METHODS FOR BUILDING THE NATIONAL SCIENCE AND TECHNOLOGY PROGRAMS IN DEVELOPED COUNTRIES - EXPERIENCE AND LESSONS FOR VIETNAM

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Summary:

Recognizing the role of science and technology (S&T) programs, many countries in the world have specific strategies and detailed roadmaps for the process of building their national S&T programs. This article reviews some experiences on the method of building national S&T programs of some developed countries, such as China, Korea, and Taiwan (China)... in the period when those countries had similar socio-economic conditions as our country today. These are some countries and territories with effectively operating S&T program systems, making great contributions to socio-economic development. Based on studying and learning from international experiences, the authors propose some suggestions for applying their lessons to improve the Vietnamese method of building national S&T programs.

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1. Concept of national science and technology program

1.1. Some related concepts

A science and technology program is a group of together gathered topics and projects, according to a specific purpose, organized and implemented in a sectoral or interdisciplinary science and technology direction, and aiming to solve the goals and contents of science and technology, economy and society which have been planned in a certain period. Science and technology programs can be at the national, sectoral, and local scales (*Vu Cao Dam, 1998*). Thus, a science and technology program is one of the forms of organizing the implementation of science and technology tasks. If independent science and technology topics and projects are formed to solve individual science and technology issues, then a science and technology program is formed to gather and concentrate resources to solve large, prioritized, comprehensive, interdisciplinary, and multidisciplinary science and technology problems.

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The national S&T program is a type of S&T program and therefore is a form of organizing the implementation of S&T tasks. In practice, depending on each country or each stage of development, the national S&T program has different names such as national research and development (R&D) program, state-level S&T program, prioritized S&T program, key S&T program, spearhead S&T program, or pioneer S&T program, etc. The concept of the national S&T program is also mentioned in many research works as well as legal documents:

First, according to research by the Institute of Strategy and Policy on Science and Technology (2004), the national S&T program is a form of strategic S&T planning, including a set of activities, processes, and coordinated measures to most effectively implement the goals of the national S&T plan.

Second, according to Vu Cao Dam (2007), the national S&T program is ordered by the State (central level) S&T program. The author also emphasized that the scope of application of this type of S&T task is at the national level.

Third, according to Hoang Xuan Long et al. (2018), the national S&T task (including the national S&T program) is a level of S&T task management (distinguished from the S&T tasks at the ministerial, provincial, and unit levels); the national S&T program requires its appropriate management method.

Fourth, the Law on Management and Evaluation of the Effectiveness of National Research and Development Projects of Korea (2014) defines the national S&T program as S&T programs funded by central administrative agencies.

Fifth, the Law on Progress of Science and Technology of China (1993) defines the national science and technology program as a program formulated by the State Council, which is closely related to science and technology, ensuring the coordination of science and technology progress with economic and social construction and development.

In Vietnam, current legal documents do not provide the concept of a national science and technology program. Only several criteria for national science and technology tasks in general (including national science and technology programs) are defined in Decree No. 08/2014/ND-CP detailing and guiding the implementation of several articles of the Law on Science and Technology (Clause 1, Article 25) as follows: *First*, it must be important for socio-economic development, national defense and security nationwide; it plays an important role in enhancing the national science and technology potential; *Second*, it must solve science and technology issues related to many sectors, many fields, and inter-regions; *Third*, it must mobilize national resources, possibly with the participation of many science and technology sectors. Thus, according to Decree 08/2014/ND-CP, only science and technology programs that meet the above 3 criteria are national science and technology programs. In practice, not all national science and technology programs fully meet these criteria. Thus, through an overview of concepts related to national science and technology programs, it can be seen that up to now, there is no unified concept of national science and technology programs. However, national science and technology programs all share some basic characteristics as follows:

Firstly, it is formulated according to the country's priority S&T orientations.

Secondly, it aims to solve important S&T problems of the country, related to many different sectors and provinces and is implemented over a long period.

Thirdly, it includes a series of S&T tasks to solve the closely linked, complementary, and mutually supportive issues, that, when implemented individually, will not help the program achieve its goals.

Fourthly, it requires large resources to implement (human, material, financial resources, domestic and foreign S&T information sources, etc.).

International experience shows that, in addition to the national S&T program, other independent national S&T tasks are being implemented. The parallel existence of different forms of implementing national S&T tasks does not conflict but on the contrary, complements and supports each other in implementing the country's priority S&T orientations. In particular, the national S&T program has the most important goals and roles.

The method for building a national science and technology program is mentioned in several research works by Taeyoung Shin and Hoagy Kim (1994), NASATI (2002), NASATI (2004), the Ministry of Science and Technology of Korea (2003), APEC (2008), NASATI (2010), United Nations (2010), NASATI (2012), NASATI (2015), Micah Springut, Stephen Schlaikjer and David Chen (2011), Yeh, Hu, Tsai (2014), Sea-Hong Oh, Hee Young Lim, Byoungsoo Kim (2016), MOST, R.O.C (2018),... One of the research works that goes into an in-depth discussion of the method of building a national science and technology program is "Reforming R&D Policy in the Context of Transition to a Market Economy in Vietnam" *(Institute of Strategy and Policy on Science and Technology, 2004).* Accordingly, the group of authors also outlined two approaches to building national science and technology programs: the "Top-down" (initiated by central science and technology management agencies) and the "Bottom-up" (initiated by enterprises, R&D organizations, universities, ministries, scientists, etc. and reviewed, selected, and approved by central science and technology management agencies).

In practice, there is no common building method that is uniformly applied to all national and international science and technology programs. The building method will depend on the context; goals, roles, and scope of each national science and technology program; and even on the will of senior leaders. From an overview of the above-mentioned documents, there is no common experience in building national science and technology programs. Each country has its own initiatives in orienting and designing the building of national science and technology programs *(Nguyen Lan Anh et al., 2020).*

1.2. The role and significance of national science and technology programs in socio-economic and science and technology development

National science and technology programs are science and technology tasks formed to solve urgent issues to bring great benefits to the socio-economic development and

science and technology of each country. In general, national science and technology programs are closely linked to the implementation of the country's priority science and technology orientations. The emergence of national science and technology programs is becoming more and more popular in many countries around the world, *on the one hand*, to meet the inevitable requirements of socio-economic development based on science and technology; *on the other hand*, the resources of each country, especially in developing countries, cannot be invested in all science and technology tasks but need to form a type of science and technology task that is capable of gathering and concentrating resources to implement the country's priority science and technology orientations. In Asia, China, South Korea, and Taiwan (China) are countries and territories that have established national S&T programs quite early (in the early 1980s). Many programs in China and South Korea have a duration of 20-30 years, serving long-term goals, and making outstanding contributions to the socio-economic development as well as S&T of the country.

In Vietnam, in recent years, national S&T programs have played an important role in strengthening S&T capacity, improving competitiveness, and contributing to promoting the socio-economic development of the country. For Vietnam, to be able to form national S&T programs that meet the requirements of S&T and socio-economic development, it is necessary to refer to foreign experiences. The above-mentioned countries and territories have had significant successes in building national science and technology programs. Therefore, learning and analyzing the experiences of these countries and territories in building national science and technology programs may help Vietnam learn useful lessons.

2. Experience in building national science and technology programs in some developed countries

2.1. Experience of Korea

2.1.1. Building a national science and technology program framework

The national science and technology program is a tool used by the Government to realize priority orientations aimed at developing based on science and technology in Korea's industry. The process of formulating and developing national science and technology programs in Korea is closely linked to and serves the development of high-tech industries. Therefore, when building national science and technology program frameworks, Korea always sets overall goals, developing science and technology but focusing on serving the development of its high-tech industries. Accordingly, the national science and technology program is essentially a tool for the Government to build a close (non-linear) relationship between technology development, industrial development, and national development. Thus, priority orientations are the basis for building the framework of the national science and technology program of Korea. Priority orientations are determined in the Government's strategic documents on science and technology development and are closely linked to the national development goals in each period. Korea considers the science and technology program as a tool to effectively use the science and

technology resources based on the principle of selection and concentration to realize priority orientations, promote industrial development, and enhance, and ensure national competitiveness in both science and technology and socio-economic fields. For example: the HAN Project (a long-term and large-scale inter-ministerial research and development project, built according to a structural framework of the national science and technology program). The Project's goal is to develop technologies serving key industries (new materials, transportation, biotechnology, environment, new energy and nuclear energy, semiconductors, networks, pharmaceuticals, etc.) to make Korea a technologically self-sufficient country, catching up with developed countries. With this goal, the Project's contents are built to develop such technology groups: *First*, the product-oriented technology, which are technology products that Korea has the potential to compete with advanced countries such as highly integrated semiconductor manufacturing technology, integrated data and service networks, agricultural chemicals and new pharmaceuticals, advanced production systems; *Second*, the fundamental technologies, which are core technologies needed to continue to sustain economic growth, such as new materials used in information technology, electronics and energy, new-generation transportation systems, new-functional biological materials, environmental treatment technology, new energy sources, and new-generation nuclear reactors.

2.1.2. Subjects involved in building national science and technology programs

Korea is a typical country in building a technocratic science and technology program that includes the broad participation of many stakeholders, such as management agencies, the science and technology community, representatives of the industrial sector, and other social components:

- *National Science and Technology Council (NSTC)*: An inter-ministerial organization chaired by the President, whose function is to coordinate the development of national science and technology programs to strengthen the connection between policies and national science and technology programs. All proposals for national science and technology programs are reviewed by the NSTC. This allows the goals, tasks, and contents of national science and technology programs to be built at the highest level and helps to comprehensively coordinate and monitor national science and technology programs in many ministries and sectors. The basis for NSTC's operations is the System Framework for “Overall Coordination” of national S&T programs issued in 1999;
- *Ministries and sectors*: Act as the agency in charge (developing, managing, evaluating) of national S&T programs. Which, the Ministry of Science and Technology is both the secretariat of NSTC, coordinating overall national S&T programs among ministries and sectors; and is also the agency in charge of several national S&T programs on basic research and international cooperation. Other ministries and sectors are the agencies in charge of national-level science and technology programs under the management of ministries and sectors such as the Ministry of Industry and Trade and Energy (MOTIE), the Ministry of Construction and Transport (MOCT), the Ministry of Information and Communications (MIC),

the Ministry of Maritime Affairs and Fisheries (MOMAF), the Ministry of Agriculture and Forestry (MAF), the Ministry of Health and Welfare (MOHW), the Ministry of Environment (MOENV), the Ministry of Education (MOE), and the Korea Small and Medium Enterprise Administration (SMBA). Supporting bodies to the ministries in charge of national-level science and technology programs are affiliated with the ministry's research units. These are units with the direct function of organizing, managing, and evaluating national-level science and technology programs. For example, the Ministry of Science and Technology has the Korea Institute for Science and Technology Evaluation and Planning (KISTEP), the National Research Foundation (NRF); The Ministry of Industry and Trade and Energy has the Korea Institute for Advanced Technology Development (KIAT), the Korea Planning and Evaluation Institute of Industrial Technology (KEIT), the Korean Institute for Energy Technology Evaluation and Planning (KETEP); the Ministry of Health and Welfare has the Korean Health Industry Development Institute (KHIDI); the Ministry of Environment has the National Institute of Environmental Research (NIER);...

- Domestic experts from academies, state research institutes, industries, political organizations, and foreign experts. All are leading experts in their fields. They participate in many activities in building the national science and technology program, such as determining technology priority directions in the national science and technology program; and determining and selecting the projects of the national science and technology program;...

2.1.3. Method for building the national science and technology programs

In Korea, each ministry uses a different method for building national science and technology programs. However, in general, there are three common stages: First, to identify and select national science and technology programs; Second, to establish the goals and tasks of the program; and Third, to formulate projects to implement the program. For example, the method of building national science and technology programs is led by MOTIE. More specifically, in determining and selecting the Program, MOTIE based on priority orientations, the organization determines and selects national science and technology programs with the support of KEIT. Then, proposals for science and technology programs are submitted to NSTC for appraisal. Developing program objectives and tasks: Based on the assessment opinions from NSTC, MOTIE develops detailed objectives, tasks, contents, and detailed plans of the national science and technology program and selects the most effective implementation plan. Developing projects to implement the program: For each program, MOTIE will select a program director from various sources, including academies, industries, and state research institutes. All directors are leaders in their fields. The program director is responsible for developing science and technology projects or tasks to implement the program.

2.2. China's experience

2.2.1. Building a national science and technology program framework

Since entering the reform and opening-up period, China has put forward the view on science and technology development that "Economic development must necessarily rely on science and technology, and science and technology activities must necessarily focus on economic construction". Therefore, the consistent goal in building China's national science and technology program frameworks is to coordinate research topics with economic development goals. Therefore, when building national science and technology programs, China always closely links the goals, tasks, and contents of the national science and technology program with the goals of socio-economic development. In general, China's national science and technology program system was born early and is quite stable, it is a long-term science and technology program system, implemented over 20 - 30 years. The system of science and technology programs is used by the Government as an important tool to organize and implement R&D activities, as well as to apply the results of science and technology research into practice and production. Like Korea, the basis for building the framework of China's national science and technology program is the priority direction of science and technology. In addition to the priority directions of high technology and technological innovation, the Chinese Government also focuses on investing in basic research, to build a solid foundation to overcome the weaknesses of the economy in the transition period, at the same time, expanding cooperation and exchange of science and technology research, interspersed with high technology development programs, supporting the development of new industries and putting them into use in the 21st century.

For example, the National Technology Innovation Program aims to: take enterprises as the main subject, orient the market, promote technological innovation activities from the aspects of Government, enterprises, and society, contribute to changing economic institutions and economic growth methods, promote rapid, healthy, and sustainable development of the national economy. At the same time, the Program is also built in the direction of the coordination of many sectors during the implementation process. For example, the National High-Tech Research and Development Program (Program 863) aims to develop some of the most important technology fields for economic development and high-tech development in China, aiming to narrow the gap between China and industrialized countries. From this goal, the Program has built the development content of 7 priority technology fields: automation, biotechnology, energy, information technology, laser, new materials, and space technology.

2.2.2. Subjects participating in the development of national science and technology programs

Subjects participating in the development of China's national science and technology programs can be divided into two different stages:

- In the period before 2006, with the Soviet-style policy model, the participants in the development of China's national science and technology programs focused on management agencies (Government, ministries, branches), and science and technology experts in the community (research institutes, universities);
- The period from 2006 to the present, the transition to a market-based model, accordingly, the participants in the development of science and technology policies

in general, and national science and technology programs, have expanded with many participants, including management agencies, experts in the science and technology community (research institutes, universities), representatives from the industrial sector, social organizations, individuals, and foreign organizations.

Some of the main stakeholders involved in the development of China's national S&T program are as follows:

- The Government's Science, Technology and Education Leadership Group. This group is headed by the Prime Minister with the participation of Ministers of relevant ministries related to S&T. The main function of this group is to coordinate overall and combine the development and implementation of national policies and programs on education and S&T. The organizational and operational model of China's Science, Technology, and Education Leadership Group is like the National Science and Technology Council of Korea;
- The Inter-Ministerial Joint Committee (IMJC) convened by the Ministry of Science and Technology was established after 2013. The IMJC includes the participation of the Ministry of Finance, the National Development and Reform Commission, and several other relevant ministries and branches. The IMJC is responsible for proposing the development of S&T strategies, proposing, and guiding the development of national S&T programs. Supporting the IMJC's professional activities is the Strategic Consultation and Comprehensive Assessment Committee. This committee, composed of experts from universities, government research institutes, and industry, has effectively contributed to the development of China's 13th Five-Year Plan for Science, Technology, and Innovation;
- The Ministry of Science and Technology is responsible for the overall coordination and management of S&T activities, including national S&T programs. At the same time, the Ministry of Science and Technology also plays a direct role in organizing the development of national S&T programs.

2.2.3. Method of building national science and technology programs

National science and technology programs are built using the "top-down" method. All national science and technology programs are organized and built by the Ministry of Science and Technology, except for Program 863, which is directly organized and decided by the Government. However, at each different stage, the "top-down" method of building national science and technology programs also has its distinct characteristics. From the 1950s to before 2006, this method in building science and technology policies in general and national science and technology programs bore a strong imprint of the Soviet model, with the State playing a direct and comprehensive role in promoting the development of China's important strategic priority directions. From 2006 to the present, although the approach to building S&T policies and national S&T programs is still based on the "Top-Down" method, it has been adjusted towards a market approach, clearly showing the expansion of the stakeholders participating in building national S&T programs, including management agencies, experts in the S&T community (research institutes, universities, etc.), representatives of the industrial sector, social organizations,

individuals and foreign organizations. The State still plays a leading role but not directly, but only in guiding, coordinating, and presiding over the organization of building national S&T programs.

2.3. Experience in Taiwan (China)

2.3.1. Building a National S&T Program Framework

In Taiwan, the most important requirement in building a national S&T program framework is that it must be related to technology, and innovation and contribute to industrial development. A typical example is the Biopharmaceutical Development Program. The goal of the Program is to develop precision medicine, biotechnology, and pharmaceutical research, transforming from basic research to clinical trials. With this goal, the mission and content of the Program include a wide range of activities, from research and development to commercialization, to develop Taiwan's biopharmaceutical industry. Specifically: Providing research infrastructure to develop advanced technologies in Taiwan on a new platform; providing professional high-tech services and expert advice to meet the needs of academic and industrial researchers; promoting high-quality services for users in the biopharmaceutical community; accelerating the upgrading of the biopharmaceutical industry in Taiwan.

2.3.2. Subjects participating in the development of national science and technology programs

It is easy to see that in Taiwan, the participation in the formation of national science and technology programs includes many relevant ministries and sectors, however, the role of the Government and the Ministry of Science and Technology is important, especially the participation of enterprises. Right from the program formulation, during the implementation and evaluation of the program, the roles of the parties are very clear, both are independent and are coordinated with each other to achieve the highest efficiency. The roles of some typical subjects can be mentioned as follows:

- *National Council for Science and Technology (BOST):* This is an agency established by the Government, and chaired by the Prime Minister. BOST members include all ministers related to science, technology, and innovation such as the Ministry of Science and Technology, the Ministry of National Economic and Development, the Ministry of Finance and Budget, the Ministry of Agriculture, the Ministry of Education, etc. BOST also includes selected prominent researchers and entrepreneurs. BOST plays a key role in coordinating government agencies and stakeholders on national science and technology policies and programs, deciding on priority science and technology directions, approving the National Science and Technology Development Plan, and deciding on budgetary allocation for science and technology;
- *Ministry of Science and Technology*: Responsible for reviewing the government's science and technology budget, and planning, and evaluating national science and technology programs. In addition, the Ministry of Science and Technology

also has a coordinating role among various agencies to link relevant national science and technology programs together;

- *Government research institutes*: Since major research and development institutes must play a central role in advising, planning, coordinating, and implementing programs, they often must upgrade themselves to be qualified for these tasks. Research institutes are both specialized agencies to draft projects in the program and the program implementers and in some programs, they are also coordinators and managers;
- In the development of national science and technology programs, and Taiwan's science and technology policy in general, several prestigious international experts in the fields of science and technology and high technology are invited to serve as advisors. These advisors have made recommendations related to policies as well as related to specific science and technology issues, promoted international cooperation, and gathered different opinions on Taiwan's science and technology development. With the participation of these foreign experts, the joint conference on science and technology consultation is held twice a year and chaired by the Prime Minister. This is an important and regular forum in which many ideas on science and technology policies and programs are proposed, publicly discussed, and internationally compared.

2.3.3. Method of developing national science and technology programs

Developing national science and technology programs combines the "Top-Down" and "Bottom-up" methods. There are several programs developed using the "Top-Down" method, typically the National Science and Technology program on Telecommunications in 1998. This program was implemented in 2 phases (1998-2003 and 2004-2008) to develop wireless infrastructure and broadband Internet. The results of the program laid the foundation for the coordination and division of labor between the industrial sector, the Government, and the science and technology community in the field of telecommunications technology. By 2009, the Ministry of Science and Technology had restructured the telecommunications program and renamed it the Network Communications Program, based on the accumulated results of the previous 2 phases, taking information technology and telecommunications as the basis. The objectives of the Program include ensuring compliance with the global trend of industrial integration and convergence and meeting the development needs of Taiwan's telecommunications industry.

Some national S&T programs are developed using the "Bottom-up" approach. Accordingly, research institutes, universities, non-governmental organizations, ministries, and sectors directly propose the development of national S&T programs.

3. Overview of the development of national science and technology programs in Vietnam

Currently, national science and technology programs in Vietnam include national key science and technology programs and other national science and technology programs. National key science and technology programs include science and

technology programs (abbreviated as KC) and social science and humanities programs (abbreviated as KX). Up to now, the system of key science and technology programs consists of 16 programs, including 11 KC programs and 5 KX programs. Along with the national key science and technology programs, up to now, there are over another 30 national science and technology programs managed by the Ministry of Science and Technology and other ministries and branches. Currently, some programs are going on to the final stage or are undergoing legal procedures to approve to be extended and prepare for a new phase.

Regarding the national S&T program framework of Vietnam, it is determined and selected based on national priority orientations; based on the context and practical needs. Reviewing the system of national S&T programs shows that the programs have been formed and based on the policies and guidelines of the Party and the State, based on the S&T development orientations stipulated in the socio-economic development strategy, S&T development strategy of each period. The program framework usually includes (i) Program objectives; (ii) Program contents and main tasks; (iii) Expected products of the program; and (iv) Program evaluation criteria.

Building a national science and technology program requires attracting many participants to ensure the right identification and selection of the science and technology program, which is necessary, has a scientific basis, is consistent with the priority orientation, and is consistent between the building subject and the beneficiaries of the program's results. Units participating in building a national science and technology program include specialized management departments/offices, research tasks and funding management units, and other relevant units/individuals.

The method of building a national science and technology program in Vietnam includes the following basic steps: *Step one,* based on the priority orientation in the Strategy/Plan for Science and Technology and Innovation Development of each stage as well as the guidance and orientation of the Ministry of Science and Technology, academies of sciences, national universities, and ministries, branches, etc., build a proposal of the national level science and technology program; *Step two*, these proposals will then be reviewed and commented on by the National Council for Science, Technology and Innovation and the Ministry of Science and Technology. The opinions of these two agencies are very important for implementing the next procedures in building a national science and technology program because these two organizations have the mandate to coordinate national science and technology policies and programs, specifically linking national science and technology programs with each other and between national science and technology programs and socio-economic development programs and plans; *Step three,* send the proposals for comments to relevant ministries, branches, etc. or relevant individuals. Then the proposals delivering agency will synthesize the comments, and opinions, adjust the proposals, and submit them to the Prime Minister for approval.

4. Lessons learned for Vietnam

It is necessary to affirm again that the national S&T program is a particularly important channel to realize the country's priority S&T orientations to achieve the country's priority goals. Through studying overseas experiences, we can refer to several measures to enhance the effectiveness of the building and management of national S&T programs as follows:

First, closely link the objectives, tasks, and contents of the national S&T program with the objectives, tasks, and contents of socio-economic development. Accordingly, when building the S&T program framework, the objectives, tasks, and contents of the program must always be comprehensive, both developing S&T and developing the economy and society. More specifically, the objectives, tasks, and contents of national S&T programs must both be research and development and apply the program's results to industrial production and business. To achieve these goals, the experience of China and Taiwan is to build a science and technology program framework in stages, from basic research with application orientation to technology development research, technology application in production, and finally product commercialization.

Second, priority orientation from the grassroots is the basis for determining and selecting the national science and technology program framework, overcoming the situation of scattered and ineffective investment for the program. Therefore, it is necessary to pay attention to the priority selection method in building a national science and technology program. To be able to determine priority orientations for science and technology to meet urgent national needs, some of the following suggestions can be considered: The process of determining priority orientations requires the participation of many parties from different stakeholders, representing priority areas, notably representatives of ministries, branches, business representatives and representatives of the science and technology community (research institutes, universities, associations and professional associations, etc.); The determination of national S&T priority orientations must originate from socio-economic development goals and further expand the participation of stakeholders, especially representatives from business sector in the context of Vietnam developing a national innovation system in the direction of taking businesses as the center.

Third, restructuring the national S&T program system, in which it is necessary to clearly define the roles and functions of each entity participating in the program-building process in correlation and linkage with each other, ensuring no overlap, duplication, and complementarity between different programs in the same system. Through the experiences of Korea, China, and Taiwan, the process of developing national S&T programs needs to expand the participation of many different stakeholders, especially the participation of the business community. Thanks to that, the development of national S&T programs will be more objective; The important thing is that through this, it will ensure the right identification and selection of the S&T programs, with a scientific basis, in line with the priority orientation, and unity between the program builder and the beneficiaries of the program's results.

Fourth, consider building long-term and continuous S&T programs, China's experience is that after 10 years, the Government reviews and approves to continue

or stop each program. The review and approval procedures must always be timely, ensuring that the implementation time of the programs is not interrupted.

Fifth, to form an agency with the function of overall coordination in building national S&T programs. Korea, China, and Taiwan have all been very successful in promoting the role of the overall coordination agency of national S&T programs, which is the National Science and Technology Council (NSTC) in Korea headed by the President; The Leading Group on Science, Technology and Education under the State Council in China is headed by the Prime Minister. Currently, in Vietnam, it is the National Council for Science, Technology, and Innovation, which will help guide the development of national science and technology programs, eliminate unnecessary duplication, and strengthen the connection between national science and technology programs and between national science and technology programs and socio-economic development programs.

5. Conclusion

The international experiences show that the construction of national S&T in countries is very diverse and flexible. The experiences of building national S&T programs in Korea, China, Taiwan, etc., show that although these countries have their views on building programs, they all have the goal of bringing benefits to the development of S&T and the socio-economic development of the country. In building national S&T programs in countries, there are some common characteristics in terms of the basis for the program's building, the goals of building programs, and the subjects participating in the program's building. Based on their overseas experiences, the authors have proposed some suggestions for building and managing national S&T programs in Vietnam in the coming time./.

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