropic funds in Indonesia, only 2.5% is used for research (CIPG, 2017). Therefore, the government can explore the potential for collaboration/coordination with philanthropic institutions to increase funding for research and innovation in Indonesia. There are two sources of non-government funding that can be further studied, namely philanthropic funds and business entities. The PIRAC study (2016) states, of the available philanthropic funds in Indonesia, only 2.5% is used for research (CIPG, 2017). Therefore, the government can explore the potential for collaboration/coordination with philanthropic institutions to increase funding for research and innovation in Indonesia [9].

Various schemes initiated by BRIN can be a solution to this problem, however, it requires the role of collaborators from various parties who can connect the needs of the industry and potential resources owned by research institutions, especially in the government (BRIN) and potential research developed by researchers and needed the industry in order to be able to fulfill the various stages of the research finalization process by

fulfilling the standards of technical feasibility and market feasibility which are usually set by the industry. At least through good collaboration, it is hoped that a healthy research environment will be built which is supported by an effective funding system and a dynamic community.

- b. The competence of researchers is considered to be quite low when viewed from the composition of educational levels and the number. This condition is considered to be able to influence the outcome of research results, especially research outcomes that are expected to have economic value and support national development. Efforts are needed to increase the competence of researchers, including improving an outcome-oriented research culture so that research results can actually be utilized by users. The BRIN talent development program can be utilized by all researchers throughout Indonesia, not only BRIN researchers to increase their capacity, especially for increasing higher education levels;
- c. Based on the baseline of previous research activities, various parties are of the opinion that research results that meet industry and market needs are still low. The Corruption Eradication Committee Study (2018) concludes that researchers have a tendency to take research topics based solely on expertise and curiosity. Very little research is done based on the problems and needs of industry or society. Obstacles in the absorption of research results by the industry can be observed in several cases as follows[11]:
 - 1) The neutral protease enzyme product made by BPPT has obtained a distribution permit from the Ministry of Trade and has been produced commercially but its uptake in the domestic market is still not good;
 - 2) Local user industries do not yet have trust and are hindered by licensing contracts from abroad so they do not want to use domestically produced enzymes;
 - 3) The Ministry of Agriculture's Balitbang patent list which has been certified from 1999 - 2016 totaling 106, but only 23 have been used by industry (22%); and
 - 4) BPPT only produces 10% of the patents utilized by the industry.
 - 5) The industry is not enthusiastic about research results because of the low short-term contribution of research results. Meanwhile, as much as 28% of business entities will support research that is in accordance with the vision and mission of the institution. Supported research is research with themes that are still related to program needs and the suitability of institutional interests (Abidin, et al, 2017)

The recommendations suggested on this matter are primarily addressed to parties who have authority in managing the research process, in this case the Ministry

of Research and Technology and the Ministry of Law and Human Rights in issuing researchers' intellectual property licenses. Notes for the Ministry of Research and Technology: First, it is necessary to periodically evaluate market needs, especially for national priority research. Second, it is necessary to formulate incentives for business entities to be actively involved in conducting research and development and industry activities utilizing domestic R&D/university/industry technology whose technology is ready to be produced. Third, it is necessary to formulate significant collaboration between the Academy, the private sector (business) and the government.

Second, various opportunities in building research and innovation ecosystems in Indonesia also need to be further strengthened to realize these goals, such as:

- a. The research facility owned by BRIN is one of the assets that can be utilized by researchers and partners. Utilization of research facilities through a joint research mechanism is expected to facilitate the research process which is carried out at a lower cost than having to rent to a third party or owning the same facility with the consequence of incurring substantial maintenance costs.
- b. BRIN as the coordinating/intermediary authority for research and innovation in Indonesia must be able to direct the determination of a research focus that is supported by all stakeholders (government, academia, industry) where all the interests of the parties can be accommodated and a conducive and sustainable research ecosystem is built. The right research focus according to the critical problems faced by the Indonesian nation is a source of research and innovation that needs to find the right solution. Researchers in collaboration with academics formulate high-novel scientific research-based solutions as the basis for quality intellectual property outcomes. Furthermore, if research results produce innovations that have economic value, cooperation with industrial partners needs to be facilitated to facilitate the acquisition of product downstream standards up to the mass production stage.
- c. On the other hand, BRIN, as the coordinating/intermediary authority for research and innovation in Indonesia, certainly has access to the use of various funding platforms originating from the government budget, especially those originating from research endowments. The use of the research budget needs to be escorted by competent resources from the planning stage to the implementation and evaluation/monitoring processes so that the allocation is right on target.
- d. Finally, BRIN also has the opportunity to lead research results as an evidence base policy for research and innovation policies in Indonesia. The results of Juliandi's study, Berry.et.all (2020) state that policy

makers in Indonesia use research results that are of low academic quality and untested (Rakhmani et al., forthcoming). Policy makers also tend to be selective in using research results, and use more political considerations than good academic information. The research also found that the poor quality of research used in policy making in Indonesia is related not only to the low research budget, but also to the available funding sources. As much as 66% of the research conducted was in the form of research assignments or orders from the bureaucracy, political institutions and other policy makers. As a consequence, research does not run independently, while the resulting analysis is tailored to the needs of the donor (Rakhmani & Sakhyya, 2019) [18].

CONCLUSION

The development of human resources (human capital) and the mastery of science and technology is the target of the Indonesian government, especially in supporting Indonesia's vision of advancing in 2045. Indonesia aspires to become research and technology that has economic value as a support for the strength of national development as is done by other countries. For this reason, a conducive research ecosystem is absolutely necessary and supported by effective and sustainable research funding. Empirically, various studies show that the weakness of research funding sources in Indonesia, which are only dominated by the government, including patterns of use that are not on target, need to be addressed appropriately. BRIN, which was formed to coordinate and liaise stakeholders in the research and innovation ecosystem, needs to focus on using research budgets to overcome various challenges that arise, such as: optimizing research collaboration partner networks; increasing the competence of researchers; as well as the need for research output required by industry and the market. In order to overcome these various obstacles, BRIN can take advantage of various opportunities as a research and technology authority in Indonesia, such as: governance of the use of appropriate research support facilities; determination of research focus in favor of real problems with the full support of stakeholders; management of access to the use of research budgets that are right on target and lead to research results as evidence base policies for research and innovation policies in Indonesia.

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