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Science, Technology and Innovation in Vietnam: Current Situation and Policy Solution

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Abstract: ***Science, technology and innovation (STI) play an important role in solving social problems, contributing to economic growth, creating prosperity and sustainable development of the nation. In Vietnam, STI is prioritized to develop through the Party and State guidelines and policies, many STI achievements have been applied in Vietnam's economic sectors, bringing practical benefits for the society. Vietnam's global innovation index is improved, scientific and technological potential is raised. However, the results are not as expected, the rate of technological innovation in economic sectors is not high; the market of science and technology is not really developed,....This paper will analyze the current situation of STI in Vietnam, thereby proposing policy solutions to promote STI development in accordance with Vietnam's conditions and globalization trend of STI.***

Keywords: Vietnam STI, Vietnam STI Policy

1. Research Overview

Science and technology of Vietnam are considered as a top national policy and a key driving force for the country's rapid and sustainable development. This view has been affirmed throughout many Party documents, policies and laws of the State. Examples are Resolution No.02-NQ/HNTW (1996) on strategic orientations for scientific and technological development in the period industrialization, modernization and the task until 2000; Resolution No.20-NQ/TW (2012) on the development of science and technology for the cause of industrialization in the socialist-oriented market economy and international integration; Decision No.272/2003/QD-TTg of the Prime Minister on approval Vietnam Science and Technology Development Strategy to 2010; Decision No.418/QD-TTg (2012) of the Prime Minister on Strategy scientific and technological development in the 2011-2020 period, just to name a few. Recently, in order to quickly adapt to the Fourth Industrial Revolution, Vietnam affirmed that innovation, along with science and technology, is an important factor to accelerate the process of renewing the growth model, restructuring the economy associated with implementing strategic breakthroughs and modernizing the country, strongly developing Vietnam's digital economy ((Directive No.16/CT-TTg of the Prime Minister (2017) on strengthening the capacity to access the fourth industrial revolution; Resolution No.52-NQ/TW of the Politburo (2019) on a number of guidelines and policies to actively participate in the Fourth Industrial Revolution, etc)).

STI of Vietnam not only have separate policies but are also integrated into other policies on development of economic sectors, for example: Resolution No.36-NQ/TW (2018) of the Central Executive Committee Meeting 8, XII course on Strategy for sustainable development of Vietnam's marine economy to 2030, with a vision to 2045. The key view of the Resolution is to take science, technology and innovation in the direction of advanced high quality of human resources as a breakthrough factor; Resolution No.23-NQ/TW (2018) of the Politburo on the orientation to formulate national industrial development policy by 2030, with a vision to 2045. In particular, developing strongly and synchronously science and technology market, promoting innovation activities in enterprises and organizations are important factors to implement industrial policies.

However, despite many development priorities, Vietnam's STI system also has many limitations such as planning and organizing the implementation of STI development strategies and capacity constraints in enterprises, science and technology organizations; limited funding and resources for STI. This article, through the method of collecting, processing and evaluating data on Vietnam's STI, will present advantages and difficulties in Vietnam's STI system, thereby proposing suitable solutions for Vietnam in the context of a strong Fourth Industrial Revolution.

2. Research Method

To clarify the current situation and propose key solutions for STI development in Vietnam, the research team used and processed secondary data on the status of science, technology and innovation in Vietnam. This data has been published in hard copy and soft copy by Vietnam's Ministry of Science and Technology from 2015 to 2019, as well as survey data on innovation in enterprises, survey data on scientific research and technology development in 2018 of the National Agency for Science and Technology Information; other research works related to science, technology and innovation policies to promote the development of Vietnam. At the same time, the research team assessed the implementation of Vietnam's STI policies issued in the period 2016-2020 to implement the objectives of the National Strategy for Science and Technology Development of Vietnam until 2020.

To further clarify secondary data, the research team conducted discussions and interviews with a number of experts through seminars and conferences on science and technology approved by the Ministry of Science and Technology and the Ministry of Industry and Trade

organized this in 2019. This will help clarify the situation and solutions to support and promote the development of science, technology and innovation in Vietnam.

3. Research results

3.1 The main advantages

Firstly, step by step creating a fairly adequate legal basis for STI activities, especially in organizing and managing STI activities according to market mechanisms in line with management reform approaches to the development trend of the world (Ministry of Science and Technology, 2018). In the period from 2015 to 2019, Vietnam has many policies through Party Resolutions, Laws of the National Assembly and many Government Decisions on STI development. These policies generally have certain synergies, creating favorable conditions for the development of the science and technology market, and enterprise development.

Secondly, Vietnam has created a new approach in implementing science and technology tasks, which is more proactive and flexible through funds: National Fund of Science and Technology Development (https://nafosted.gov.vn/); funds of scientific and technological development in Vietnam's provinces and cities (63 funds of 63 Vietnamese cities); enterprise support funds such as National Technology Innovation Fund (http://natif.vn), Small and Medium Enterprise Support Fund (http://phattriendnnvv.mpi.gov.vn); the formation of science and technology development fund of businesses, along with supporting businesses, small and medium enterprises in STI activities. One example is the deploying of Resolution No. 35/NQ-CP dated May 16, 2016 of the Government on supporting and developing enterprises by 2020. In 2018, there are 11 tasks under the implemented programs with the host unit is the businesses as Joint Stock Technology Industrial Posts and Telecommunications (VNPT Technology); Hai Duong Pump Manufacturing Joint Stock Company; Binh Dinh Pharmaceutical and Medical Equipments Joint Stock Company etc. The total budget from the state for these 11 projects is 70.46 billion VND, of which the granted budget for 2018 is 16.90 billion VND.

Thirdly, the State's direct intervention in civil relations in the field of STI activities has been sharply reduced. This helps to create favorable conditions for the establishment and operation of non-public science and technology organizations, promote socialization of STI activities. At the same time, restructuring S&T public institutions and creating a legal basis for vigorously renovating the organization and operation of science and technology organizations (Decision No. 2245/QD-TTg 2015 of the Vietnam's Prime Minister) on approving the project of restructuring science and technology industry to 2020, with a vision to 2030, gradually implementing the autonomy and self-responsibility mechanism at an increasingly high level (Decree No.54/2016/ND-CP of the Vietnam's Government on stipulating the autonomy mechanism of public scientific and technological organizations).

Fourth, STI of Vietnam have achieved achievements in specific fields. Social sciences and humanities provided the basis for the Party's opinions and directions, the State's policies and laws. Natural sciences have made progress in basic research, creating a basis for the formation of a number of new multi-disciplinary science and technology fields, contributing to raising the level and capacity of basic sciences. Engineering sciences have contributed positively to improving productivity, quality of goods and services, increasing the competitiveness of businesses and the economy. The potential of science and technology, international cooperation on science and technology has been raised; the state management of science and technology has been gradually renovated and perfected in the direction of approaching the regional trends and the world.

Fifth, many national programs/projects on STI have been implemented. According to the Ministry of Science and Technology (2019), there are currently 39 national science and technology programs/projects being implemented under the management of ministries, ministerial-level agencies and government-attached agencies. The programs/projects have promoted the role of STI in socio-economic development, contributing to improving productivity and quality of competitiveness of products, services and goods in the process of industrialization and modernization.

In addition, STI have many development opportunities to promote Vietnam's strengths, especially in industry and trade enterprises. In 2018, labor productivity of industrial sector reached 154.1 million VND / labor, an increase of 55.4 million VND / labor compared to 2011; the contribution of total factor productivity (TFP) to economic growth is 42.7%. In particular, STI also play an important role in increasing the localization of components and spare parts in many industries, forming a number of businesses/economic groups with good potential and competitiveness globally (Ministry of Science and Technology, 2019). Along with that, the Ministry of Industry and Trade is speeding up the implementation of the project of applying STI in restructuring industry and trade (Decision No.754/QD-TTg of the Prime Minister on 2017 approving the Project of scientific application and technology in the process of restructuring the Industry and Trade sector to serve the cause of industrialization, modernization and sustainable development until 2025, with a vision to 2030), and the Joint Program on Science and Technology between the Ministry of Industry and Trade and Ministry of Science and Technology.

3.2 The main difficulties

Firstly, STI promotion activities have not been considered by the authorities as the leading national policy, and have not focused for the direction of scientific and technological activities, although the Party and the State have issued many important documents affirming STI's fundamental role in socio-economic development, ensuring national defense, security, improving the people's material and spiritual life. Moreover, the orientations of the STI development strategy are not really compatible with the socio-economic development strategy in each period, have not really been centralized; have not approached under the concept of national innovation system in planning for science and technology development. In addition, the state management

apparatus of science and technology is not yet associated with the responsibility of the heads of the branches and localities with the results of STI activities. The coordination of scientific and technological activities has not yet been taken seriously, leading to overlaps in the management of STI projects.

Secondly, the development of STI legal documents still has certain shortcomings such as inadequate document development plan, time for submission of science and technology projects has not been timely, has not pursued relevant ministries and agencies in coordinating to build important for implementation documents on STI. As a result, many targets for the science and technology development Strategy for the 2011-2020 periods (the Prime Minister's Decision No.418/QD-TTg 2012) have not been achieved. For example, the target of establishing 60 incubators by 2020 (until December 2019 have only have 9 incubators built and established nationwide); or the establishment of 5,000 science and technology enterprises to 2020 is not feasible (by the end of December 2019, fewer than 500 enterprises have been formed). The same is the unrealized target of about 60 research basic and application organizations reached regional and world level by 2020 (currently there are only 6 organizations reaching regional and international level, 8 other organizations can invest to reach regional and international level by 2020).

Thirdly, the adaptation of enterprises to the rapid changes of the environment, especially in the context of still low I4.0 revolution. According to the Ministry of Industry and Trade and the United Nations Development Program (2019), 89% of domestic private enterprises in Vietnam have no plans for I4.0, only 10% of businesses have just begun to learn about I4.0; 1% had moderate preparation. Still few experts with experience in I4.0 yet. Thus, it can be seen that the number of businesses interested in I4.0, and long-term activities to adapt with I4.0 are limited, enterprises have not realized the impact of I4.0, or opportunities that I4.0 can bring. In addition, the capacity to support businesses from intermediary organizations operating in the field of science and technology services is not high. The science and technology service system includes science and technology information, technology transfer consultancy, intellectual property, quality control, metrology and standards that are not yet equipped with sufficient facilities and capacity to provide services to meet requirements of integration. In particular, the linkage between science and technology organizations, institutes, universities and enterprises is loose. The results of the 8,000 enterprises survey by the National Agency for Science and Technology Information (2018) show that, only about 7.5% of enterprises that innovate have used sources rated as "high" on the role of "science and technology organizations" in providing and sharing information for innovation.

In addition, although the science and technology organization system has been arranged and even planned to restructure, but the system of science and technology organizations is still duplicated, with unreasonable distribution among regions. The State's scientific and technological organizations have not fully exercised their autonomy in planning, finance, human resources and international cooperation in order to promote their creativity and coherence between research, training and manufacturing. In particular, the investment capital for STI is limited, no suitable mechanism has been set up, and there are no strong enough incentives to mobilize investment resources from enterprises and society for STI activities (Ministry of Science and Technology, 2019). Besides, the potential of human resources for science and technology has grown in number, but has not met the requirements, as policies to attract and respect talents are not really effective.

4. Conclusions and Recommendations

To enhance the role of STI in economic and social development and solve difficulties in STI development, in the coming time, Vietnam should have some following policy solutions.

Firstly, a set of policies to create an enabling environment for STI development. The favorable institutional environment will make an important contribution to raising the technological level and endogenous national technological capability through research and development activities to create products with strong competitive advantages having export potential. In particular, it is necessary to innovate the business model, create many new services to meet the increasing demands of customers. Along with that is the improvement of the law on intellectual property, protection and exploitation of intellectual property created by Vietnam; encourage commercialization and transfer of intellectual property right. At the same time, perfect financial policies to encourage and mobilize all social resources to invest in STI activities. Another aspect to implement is reviewing and amending regulations on investment in the direction of facilitating activities to attract capital from foreign investors for science and technology enterprises and creative start-up.

Secondly, it is necessary to improve the operational efficiency of organizations implementing STI policies. After the STI policy is issued, it is necessary to specify by action programs and plans to realize the STI objectives, prepare resources and mobilize resources from the central and local levels. The implementation of STI policies must be synchronous, have a roadmap and be closely linked with improving the capacity and technological level of enterprises; at the same time contributing to restructuring the industry based on the application of scientific and technological advances, the application of advanced technologies of the Fourth Industrial Revolution (Vietnam has issued the Decision No.3685/QD-BKHCN 2018 of the Minister of Science and Technology on this subject). According to this decision, I4.0 program of Vietnam includes promoting 43 technologies according to the list of key I4.0 technologies, such as: Artificial Intelligence, Blockchain, Big data, Internet of Things, 5th generation, robots, I-cloud, etc.

Thirdly, restructuring science and technology organizations and strengthening the linkage between science and technology organizations and enterprises. The restructuring of science and technology organizations should ensure linking scientific research with training; associate scientific

research with production; rationally arrange scientific research forces in the regions; focus investment on building science and technology agencies to implement national key directions, focusing on solving scientific and technological issues of national interest. Along with that, encourage businesses to invest in STI activities such as in-house research and development activities, or sign contracts with domestic and foreign organizations and individuals; invest in technological innovation; develop scientific and technological services such as guidance on installation and operation of technological lines, calibration of machines, equipment, testing instruments, measuring devices and activities related to the protection of property rights and technology transfer, applying new techniques to production.

Fourthly, to improve the quality of science and technology human resources, promote the development of science and technology market; supporting technology evaluation, creating favorable conditions for putting research results, patents and useful solutions into production. Developing the independent evaluation system and develop a set of indicators to evaluate technology transaction value and technology innovation. In particular, it is necessary to develop intellectual property exchanges and patent exchanges; formation and development of an innovative start-up ecosystem, science and technology enterprises as specified in the Scheme on Supporting the National Innovative Startup Ecosystem to 2025 (by Decision No.844/QD-TTg of the Prime Minister, 2016).

In addition, deploying policy solutions to enhance adaptation to I4.0. Strong propaganda is needed to raise the awareness of civil servants, scientists, people, organizations and businesses that understand the opportunities and challenges of I4.0. This is an important task in scientific and technological activities, decisive to the orientation and implementation of incentive policies, supporting the application of scientific and technological results in production. At the same time, it is necessary to implement vigorously the Prime Minister's Directive No.16/CT-TTg of May 4, 2017 on strengthening the capacity to access the I4.0; Resolution No. 19-2018/NQ-CP of the Government on continuing to perform key tasks and solutions to improve the business environment, enhance national competitiveness in 2018 and the following years; Resolution No.35/NQ-CP (2016) of the Government to promote the development of enterprises, improve technology level, technology absorption capacity, innovation capacity of enterprises to apply and deploy advanced technologies into production; Resolution No. 52-NQ/TW of the Politburo (2019) on a number of guidelines and policies to actively participate in the Fourth Industrial Revolution.

References

[1] The Ministry of Science and Technology (2015-2019), Vietnam Science and Technology, Science and Technology Publishing House, Hanoi, Vietnam.
[2] The Ministry of Science and Technology (2017), World Science and Technology: Skills for innovation, Science and Technology Publishing House, Hanoi, Vietnam.
[3] The Ministry of Industry and Trade and United Nations Development Program (2019), Assessment of readiness to approach the industrial revolution 4.0 of enterprises in Vietnam's industries, Hanoi, Vietnam.
[4] National Agency for Science and Technology Information (2018), Results of innovation surveys in enterprises, Science and Technology Publishing House, Hanoi, Vietnam
[5] National Agency for Science and Technology Information (2018), World economic forecast 2019 - 2020 and the contribution of knowledge-technology-intensive industries to GDP, Hanoi, Hanoi, Vietnam.
[6] Resolution No.02-NQ/HNTW of the Party Central Committee in 1996 on the strategic orientation of science and technology development in the period of industrialization, modernization and missions until 2000, Vietnam.
[7] Resolution No. 20-NQ/TW of the Party Central Committee in 2012 on the development of science and technology for the cause of industrialization in the context of socialist-oriented market economy and international integration, and Conclusion of the Secretariat in 2019 on the continued implementation of Resolution No. 20-NQ/TW, Vietnam.
[8] Resolution No. 36-NQ/TW of the Central Executive Committee Meeting 8, XII Course in 2018 on the Strategy for Vietnam's Sustainable Marine Economic Development to 2030, with a Vision to 2045, Vietnam.
[9] Resolution No.23-NQ/TW of the Politburo in 2018 on the orientation to formulate national industrial development policy by 2030, with a vision to 2045, Vietnam.
[10] Resolution No.35/NQ-CP of the Government in 2016 on supporting and developing enterprises until 2020, Vietnam.
[11] Resolution No. 52-NQ/TW of the Political Bureau in 2019 on a number of guidelines and policies to actively participate in the Fourth Industrial Revolution, Vietnam.
[12] Resolution No.19-2018/NQ-CP of the Government on continuing to carry out the main tasks and solutions to improve the business environment, improve national competitiveness in 2018 and the following years, Vietnam.
[13] Decree No.54/2016/ND-CP of the Government in 2016 on regulating the autonomy mechanism of public science and technology organizations, Vietnam.
[14] Decision No.272/2003/QD-TTg of the Prime Minister in 2003 on approving the Vietnam Science and Technology Development Strategy till 2010, Vietnam.
[15] Decision No. 418/QD-TTg of the Prime Minister in 2012 on the Science and Technology Development Strategy for the period of 2011-2020, Vietnam.
[16] Decision No.2245/QD-TTg of the Prime Minister in 2015 on approving the Project of restructuring S&T industry to 2020, with a vision to 2030, Vietnam.
[17] Decision No.754/QD-TTg of the Prime Minister in 2017 on approving the Scheme on application of science and technology in the process of restructuring Industry and Trade for industrialization, modernization and sustainable development sustain the period to 2025, vision to 2030, Vietnam.
[18] Decision No.3685/QD-BKHCN of the Minister of Science and Technology in 2018 on the list of key technologies of Industry 4.0, Vietnam.

[19] Decision No. 844/QD-TTg of the Prime Minister in 2016 on approving the Scheme to support national innovation start-up ecosystem by 2025, Vietnam.
[20] Prime Minister's Directive No.16/CT-TTg on strengthening access to the fourth industrial revolution in 2017, Vietnam.
[21] Tran Ngoc Ca (2018), Innovation and Development in Vietnam, Science and Technology Publishing House.
[22] Nguyen Huu Xuyen (2014), Policy on Science and echnology Innovation, Publisher of National Economics University.