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State Budget Spending on Science and Technology Activities in Vietnam

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Abstract

In recent years, the issue of state budget allocation in general and state budget allocation for science and technology activities in particular has gradually improved towards more reasonable distribution, stronger decentralization, increased autonomy, and responsibility linked to transparency and accountability. However, this

issue still faces many challenges. This research article aims to explore the content of science and technology activities and the current state budget allocation for these activities in Vietnam. It identifies the existing shortcomings in the current state budget allocation for these activities and proposes some solutions to address these shortcomings.

Keywords: Science and Technology, State Budget, Vietnam

1. Introduction

The development of science and technology is an especially important issue, long considered a top national policy and a driving force for socio-economic development. At the 11th Congress, the Congress Document clearly stated "promoting industrialization and modernization of the country linked to the development of a knowledge-based economy". Continuing to concretize the development direction, at the 6th Central Executive Committee Meeting (2012), the Central Committee continued to affirm the viewpoint that "development and application of science and technology is a top national policy and one of the most important driving forces for socio-economic development and protection of the Fatherland". At the 12th Congress, for the first time, science and technology were included in a separate section (Section VI: Development and Application of Science and Technology), not merged with other issues as in previous Congress documents. This demonstrates the importance of science and technology and our party's new awareness of their development in the new stage of our country. In the 12th Congress Document, our Party continues to affirm: "Science and technology are the most important driving forces for developing a modern productive force."

At the 13th Congress, in the new context, the Party and the State continue to elevate the role of science and technology. The Congress document considers science and technology as two of the most important strategic breakthroughs for rapid and sustainable development. The Congress resolution affirms: "Continuing to consistently implement the policy of science and technology is a top national priority and a key driving force for developing a modern productive force." This is a new and important mindset, reflecting the party's strategic vision for the role of science and technology in the country's development process.

In terms of legislation, at the 6th session of the 13th National Assembly (2013), the National Assembly passed the Law on Science and Technology. This is the first time that the party's and state's policy orientation in the field of science and technology has been formalized through the highest legal document of the state. To implement the Law on Science and Technology, the Government, the Prime Minister, and relevant ministries and agencies have issued many legal documents, such as decrees, resolutions, and circulars, to ensure its early implementation in daily life.

The recent changes in policy mechanisms in the field of science and technology have demonstrated a strong, fundamental, comprehensive, and cohesive mindset towards management mechanisms, operational mechanisms, and science and technology organizational mechanisms. However, these changes have only "removed" obstacles for science and technology during the transition phase but have not been powerful enough to "drive" science and technology activities. Therefore, alongside the achievements, our country's science and technology activities still have many limitations and have not met the requirements to serve the innovation and development of the country in the context of strong globalization, which has become an inevitable trend for the world in the new era—the era of the Fourth Industrial Revolution—with the important role of the knowledge economy.

In the management system for science and technology activities, financial management plays a crucial role. Finance serves as both a resource and a motivation for the development of science and technology. Adequate allocation and rational distribution of financial resources is just one aspect of the issue; the other aspect is to have appropriate financial management mechanisms built and implemented based on the characteristics of science and technology activities. Recently, in line with the party and state's guidelines, investment in science and technology activities, especially from the state budget, has significantly increased. Financial management mechanisms in general and budget management mechanisms in particular for science and technology activities have gradually been innovated, overcoming difficulties encountered during the implementation process. However, along with the development of the socio-economic system, the improvement of economic management mechanisms, and the increasing demand for contributions from science and technology factors to the economy, financial management mechanisms in general, and budget management mechanisms in particular, science and technology activities have also revealed many limitations and shortcomings both in theory and practice. This calls for further research and improvement to enhance the effectiveness of budget allocation for science and technology activities.

2. Theoretical Foundation

▪ Science and technology activities

The 2013 Law on Science and Technology provides an accurate definition of science and technology activities, which encompass all activities related to "scientific research, experimentation, technology development, technology application, science and technology services, innovation, and other creative activities aimed at promoting science and technology."

Science and technology activities are specific activities aimed at solving practical problems. From there, the concept of science and technology tasks is formed. Accordingly, science and technology tasks are science and technology issues that need to be solved to meet the requirements of economic and social development, ensure national defense and security, and promote science and technology development. Therefore, a science and technology task can be a basic research activity, an applied research activity, an experimental deployment, a test production, or a science and technology service aimed at solving a scientific problem.

▪ The role of science and technology activities

Science and technology drive economic growth and development. They contribute to the efficient discovery and exploitation of resources, enabling a shift from broad to deep development models.

Science and technology drove the structural transformation of the economy towards progress, with the proportion and position of GDP in the industrial sector and especially the proportion of the service sector increasing while the proportion of agriculture decreased. Science and technology change the production structure, leading to the emergence of new industries and fields. In developed countries, the contribution of TFP to GDP growth is usually high, around 50%; for developing countries, it is about 20–30%. (A. Le Peng Cheng, 2010)^[4].

Science and technology enhanced the competitive capacity of businesses and the economy. A country with strong science and technology capabilities will be highly competitive internationally. Technological innovation is one of the fundamental criteria for ranking the competitive capacity of businesses and countries. The application of science and technology progress improves the efficiency and effectiveness of input factors, especially synthetic factors, expands production and consumption scales, creates new markets, focuses on exports, and increases competitiveness in the international and regional markets.

▪ The state budget for science and technology activities

According to the State Budget Law of 2015, "the State Budget is the total revenue and expenditure of the State that is estimated and implemented within a certain period of time, decided by the competent state authority to ensure the fulfillment of the functions and tasks of the State." From a political-economic perspective, state budget expenditure is the process of redistributing concentrated financial resources into the state budget and allocating them for specific purposes. State budget expenditures are classified according to various criteria. In terms of nature, state budget expenditure mainly consists of investment and development expenditure and regular expenditure; in terms of factors, state budget expenditure includes payment of salaries, wages, purchase of assets, provision of services, etc.; in terms of sectors, state budget expenditure includes administrative management expenditure, social security expenditure, national defense and security expenditure, and expenditures for various sectors such as education and training, science and technology, culture and sports, etc. Therefore, within the sectors of state budget expenditure, there is a sector for science and technology expenditure.

▪ The state budget allocates funds for science and technology activities, including:

Investment in science and technology development: Investment in science and technology development is an irregular expenditure aimed at building infrastructure and technical facilities for science and technology organizations, regardless of their economic composition. Investment in science and technology development.

Regular expenses for science and technology are recurring, periodic annual expenditures such as expenses for carrying out science and technology tasks.

▪ The role of the state budget in funding science and technology activities

Science and technology are the key focus of the state budget. The government plays a role in promoting science and technology activities and fostering innovation based on resources, including the state budget.

However, the role of the state budget in science and technology varies in each country and period. In developed countries, investment in science and technology from the state budget serves as a catalyst and promoter, so the proportion of state budget expenditure for science and technology is only about 15-20% of the total national expenditure. In developing countries, this proportion is much higher. The reason is that the resources outside the state budget for science and technology in these countries are still very limited, while the demand for investment in

science and technology is high. Along with the development of the economy and the strength of enterprises, this trend will gradually change in the opposite direction, with a decrease in the proportion of state budget expenditure and an increase in expenditure from external sources. However, regardless of whether the proportion is high or low, state budget expenditure still plays a very important role in the development of science and technology in all countries for essential science and technology fields, especially in basic research.

Table 1: Total expenditure on science and technology in some countries around the world

Unit: Million Dollars

Country	Total R&D expenditure	R&D expenditure/GDP(%)
EU (2018)	430.121	2.03
USA (2017)	581.553	2.83
Russia (2018)	41.505	0,99
China (2018)	465.162	2,19
Japan (2018)	171.294	3,26
Korea (2018)	98.451	4,53
Singapore (2018)	10.531	1,84
Malaysia (2018)	9.250	1,44
Thailand (2017)	12.078	0,78
Vietnam (2019)	4.297,76	0,53

Source: Ministry of Science and Technology, Science and Technology Bulletin and Vietnam Innovation 2020

Principles of management of state budget expenditures for science and technology activities

The state budget for science and technology activities is part of the state budget; therefore, the implementation of the management mechanism of the state budget for science and technology activities needs to meet the basic principles of state budget management.

- The management of the state budget in general and the state budget for science and technology activities in particular must ensure the principle of overall financial balance.
- The management of the state budget for science and technology activities must ensure minimum requirements for funding science and technology activities and fulfill expenditure commitments.
- The management of the state budget for science and technology activities must ensure efficiency in resource allocation and promote science and technology institutions to provide high-quality science and technology products.
- The management of the state budget for science and technology activities must promote the socialization of science and technology activities and gradually reduce and eliminate state subsidies for science and technology activities.
- The management of the state budget for science and technology activities must ensure financial discipline.
- The management of the state budget for science and technology activities must ensure transparency and accountability.

2. Research Methods

The analysis and synthesis method is used to analyze the results and evidence obtained during the research process and then synthesize and present the main argument.

The classification and system method is used to classify the

collected information based on specific criteria, systematize it, and draw conclusions.

The method of summarizing previous scientific research experience is used to gather results from previous studies, providing a foundation for the research in the article.

Data collection: The secondary data source includes data from the Ministry of Finance and the Ministry of Science, Technology, and Environment. Additionally, the research utilizes data from published research projects.

2.1 The Current Situation of Science and Technology Activities and State Budget Allocation for Scientific And

▪ The results of science and technology

In the process of innovation, science and technology activities have received special attention from the party, the state, management agencies, businesses, and society as a whole. As for science and technology activities themselves, they have undergone significant changes in all aspects, making practical contributions to socio-economic development, improving people's quality of life, and strengthening national defense and security. The development of science and technology activities in our country in recent times has been demonstrated through the following activities:

- The national science and technology capacity is increasingly developing. In the past, the country had a very limited number of research institutions and a small number of research personnel. But now, the country has over 4,000 science and technology organizations, 3 national high-tech zones, 13 high-tech agricultural application zones, and 8 information technology-concentrated zones. The number of research personnel has reached approximately 67,000. The research infrastructure in many fields continues to be strengthened.
- Vietnam's science and technology level significantly improved, with science and technology contributing more and more to the economy and society in various fields. The social sciences and humanities have provided profound arguments for the party and state's economic and social development orientations. Natural sciences, engineering, and technology have actively contributed to enhancing productivity, quality, and the growth rate of the economy, creating a new position and strength for the country. The application of high technology and the development of value-chain-based products have been promoted in agriculture and industry. The contribution of total factor productivity (TFP), particularly labor productivity, to GDP growth has reached 45.7% in the period 2016–2020, much higher than the average of 33.6% in the period 2011–2015. Labor productivity alone increased by an average of 5.88% per year from 2016 to 2019. The science and technology factors contribute over 30% of the value added in agricultural production, 38% in crop production, and animal husbandry. Domestic scientists have mastered the technology for designing and constructing various large-scale projects such as hydroelectric plants, underground works, high-rise buildings, cable-stayed bridges, and international standard highways; they have also mastered many advanced techniques in healthcare. Many scientific works have been highly regarded both domestically and internationally. The number of international

publications by Vietnamese scientists has increased by an average of 26% per year. In particular, within the university system, the number of international scientific publications by higher education institutions has tripled compared to seven years ago. This result affirms that Vietnam's research capacity has significantly improved at universities. As a result, Vietnam's position in the ranking of innovation capacity has continuously increased, reaching 48th out of 132 countries in 2022, ranking second (after India) among low- and middle-income countries.

- Science and technology activities were not limited to the state sector but had spread to businesses and the community. In this context, investment from businesses in science and technology is increasing significantly. Advanced industrial technology research institutes have been established both in the state and private sectors, such as the V-KIST Institute and VinGroup's research institutes on big data and high technology. The technology market and innovative startup ecosystem are thriving, with an improving system of intellectual property rights, standards, measurements, and quality. This creates a favorable environment for businesses and encourages the emergence of thousands of potential growth startups.
- The legal framework, mechanisms, and policies for science and technology management are being innovated to align with international standards and create an increasingly favorable environment for research and innovation. Administrative management practices are gradually being eliminated, replaced by flexible funding mechanisms and transparent expenditure control. Research tasks are being linked to practical applications and the market, with a commitment to autonomy in science coupled with accountability. Encouragement is given to businesses to establish research institutes and invest in science and technology. Talented scientists are being recruited based on specific target groups.
- In terms of scientific research and technology, the country has established a wide network of research institutions, especially those belonging to ministries, sectors, localities, and universities. Among them are two major science and technology institutions: the Vietnam Academy of Social Sciences and the Vietnam Academy of Science and Technology. Science and technology activities are managed by a system of state management agencies and associations. At the central level, there is the Ministry of Science, Technology, and Environment, while at the local level, each province and centrally governed city has the Department of Science, Technology, and Environment.
- The training of scientific personnel was highly valued by the state, as evidenced by various projects and initiatives. The Ministry of Education and Training has implemented Project 911 (doctoral training for higher education institutions and colleges) from 2010 to 2020; Project 89 is being implemented from 2021 to 2030. The basic objectives of these projects are to enhance the scale and quality of doctoral training for university and college lecturers through three methods (full-time training abroad, domestic training, and collaborative

training). The project was launched in August 2011 and has trained 5,988 research students (2,926 research students abroad and 2,062 research students domestically). Along with the Ministry of Education and Training, other ministries also have doctoral training programs, such as the Biotechnology and Aquaculture Program of the Ministry of Agriculture and Rural Development, with a goal of training 60–80 new doctors; however, in reality, the project has only sent 168 people to pursue doctoral studies, with 70 of them being lecturers.

In summary, science and technology activities in recent times have undergone positive and comprehensive transformations, making significant contributions to the country's development in both theory and practice. They have been highly appreciated by the party, the state, and society, as well as recognized by the international community.

2.2 The Current Situation of State Budget Allocation for Science and Technology Activities in Vietnam

State budget allocation for science and technology activities has gone through several stages (2001–2005; 2006–2010; 2011–2015; 2016–2020; etc.), each with its own characteristics and results.

The period from 2016–2020 and the two years 2021–2022 are relatively stable in terms of policies and regulations in the field of science and technology, as well as investment from the state budget for science and technology activities. However, according to the Law on Public Investment (effective from the 2017 budget year), this period marks the transfer of autonomy in resource management from the state budget to science and technology activities between central and local levels. Accordingly, the National Assembly only allocates the total investment capital from the State Budget without allocating detailed funding for each specific sector as before. Therefore, since 2017, it has not been possible to calculate the total investment capital for science and technology activities nationwide, as well as the total investment resources from the state budget for science and technology activities. As for regular expenditures, during the period of 2016–2020, the state budget always allocated higher funding for science and technology activities in the following year compared to the previous year. If in 2016 it was 10,471 billion VND, then in 2020 it will increase to 14,042 billion VND. In five years, a total of 60,771 billion VND was allocated from the state budget, with an average annual increase of 6.9%. Of which, national science and technology programs received 47,670 billion VND, accounting for 78.4%, while local budgets received 13,101 billion VND, accounting for 21.6%. However, in 2021–2022, due to the impact of the COVID-19 pandemic, the investment resources from the state budget for science and technology activities have not grown proportionally to the overall increase in state budget expenditures. In these two years, although the total state budget expenditures are basically equal to those of 2020, the allocation for science and technology has decreased to the level of 2016–2018, mainly in terms of regular expenditures for science and technology activities at the central level (national-level and ministry-level science and technology expenditures)

Table 2: State budget for science and technology activities in the period 2016-2020

Unit: Billion VND						
Targets	2016	2017 (*)	2018	2019	2020	2016 – 2020
I. Total State Budget Expenditure	1.237.200	1.390.480	1.523.200	1.633.300	1.787.950	7.572.130
Science and technology expenses						
1. Development investment expenses						
2. Operating expenses	10.471	11.243	12.190	12.825	14.042	60.771
Central	8.121	9.380	9.440	9.895	10.834	47.670
Local	2.350	1.863	2.750	2.930	3.208	13.101
3. The State budget provision expenses	1.800	1.800	1.800	1.800	1.970	9.170
II. Tax incentives expenses	4.000	4.000	4.000	4.000	4.000	20.000

Source: Institute of Strategy and Financial Policy, Ministry of Finance

Table 3: State budget for science and technology activities in the years 2021-2022

Unit: Billion VND		
Target	Year 2021	Year 2022
Total state budget expenditure	1,687,000	1,786,600
Allocate funds for Science and Technology.		
1. Invest in development (at the central level).	3.047	4.291
2. Regular expenditure.	10.838	12.331
- At the central level.	7.732	9.136
- Locally	3.106	3.195
3. From tax incentives	4.000	4.000

Source: Institute of Strategy and Financial Policy, Ministry of Finance

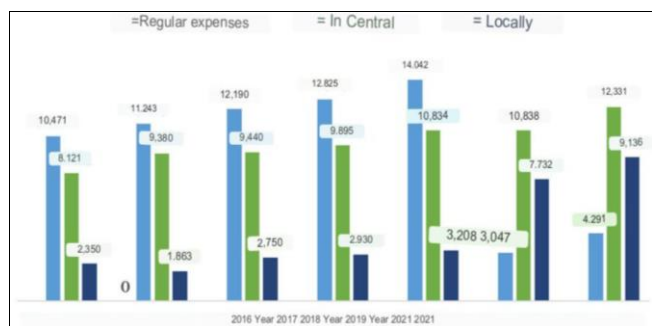


Chart 1: Regular expenditure of the State budget for science and technology activities in the period 2016-2022

2.3 General Comments on the State Budget for Science and Technology Activities in Recent Times

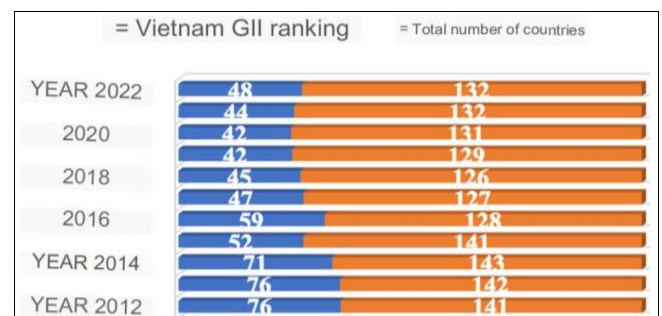
If we include the state budget for science and technology activities in defense and security, especially and from the income tax-exempt sources of enterprises as regulated, the total state budget expenditure for the science and technology sector basically ensures 2% according to the Resolutions of the Central Committee. The budget for science and technology increases annually at the same rate as the total state budget.

Every year, based on the proposal of the Ministry of Science and Technology, the Ministry of Finance consolidates and submits to the Prime Minister for presentation to the National Assembly for budget allocation for ministries, sectors, central agencies, and localities for funding science and technology activities (career expenses); the Ministry of Science and Technology coordinates with the Ministry of Planning and Investment to submit to the Prime Minister for presentation to the National Assembly for allocation of capital for investment and development for ministries, sectors, central agencies, and localities.

International comparisons show that Vietnam has great potential for developing science and technology capabilities

and fostering innovation, but it has not been optimally invested in. Encouragingly, the development of science and technology has contributed to enhancing Vietnam's position on the international stage, as evidenced by its improved ranking on the Global Innovation Index (GII). In 2022, Vietnam's GI ranking increased to 48 out of 132 countries and economies, rising 11 places from 2016 and 28 places from 2012. Currently, Vietnam ranks second among the group of 29 countries with similar low average incomes (after India) and third in ASEAN after Singapore and Malaysia in terms of the GI. The high innovation performance coefficient helps improve the GI ranking, indicating that when more investment is made in science and technology activities, the country will benefit from the strong potential of this field. Although Vietnam's investment in R&D is still relatively low compared to other countries, there has been significant improvement in total expenditure on research and development, increasing from 0.37% of GDP in 2013 to 0.53% of GDP in 2020.

So, it can be said that over the past 20 years, the state budget for science and technology activities has truly undergone significant changes, exerting a powerful impact on the development of the science and technology career.



Source: Institute of Strategy and Financial Policy, Ministry of Finance

Chart 2: Ranking of Vietnam's GI over the years

2.4 Limitations and Solutions

Limitations in terms of resources. The main source of investment for R&D is still the state budget. However, due to its small scale, the balancing capacity of the state budget cannot meet the requirements of the approved science and technology tasks.

The budget for science and technology activities is not fully established, and the allocation of funds is not appropriate. There is no effective, clear, and transparent mechanism for budgeting and allocating regular funding for science and technology between the National Science and Technology Program and the National Socio-Economic Development Program.

In the management of the state budget, this "phase shift" phenomenon occurs at every stage of science and technology tasks, from task determination; selection and direct assignment; appraisal (content and finance); contract signing; advance funding; and final settlement. It also affects all management agencies (ministries, organizations, and localities), program offices, implementing organizations, and task leaders. This phenomenon is quite common in most activities that use the state budget because the budget year starts on January 1st and ends on December 31st of the Gregorian calendar. However, many activities and tasks that use funding from the state budget have start and end dates that do not coincide with the budget year (Gregorian calendar year) and can even extend over several years, such as construction investment projects.

3. Solution

1. Diversify financial investment sources for science and technology activities.

To enhance investment resources for science and technology, we should not rely solely on the state budget, as this funding is limited, but also encourage investment from businesses.

2. Implement expenditure commitments, ensuring the ability to balance the STATE BUDGET to meet the requirements of approved science and technology tasks and enhancing the effectiveness of managing expenditure from the STATE BUDGET for science and technology activities.

In order to enhance the effectiveness of managing the state budget for science and technology activities, the first issue is to address the issue of dispersion. The selection and assignment of research tasks should be based on budgetary capabilities. After deciding on the topics and plans, it is necessary to promptly and adequately allocate funds according to the schedule. While the budget for science and technology investment is limited, there should be regulations controlling the number of state-funded science and technology projects and limiting the maximum state budget expenditure. The authorities responsible for approving research tasks need to determine the funding sources before approving the tasks and budget estimates.

3. Distinguish between the state budget for management activities and the state budget for science and technology tasks.

The operational expenses of the agency or management unit include salary expenses, administrative expenses, the organization of workshops, interim and final evaluations, etc. of the science and technology management agency. These expenses have a stable annual nature and are less dependent on fluctuations in the number of tasks or budget for task implementation. As for this budget, it should be implemented according to the autonomous mechanism of public science and technology organizations in determining it. Accordingly, it is necessary to determine the annual state budget amount, which facilitates stable operations for the units.

4. Improve the legal system and address the overlap in science and technology management

Review the program and quantity of national-level science and technology projects and provide specific guidance on financial management mechanisms for special science and

technology tasks. Scientific management agencies need to study and issue specific, clear criteria, reform the selection process, determine, assign, approve, and evaluate science and technology tasks, especially national-level tasks, to ensure they are suitable for requirements and capabilities at each management level.

4. Conclusion

The reality shows that countries with strong economic development have particularly advanced science and technology. In order for science and technology to fulfill their important role, the state budget for science and technology activities must constantly be improved to meet management requirements in each stage of development, especially in the current industrial revolution.

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