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The Law Number 11/2019 on National System of Science and Technology: Strengthening Institution and Networks for Invention and Innovation Development

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ABSTRACT

Science and technology are associated as capital and investments in national development. Its development is governed by the Law Number 11/2019 on National System of Science and Technology which is a sustainable relationship between institutional elements and research's resources. The objective is to build a network of science and technology as a whole in supporting the implementation of science and technology as a scientific foundation in the formulation of development policies. In the perspective of strengthening science and technology institutions to improve research performance and the integrated application of invention and innovation, a national research and innovation body will be established. Science and technology resources consist of human resources, funding, facilities and infrastructure that need to be improved in terms of its use and its value. In supporting the implementation of science and technology networks, science and technology information systems are built to collect basic data in an integrated way as a source of information for science and technology organizations. The output of the implementation of science and technology is the invention and innovation used and developed to improve the nation's competitiveness and development of valueadded products for the welfare of society. The government conducts and oversees the administration of science and technology. Supervision is carried out to ensure the planning and implementation of science and technology is in line with the master plan as a reference in achieving the goals as well as a reference for the development of science and technology in the future.

Keywords: science and technology, institutions and resources, administration and networking, invention and innovation, guidance and supervision

INTRODUCTION

On 13th August 2019, the President of the Republic of Indonesia signed the ammendment of the Law Number 18/2002 on National System on Research, Development and Application of Science and Technology became the Law Number 11/2019 on the National System of Science and Technology. The previous law is considered obsolete and cannot meet the current needs of society. On many occasions the President of the Republic of Indonesia, Mr. Joko Widodo, criticized the research system as being too many and fragmented research organization spread over all Ministries/Agencies and universities. He also mentioned that accountability of research program which spent a relatively large sum of public money that is difficult to assess. Therefore, the new law tries to answer some of the issues raised by the President. The law on the national system of science and technology regulates the planned, targeted, measurable, and sustainable relationships between institutions and resources elements. The ultimate goal is a network of science and technology as a unified system in supporting its implementation as a scientific foundation in the formulation and decision making process of national policy development. In this context, the state is obliged to promote science and technology for the advancement of civilization, human welfare, and as a foundation in the formulation of development policies

by means of strengthening the capacity of science and technology to increase the competitiveness and self-reliance of the nation.

The law on national system of science and technology is based on nine main indicators namely devotion to God, humanity, justice, benefit, security and safety, scientific truth, transparency, accessibility, and respect for traditional knowledge and local wisdom. In addition, the law also recognises, respects, develops and conserves natural and non-living natural resources, and culture as part of national identity.

The Law Number 11/2019 on national system of science and technology addresses four main objectives, namely: (a) Promoting and improving the quality of education, research, development, assessment, and application of science and technology which drives inventions and innovations; (b) Increasing the intensity and quality of interactions, partnerships, synergies between elements of science and technology stakeholders; (c) Increasing the use of science and technology for sustainable national development, quality of life and public welfare; and (d) Increasing self-reliance, competitiveness, and attractiveness of the nation in advancing the nation's civilization through international relations.

The objective of this paper is to highlight major points of the Law Number 11/2019 on National System of Science and Technology. The paper may serve as a quick reference on the direction of science and technology policy in Indonesia.

MASTER PLAN FOR STRENGTHENING SCIENCE AND TECHNOLOGY

To achieve the goals of the national science and technology system, a master plan will be prepared, which will serve as a reference and the basis for the national long-term and medium-term development plan on science and technology. The master plan is prepared by the central government in coordination with other stakeholders.

Preparation of the master plan for the advancement of science and technology needs to consider several strategic conditions such as the potential of natural resources, the potential, needs, and development of science and technology, social culture and local wisdom. In addition, it is necessary to consider the potential development and socio-economy of the region, where all of those aspects are dedicated to improve the quality of human life, people's welfare, self-reliance, competitiveness and national civilization.

The master plan for the long-term development of science and technology contains at least one vision, mission and strategy, goals and stages of achievement, institutional empowerment, resource development, and strengthening the capacity of science and technology. Meanwhile, in the medium term it will determine the goals and stages of its achievement, institutional development, as well as enhancement of the science and technology resources. In addition, the law also emphasizes the development of science and technology, development of networks, and prioritizes the implementation of science and technology advancement. Finally, the master plan for the advancement of science and technology in the medium term is translated into the annual plan for the promotion of science and technology.

MANAGEMENT OF SCIENCE AND TECHNOLOGY DEVELOPMENT

The implementation of science and technology is managed by the central government and is carried out by means of education, research and development, assessment and application of science and technology. In addition to these three aspects, some of the elements which are no less important in the delivery of science and technology are related to invention and innovation.

Education is implemented to prepare quality of human resources, improve the quality and the relevance of science and technology, and community service as a means of the application of science and technology. The implementation of science and technology through education is dedicated to increase the capacity of the nation in managing resources to meet national needs in the context of strengthening self-reliance and competitiveness of the nation.

The central government guarantees scientific self-reliance and freedom in conducting research and development targeted to comprehend basic and applied sciences (including social science) and solutions to development problems. The results of research and development must be published and disseminated, and intellectual property and royalties from R&D funds financed by the state become the rights of the governments, R&D institutions, and inventors.

The assessment is aimed to ensure the benefits of science and technology in solving development problems through engineering, technology clearing, and technology auditing. The application of science and technology must be carried out based on the results of R & D and/or studies to promote innovation as an effort to increase productivity, self-reliance, and national competitiveness. The application of science and technology can be done through technology transfer, technology intermediation, diffusion of science and technology, and technology commercialization.

The government (central and regional) must develop inventions and innovations as solutions to national problems and create value added for the welfare of society. The central government must facilitate the

protection of intellectual property and its application as a result of national inventions and innovations. Business entities that produce national inventions and innovations will be given some incentives in the form of guarantees for the purchase of certain innovation products and/or guarantees for the inclusion of innovation products in electronic catalogues of the government procurement of goods/services.

POLICY AND INSTITUTION OF SCIENCE AND TECHNOLOGY

The formulation and decision of national development policies must have a scientific framework and must be based on science and technology resulting from research (R&D and assessment) and their application. In its implementation, the research and its application has met the ethical feasibility by the scientific field. In addition, the central government also stipulates mandatory submission and compulsory retention of primary data as well as the results of research and its application.

Science and technology institutions consist of R&D institutions, assessment and application institutions, universities, business entities, and supporting institutions. R&D institutions function to foster the ability to advance science and technology and are responsible for producing inventions and adhering to their potential for development. Meanwhile, the assessment and application institution focuses more on its function in the mastery and utilization of technology and is responsible for generating innovation and encouraging successful implementation. Supporting institutions have the function of providing conducive support and climate in the process of creating inventions and innovations. In carrying out research and its application, as well as integrated inventions and innovations, a new national research and innovation body will be created by the President.

RESOURCES FOR SCIENCE AND TECHNOLOGY DEVELOPMENT

Science and technology resources consist of human resources, funding, as well as facilities and infrastructure which need to be continuously improved in terms of its use and its value. The human resources of science and technology can be grouped into researchers, engineers, lecturers, and other human resources of science and technology and to ensure their accountability should be coordinated by the scientific professional organizations. To further optimize the available human resources, retirement age of the researchers and engineers with grade in the civil servant as the first expert level and young experts level is both 58 years. Whereas retirement for the intermediate expert will be extended to 65 years, and retirement age, of the senior expert is extended to 70 years. The law also regulates possible reemployment of the retired researchers based on need and qualification.

Human resources on science and technology receive protection in carrying out their duties in the form of social security and legal assistance. If in carrying out research and their application by scientific principles (design and method) as well as meeting ethical eligibility, but the results are not as expected, then it is not subject to any sanctions.

Funding for the implementation of science and technology originates from the state budget, regional budget, endowment budget for research and application, business entities, and other legal and non-binding sources. The state budget is the mainstream of funding sources for the development of science and technology with adequate and sustainable allocation according to degree of priority in the master plan for the advancement of science and technology. The government establishes an endowment budget of research and its application to produce inventions and innovations originated from the state budget and other legal and non-binding sources. The creation of endowment budget are dedicated to finance research and its application, institutional operation, and the accumulation of the endowment budget.

Funding for science and technology originated from business entities is created from the expenditures dedicated specifically for research and its application and set aside from net income, the amount of which is determined based on the principles of propriety and fairness. The contribution and expenditure of business entities is entitled for the incentives in the form of tax amnesty and/or technology transfer for industrial development to increase competitiveness.

Provision and improvement of science and technology facilities and infrastructure are carried out by improving, establishing, maintaining and/or operating laboratories, research zones, center for education and training, innovation centers, incubation centers, and/or other science and technology facilities and infrastructure. Human resources in science and technology are entitled to have access in using and utilizing the facilities and infrastructure of science and technology managed by any work units and owned by the private sector.

NETWORK OF SCIENCE AND TECHNOLOGY

Science and technology network is an interactive network of human resources that integrates institutional elements to produce maximum and efficient performance and benefits. In developing a network of elements of science and technology institutions are obliged to establish partnerships that include easy access to information, facilities and infrastructure, and mobility of science and technology resources. Partnerships can be carried out

with foreign partners with the obligation to transfer technology based on the principle of free and active foreign policy.

In conducting research and its application which is fully or partly funded by the government (central and regional), it is obligatory to transfer technology to business entities, the public, and the government. Science and technology institutions have the right to manage inventions and innovations to strengthen and develop their institutions.

The research and its application can be carried out by foreign science and technology institutions and/or foreigners with the requirement of obtaining a permit from the central government and in carrying out ethical conduct by the ethics commission. In addition, cooperation with foreign partners with foreign financing sources has several obligations including producing outputs that are beneficial to Indonesia, involving and including Indonesian human resources, transferring technology, obliging to submit primary data, and providing proportional profit sharing. For protection purposes, it is prohibited to transfer biodiversity material, Indonesian local specimens, social heritage, cultural and local wisdom, both in physical and digital form, as long as material testing can be carried out in Indonesia.

In supporting the implementation of the network of science and technology, the central government is establishing a national science and technology information system which is a collection of basic data on the implementation of science and technology that is nationally integrated. This national science and technology information system function as a source of information for the development of science and technology.

GUIDANCE AND SUPERVISION

The central government promotes the administration of science and technology through fostering motivation, providing stimulation and facilitation, and creating a conducive climate for the development of the national system of science and technology. Local governments put an emphasis on the growth and synergy of institutional elements, resources, and networks of science and technology. In this context, the corresponding policies are resource support, institutional strengthening, incentives, and the implementation of science and technology programs.

To foster institutional science and technology, the government may provide incentives, especially to research institutions that have been integrated with the obligation to submit data and information on the implementation of science and technology and ensure their truth and accuracy. The institutional development of science and technology is carried out through facilitation and assistance while the development of scientific and technological resources is carried out through certification of human resources, research incentives and their application, and improvement of science and technology facilities and infrastructure. The improvement of science and technology networks is carried out through the facilitation of science and technology partnerships with related work partners both domestic and international.

Supervision is carried out to monitor the planning and implementation of science and technology in line with the master plan for the advancement of science and technology. The central government also plays a role in supervising the mandatory primary data storage activities and outputs of research and development results, transfer of material, research and application activities carried out by foreign parties, research activities and high-risk and dangerous applications, and technology transfer.

CONCLUSION

The Law Number 11/2019 on national system of science and technology is a reformulation and revitalization of the earlier Law Number 18/2002 which is considered obsolete and unable to meet current needs of the society. The new law consists of at least six strategic aspects, namely the master plan, implementation, policies and institutions, resources, networks, guidance and supervision. The master plan for the advancement of science and technology is an instrument for realizing the objectives of the new regulation and serves as a reference for the development of science and technology. The outputs of science and technology development are inventions and innovations that must be utilized and developed as solutions to national problems and increase value added for the welfare of society. In this context, the formulation and decision of national development policies must be on scientific based and supported by science and technology as a result of research and its application.

Science and technology institutions must work together synergistically in the process of creating and implementing inventions and innovations for the development and interests of the community. In order to improve the performance of research and its application in an integrated manner, a new national research and innovation body will be established. Science and technology resources consist of human resources, funding, and facilities and infrastructure that need to be continuously improved in terms of effectiveness and usefulness. Human resources of science and technology are entitled to have better access in using and utilizing the facilities and infrastructure of science and technology managed by any work units and owned by private parties.

In supporting the implementation of the science and technology network, a science and technology information system has been developed to collect basic data in an integrated manner as a source of information for the organization of science and technology. In addition, the government provides guidance and supervision of the planning and implementation of the science and technology development, in line with the master plan for the advancement of science and technology.

In general, the law is expected to end up with a stronger science and technology outcomes, including those related to agriculture. On the other hand, some elements of the law which underline compulsory submission of the research result to the government seemingly hinder the interest of potential partners to established research collaboration. The implementation of this specific policy is subject to further elaboration in the corresponding government regulation as derivative to this law. Any stakeholders concern with this issue should actively provide necessary inputs to come up with the appropriate government regulation.

In line with the spirit of this law, the Ministry of Science, Technology and Higher Education is currently coordinating the framework on National Research Flagship Program (NRFP) to be implemented in the year of 2020. To promote synergy and cooperation across research agencies and universities, the NRFP is designed as a research consortia, led by the most advance research agency in the expected field. Related to food and agriculture the program focuses on nine priority commodities, namely: rice, maize, soybean, oil palm, beef cattle, native chicken, chili, onion, and shallot. The priority subject is modern biotechnology and technology supporting seed/breed industry.

REFERENCE

State Secretariate of the Republic of Indonesia. The Law Number 11/2019 on National System of Science and Technology. Jakarta

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