International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

The State Management of Science, Technology and Innovation to Serve Industrialization and Modernization in Vietnam

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Abstract: ***Industrialization and modernization based on the development of science, technology and innovation (STI) are of great concern to the Party and State of Vietnam; At the same time, it has created many favorable conditions for STI activities to develop, always considering STI development as a top national policy, a key driving force for industrialization, modernization, and rapid, sustainable and prosperous national development. Using quantitative and qualitative research methods (mainly qualitative research), this article summarizes some of the main guidelines and policies for STI development in Vietnam; present results in state management of STI in Vietnam in recent times. From there, proposing a number of directions, solutions to improve state management of STI to serve Vietnam's industrialization and modernization by 2030.***

Keywords: Industrialization, modernization; science, technology and innovation

1. Overview of research

In the common sense, state management is the state's activities in the legislative, executive and judicial fields to perform functions in all areas of social life. According to Cirera Xavier and Maloney (2017), the institutional structure and management of STI in Vietnam is fragmented with many participants and limited coordination. The Ministry of Science and Technology is the agency in charge of building the strategy of STI, and is assigned by the Vietnam's Government the functions and tasks of state management of STI at the national level. Include the process of planning, organizing, operating and controlling the system of state administrative agencies over social processes and human behavior according to the law to achieve development goals STI and economics and society in each specific period.

In STI activities, State intervention through state management policies on research, development and innovation aims to reduce market failure, system failure and capacity failure (Aaron Melaas and Fang Zhang, 2016). Regarding market failure, innovations spread quickly between markets and are easy to copy. Innovators may find it difficult to recover costs even though they have invested in R&D, and therefore, governments use a variety of methods to protect innovators through policies such as patent protection and intellectual property rights. Regarding systemic failure, a country's development depends heavily on the initial choice of option/path, and choosing research, development and innovation policies that are not consistent with the corresponding system development process will make future reforms more difficult (OECD, 2021). Regarding capacity failure, the national innovation system (NIS) is necessary for innovation, however the NIS of developed countries can be applied indirectly to developing countries, which often lack capacity NIS adoption from developed countries.

In Vietnam, the state management function of STI is assigned to the Ministry of Science and Technology. Accordingly, the Ministry of Science and Technology is the Government agency that performs the state management function of STI, including (Government of Vietnam, 2023): Scientific research, technology development, and innovation activities; Developing scientific and technological potential; Intellectual property; Quality measurement standards; Atomic energy, radiation and nuclear safety; State management of public services in the areas under the ministry's management according to the provisions of law. In addition, the Ministry of Science and Technology is responsible to the Government of Vietnam for implementing state management of S&T nationwide (Article 74, Law on S&T, 2013).

The Party and State of Vietnam always uphold the role, position and focus on creating favorable conditions for STI activities to develop very early. This is expressed in Party documents such as Resolution No. 37-NQ/TW dated April 20, 1981 of the Politburo on S&T policy and resolution No. 26-NQ/TW dated March 30 /1991 of the Politburo on S&T in the cause of innovation. Next, Resolution No. 02-NQ/TW dated December 24, 1996 of the Party Central Committee on the strategic orientation of S&T development to 2020. Accordingly, Resolution No. 02-NQ/HNTW affirms ".....by 2020 we must strive to build our country to basically become an industrial country; S&T must become the foundation and driving force for industrialization and modernization of the country".

After the Resolution No.02-NQ/HNTW, the Sixth Conference of the 11th Party Central Committee issued Resolution No.20-NQ/TW dated November 1, 2012 on developing S&T to serve the cause of industrialization and modernization under the conditions of a socialist-oriented market economy and international integration.Resolution No.20-NQ/TW set out the general goal of strongly developing science and technology (S&T), making S&T truly the most important driving force to develop modern productive forces, knowledge economy, improving productivity, quality, efficiency and competitiveness of the

economy; protect the environment, ensure national defense and security, and basically turn our country into a modern industrial country by 2020 and a modern socialist-oriented industrial country by the middle of the 21st century. In addition, Resolution No.52-NQ/TW dated September 27, 2019 on a number of guidelines and policies to proactively participate in the Fourth Industrial Revolution shows that there is a major role of STI in with the driving force of economic and social development, economic growth model innovation and national digital transformation process. The Politburo issued Conclusion No. 69-KL/TW dated January 11, 2024 on continuing to implement Resolution No.20-NQ/TW on the development of S&T to serve the cause of industrialization and modernization in the context of a socialist-oriented market economy and international integration.

Thus, the Party and State of Vietnam really attach importance to STI activities to serve industrialization and modernization, helping Vietnam develop economically and gradually escape the middle income trap.

2. Research Methods

To obtain information about policies STI activities, this study collects secondary data through research works that have been published in hard copy form domestic and foreign soft copies of STI activities to serve the assessment of the current situation and identify factors affecting state management of STI in Vietnam.

To clarify the results achieved in state management of STI, the study conducted in-depth interviews with a number of experts, entrepreneurs, and managers in Vietnam in the field of STI. The information obtained is one of the important bases for providing solutions to improve state management of STI in Vietnam.

3. Research results

Some key policies on developing STI to serve Vietnam's industrialization and modernization

The Constitution of Vietnam (2013) affirmed “Development of S&T is the top national policy; S&T play a key role in the country's socio-economic development." This is an important legal basis to guide the development of legal documents on the development of STI to serve the country's industrialization and modernization. To date, the National Assembly has promulgated 08 specialized laws in the field of S&T (Law on Intellectual Property; Law on Technology Transfer; Law on Standards and Technical Regulations; Law on Product and Goods Quality; Law on Energy Nuclear; Law on High Technology; Law on Measurement; Law on S&T). At the same time, Resolutions on economic and social development and Resolutions on annual state budget allocation for STI development have been issued to promote industrialization and modernization of the country. Thereby, it continues to show that STI is playing a key role, foundation and driving force for industrialization, modernization, and rapid development sustainability.

To develop STI, in the period 2005-2022, the Government and Prime Minister have issued over 90 Decrees and Decisions to detail and guide the implementation of laws and have had over 300 Circulars and Joint Circular were issued. Most recently, on May 11, 2022, the Prime Minister issued Decision No.569/QD-TTg on the STI Development Strategy until 2030. In addition, based on the Party's guidelines and policies and the State's laws, localities across the country have also issued many policies expressed in decisions, regulations and statutes related to develop science, technology and innovation for implementation to promote local economic and social development based on STI.

Basic achievements in state management of STI serving industrialization and modernization in Vietnam

Firstly, the Party's guidelines and the State's legal policies have contributed to creating an important premise and driving force and creating a favorable legal corridor for science, technology and innovation activities in a business-centered direction. In particular, the Government, the Prime Minister, the Ministry of S&T, ministries and branches have proactively reviewed to promulgate new policy documents, or supplement or edit policy documents that are no longer appropriate to solve the problem difficulties and obstacles arising in practice to serve the cause of industrialization and modernization of the country. The development and promulgation of documents have complied with the processes and procedures of the Law on Promulgation of Legal Documents. On that basis, localities across the country have also closely followed the directive documents of superiors to issue guiding documents and specifically deploy STI activities suitable to their localities to promote economic and social development.

Secondly, policies and laws on science, technology and innovation promulgated by competent authorities have focused on mobilizing resources for STI activities, including:

- Strengthen the establishment, protection, enforcement and exploitation of intellectual property, meeting international commitments that Vietnam has signed or participated in; create favorable conditions and simplify procedures for importing used production lines for high-tech enterprises, projects with high-tech application activities, and projects that enjoy special investment incentives. specifically as prescribed in Article 20 of the Investment Law;
- Attract, utilize, use, and develop a team of knowledge to ensure quantity and quality, meeting the requirements of socio-economic development; improve operational efficiency, autonomy, and self-responsibility of public S&T organizations;
- Support businesses to innovate technology, promote the application of scientific and technological advances in production and life, and support the development of an innovative startup ecosystem;
- Remove obstacles in using the S&T Development Fund of enterprises to innovate technology to serve production and business activities, contributing to economic recovery; promulgate economic and technical norms for public service services using the state budget in the field of S&T; provide guidance on implementation of regulations on conducting radiation work and service activities supporting atomic energy applications.

Thirdly, financial resources: Investment in S&T in recent years has marked a strong change in social contributions, especially from the business sector. If about 10 years ago, funding for S&T activities mainly relied on the state budget (about 70-80% of total investment in S&T), then up to now, investment in S&T from the state budget and from businesses has been relatively balanced with the respective rates are 52% and 48%. In 2022, the state budget for S&T activities (excluding funds for national security and defense, reserve expenditures, and development investment expenditures for S&T from local budget sources) is 16,622 billion VND, accounting for about 0,93% of total state budget expenditure.

Fourth, the S&T organization and human resources: Planning for the network of public S&T organizations in the period 2021-2030, with a vision to 2050, is built to improve the operational efficiency of public S&T organizations, appropriately with the investment capacity of the state budget. The Ministry of S&T focuses on researching and proposing the building of specific autonomy mechanisms of S&T organizations in the coming period, while effectively implementing regulations on decentralization and decentralization in the field of S&T.

Fifth, the S&T market is initially developing, the transaction value of S&T goods tends to increase, and intermediary organizations have initially affirmed their role in promoting the connection between supply and demand of S&T goods. During the period 2011-2020, the Ministry of S&T organized 13 events connecting technology supply and demand (Department of Technology Application and Development, 2021), thereby selecting and introducing more than 3,000 processes and technologies, equipment and products of nearly 700 research institutes, universities, domestic and international enterprises; develop a technology handbook including 2,500 processes, technologies, equipment, and products of organizations and individuals; Supporting the connection of 142 cooperation and technology transfer contracts with a total value of more than 2,250 billion VND (the rate of contracts and cooperation agreements implemented after signing reached 41.5%).

Sixth, the system of national standards and national technical regulations are regularly reviewed, amended, supplemented, and updated to suit practical requirements and the level of harmony with international standards. international standards. In 2022, the Directorate for Standards, Metrology and Quality has well organized the work of receiving, commenting, appraising and publishing 496 national standards, focusing on the fields of mechanical engineering, agricultural products, and automation. , food safety, fire prevention, environmental control, road traffic, construction materials and works, information security. To date, more than 13,000 standards have been published, covering most socio-economic fields, of which the proportion harmonized with international standards is 60%, contributing to effective support for development socio-economic, meeting the basic requirements of production and trade development. More than 800 regulations have been issued, becoming an important tool of state management activities to prevent poor quality products, goods and services affecting the environment, health, and protecting national interests, benefits businesses and consumers.

In addition, the Law amending and supplementing a number of articles of the Intellectual Property Law, was passed by the National Assembly on June 16, 2022. The new regulations were issued that had positive impacts on intellectual property activities. In the field of radiation and nuclear safety, the Ministry of S&T issued Circular No. 02/2022/TT-BKHCN dated February 25, 2022 guiding the implementation of a number of articles of Decree No.142/2020/ND-CP dated December 9, 2020 of the Government regulating the conduct of radiation work and service activities supporting the application of atomic energy; Circular No. 08/2022/TT-BKHCN dated June 6, 2022 promulgating a number of economic and technical norms for public service services using state budget on response and handling of radiation and particle incidents core; personal radiation dose measurement; testing and calibrating radiation measuring equipment; Circular amending and supplementing a number of articles of Circular No.25/2014/TT-BKHCN dated October 8, 2014 regulating the preparation and response to radiation and nuclear incidents, preparation and approval of plans response plan for radiation and nuclear incidents.

Main limitations in state management of STI serving Vietnam's industrialization and modernization

Firstly, although awareness of the position and role of S&T has been raised, it has not met the requirements of becoming a foundation, national policy, and driving force for economic and social development. Many research tasks do not closely follow the requirements of production and life, the contribution of S&T to growth, economic restructuring and increasing social labor productivity still has many inadequacies. The application of research results is not high (Central Theoretical Council, 2021). Besides, the viewpoints and goals of the Strategy for the period up to 2020 have not been fully understood, both in awareness and in action (Ministry of S&T, 2021). Therefore, STI is not really considered a top national policy, not the most important and crucial driving force to improve productivity and quality to serve industrialization and modernization.

Secondly, planning and plans for S&T development are not linked to economic and social development requirements (Resolution No. 20-NQ/TW), some planning and plans for development of industries, fields and localities. method is not based on in-depth scientific assessment (Central Theoretical Council, 2021). The system of legal documents on S&T is still quite complicated, it has been supplemented and amended many times, but the system is not high, so the implementation faces many difficulties, the S&T management mechanism is still administrative. There is no policy to adequately motivate researchers and S&T staff and a reasonable policy to attract and utilize talent (National Assembly Standing Committee, 2016); Although the financial management mechanism for S&T has been innovated, it is still inadequate, not synchronized, and the budget allocation is not reasonable (Conclusion No. 50-KL/TW, 2019). Therefore, STI are not really closely linked with production and business, activities to support innovative start-ups and support businesses in applying technology of the Fourth Industrial Revolution have not

been promoted.

Thirdly, there is a lack of appropriate priorities and strong policy solutions to create breakthroughs in areas where Vietnam has advantages, so key, competitive S&T fields have not yet been formed. with the region and the world; at the same time, the priority orientations in the S&T development strategy are still scattered and lacking focus (Ministry of S&T, 2021), there is no connection between goals and strategic solutions, some goals do not have solutions. Direct solutions such as goals on the speed of innovation in technology and equipment, goals on the number of high-tech incubators and high-tech business incubators. In addition, the formation of S&T tasks in the fields of S&T research is not highly interconnected and depends heavily on annual state funding.

Main reasons for limitations in state management of STI to serve Vietnam's industrialization and modernization

Firstly, many levels of party committees and authorities have not really been deeply aware of and acted decisively in enhancing the position and role of STI activities for sustainable economic and social development; not really considering STI as the most important and key driving force to develop modern production forces to serve the country's industrialization and modernization, creating breakthroughs in productivity, quality, efficiency and competitiveness of the economy. The institutionalization of the Party's guidelines into specific policies and solutions on the development of STI is still not proactive, not really drastic, with many difficulties and obstacles in the process of carrying out tasks. The S&T issue has not been resolved in a timely manner, there is no effective inspection and supervision mechanism in S&T research activities, especially the control of post-acceptance S&T tasks.

Secondly, NIS of Vietnam has just been initially formed and is not yet synchronous and effective. The State has not guaranteed spending on S&T to be 2% or more of the total annual state budget expenditure and gradually increase according to the development requirements of the S&T cause as confirmed in the 2013 Law on S&T. Therefore, maintaining Maintaining and developing S&T capacity and investing in technology infrastructure for S&T organizations faces many difficulties. In the process of implementing S&T tasks, there is no synchronization and consistency in assignment and coordination between ministries and branches from central to local levels. Some solutions and tasks stated in the strategies, master plans and plans for S&T development have unclear resources for implementation, especially the financial mechanism is not suitable for the characteristics of S&T activities and payment and settlement procedures when implementing S&T tasks using state budget, there are still certain difficulties.

Thirdly, the absorptive capacity of enterprises is not high, the driving force for technological innovation is not high, and the endogenous capacity has not been formed strong enough to promote the role of STI in increasing productivity and quality, business efficiency and enhancing the competitive position of businesses in the market based on STI.

In addition, the quality of S&T human resources is still limited, remuneration policies in STI activities are still formal and administrative, so they do not encourage and motivate scientists to promote their creativity, especially are Vietnamese scientists abroad; Support for domestic scientists to exchange, cooperate and work with prestigious S&T organizations in the world has not been promoted. Besides, the connection between the research area and the production and business area is still loose and not tight.

4. Conclusion and Recommendations

To promote Vietnam's industrialization and modernization based on STI, in the coming time, there should be some directions to improve state management of STI as follows:

Firstly, it is necessary to raise awareness and in-depth understanding of party committees and authorities about the dialectical relationship between science, technology and innovation with sustainable economic and social development to serve industrialization and modernization. In many policy documents of Vietnam, terms such as "industrial country", "basically becoming an industrial country" and "modern industrial country" are mentioned. However, the connotations of these terms have not really been clarified. Therefore, to gain awareness and in-depth understanding, we must first define more clearly what is an industrial country?, what is basic to become an industrial country? and what is a modern industrial country. Next, it is necessary to develop and promulgate a set of evaluation criteria, targets and indicators to measure "industrial country", "basically becoming an industrial country" and "modern industrial country". Then, find out the relationship and correlation between the criteria and indicators in STI activities with the criteria and indicators in the set of criteria for evaluating "industrial country", "basically becoming a country industrial" and "modern industrial country". If this is done well, raising awareness through propaganda, training, and training for party committees and authorities will be easier and more convenient.

Secondly, proactively review and institutionalize the Party's guidelines into specific policies on the development of STI, linking STI with economic and social development and economic restructuring, at the same time, it continues to affirm that the development of STI is a top national policy, the main driving force to promote economic growth, create breakthroughs in productivity and quality, and is the foundation for implementing digital transformation nation, making an important contribution to sustainable development and ensuring national defense and security. Along with that, it is necessary to research, develop and perfect policies on inspection, examination and supervision in S&T research activities. In particular, it is necessary to have a policy to control S&T tasks after acceptance for about 10 years to encourage the application of research results, contribute to creating a supply of goods for the S&T market, and promote connections between the S&T market and the S&T market goods and services markets, labor markets and capital markets.

Thirdly, complete the NIS of Vietnam, sectoral and regional

innovation systems, high-tech parks, network of innovation centers, innovation start-up network, intermediary organizations, and support organizations to promote innovation (Decision 569/QD-TTg, 2022), gradually linking the national innovation ecosystem with the innovation ecosystem of some countries in the region and the world. At the same time, improve the state management capacity of STI, especially the capacity to plan and organize the implementation of STI policies. Review and complete the development of S&T development planning and plans, decentralization and decentralization mechanisms in state management of STI to ensure streamlining, effectiveness and efficiency. Continue to increase investment from the state in STI, ensuring at least 2% or more of total annual state budget expenditure, striving to reach 4% by 2030 and 6% by 2045.

Fourth, improve the ability of businesses to absorb technology and innovation, promote digital transformation and smart manufacturing, and support businesses to assimilate, adapt, and master the technology of the Industrial Revolution the fourth time to develop new products and new services. Along with that, continue to innovate thinking and awareness about developing the country into a modern industrial country. Do not associate the criteria of industrialization with the criteria of becoming a modern industrial country because industrialization is a process, and a modern industrial country is the destination, a milestone marking the level of achieving the criteria at a certain time. certain (Tran Thi Van Hoa, 2021). Therefore, it is necessary to have policies to support and link the development of STI in enterprises with the goal of becoming a modern industrial country according to international standards on the basis of research, absorption and mastery. , transferring and applying advanced technology to develop green economy, circular economy, and environmental protection.

Fifth, improve the quality of S&T human resources, attract foreign experts and overseas Vietnamese experts with high creative capacity to develop S&T potential and infrastructure. Review and reorganize the S&T organizational system, reduce intermediaries, and overcome overlap and duplication of functions, tasks and fields of S&T research; at the same time, continue to restructure national S&T programs in a direction that practically serves the goal of industrialization and modernization of the country in a modern direction. Remove barriers in the legal system, economic, financial and investment policies for STI activities, and the autonomy of S&T organizations; Allows the implementation of new policy testing mechanisms, accepting risks in deploying and applying new technology, innovation, and new business models; promote the socialization of investment sources for STI, especially from businesses; closely link acience, society and human resources with natural sciences, technical sciences and technology in the process of implementing socio-economic development tasks; promote deep and wide international integration in STI to quickly access international standards, comply with international practices in the management and implementation of STI activities, especially international integration on STI management.

In addition, it is necessary to pay attention to investing properly in basic research, focusing on applied research in priority areas to create core technologies and source technologies for a number of key industries with competitive advantages; create a legal framework to implement an experimental policy on commercialization of research results using state budget; develop research institutes and universities to become strong research subjects. Complete and develop high-tech zones, high-tech agricultural zones, and key laboratory systems; at the same time, promote international cooperation on STI in a focused direction, linking international cooperation on STI with international cooperation on economic development, especially the digital economy in a sustainable direction.

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