

POLICIES ON THE DEVELOPMENT OF SCIENCE AND TECHNOLOGY POTENTIAL RESOURCES IN UNIVERSITIES IN VIETNAM

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Abstract:

Currently, universities in Vietnam are the home of a large number of S&T institutions, which are both a hub of a huge amount of high-qualified S&T expertise and the provider of S&T human resources to serve the socio-economic development of the country. Strengthening the S&T potential resources for S&T activities in universities is an important measure to support universities to operate their assigned functions in the best manner. The paper analyzes the current state policies on developing S&T potential resources in universities and some additional policies proposed to develop S&T potential resources in universities in the coming period.

Keywords: *S&T potential resources; S&T policies; Universities.*

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1. The concept of S&T potential resources

The book of “The key issues of scientific and technical policies” (*Y.de Hemptinne², 1987*) highlighted that, in order to be well operated, the national scientific and technical system requires the resources³ such as human resources, financial and physical resources (infrastructure and equipments) and information resources, which have always to be ready to be mobilized (i) at the time while needed; (ii) with the sufficient amount; (iii) at the proper proportion between these resources.

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³ Natural resources are not discussed on this article because they only take part in the level of production of wealth and services, they do not constitute the input of national scientific and technical system, definition of UNESCO, page 26.

S&T potential resources perform the practical capacities on the S&T's strength, quality and its effectiveness. They include all organized resources that the society could mobilize for S&T activities (*Tang Van Khien, 1997*). These resources are performed in the following basic forms: S&T human resource, financial resource (funding for S&T), S&T physical resource (infrastructures, equipment, S&T public facilities); information resource (information, scientific literature,...); and the resource of "the organizational structure of the S&T system" (the capacity of the S&T organization and management system). The fifth resource is considered as a performance for the strength and the effectiveness of the structural S&T organization framework on its ability to organize, operate and deliver S&T tasks that are assigned for each period. This resource is a new concern that has been discussed in the recent period.

In order to unify the concept of S&T potential resources in service of scientific research and S&T surveys, the Government issued Decree No. 99/2014/ND-CP dated on 25th October 2014, in which the S&T potential resources include: S&T human resource; intellectual property; physical facilities, laboratories, equipment; financial resource for the implementation of S&T tasks (Article 3 of Decree No. 99/2014/ND-CP).

2. The policies to develop S&T potential resources in universities in Vietnam

2.1. The policies to develop S&T human resources in universities

2.1.1. Policies on training

Right after the reunification, the Party and the Government have issued a number of documents and policies to develop S&T human resources in the aim to the development of S&T itself as well as to the contribution for socio-economic development.

Domestic PhD degree trainings were first allowed by the Decision No. 224-TTg signed by the Prime Minister dated on 24th May 1976 regarding to postgraduate trainings in the country. Master degree trainings have recently included to the education system of the country since 1991 with the Decision No. 55-HĐBT dated on 09th March 1991 on the establishment of higher education in the national education system.

The objectives of postgraduate training were clearly stated in the Educational Law No. 38/2005/QH11 dated on 14th June 2005 and the Regulations on postgraduate training, which were "...to build an aggregation of scientists, who are political qualified, moral, conscious of serving the

people and highly qualified that meet the requirements for socio-economic and S&T development of the country”. “... A graduated master degree must have solid expertise, practical capacities and high adaptability to the development of science, technology (S&T) and the economy, with the capability of detecting and tackling specialized issues in their trained major. A graduated PhD degree must have a high expertise in both theories and practices, with creativity and independence in research, and are capable of guiding scientific research and professional activities to detect and solve the S&T issues” (Article 2). These objectives of postgraduate trainings were fully consistent to the aim of forming the aggregation of highly qualified scientists who are able to create high qualified S&T products.

In order to meet the needs of training for qualified expertise as well as to meet the demand to catch up S&T progress worldwide, the Prime Minister signed Decision No. 322/QĐ-TTg dated on 19th April 2000 on the approval of the Project “Training for scientific and technical staffs in oversea facilities by using the State budget” (so-called **Project 322**). The targeted trainees for the Project 322 were *lecturers in the faculties, scientific and technical staffs and managers, those working at universities, scientific research institutes, national key laboratories, high-tech centers...* From the year 2000 to the date of 31st October 2011, the Project has assigned 5,467 people to study abroad.

With the aim to develop S&T human resources for the economic development of the provinces in Mekong Delta, the Government has allowed the Mekong Delta provinces to deduct the funds from the local budget to implement the trainings of S&T human resource development for the Mekong Delta provinces. The scheme has been established since 2005, so-called the **Mekong Program 1,000**, with a target of training for 1,000 abroad scientific and technical postgraduates for 13 provinces of the Mekong Delta with a focal point of Can Tho University and a total budget of about 50 million USD.

With the aim of increasing in the number of doctoral degrees with professional capabilities on research, teaching and advanced university management for lecturers at universities and colleges as well as capacity building and quality improvement of doctoral degrees who graduated in the country, enlisting and strongly promoting international cooperation in education and training, contributing to quality improvement of education and scientific research in universities, the Prime Minister has approved the Project for training lecturers with PhD degree qualification for universities and colleges in the period of 2010-2020 (Decision No. 911/QĐ-TTg dated on 17th June 2010 by the Prime Minister, referred as **Project No. 911**).

To meet the requirements of industrialization and modernization in conditions of socialist-oriented market economy and international integration, at the 8th Central Conference of Party Central Committee XI, a Resolution on fundamentally and comprehensively innovating education and training (Resolution No. 29-NQ/TW dated on 11th April 2013) has been approved. The Resolution has outlined specific goals for higher education, which aims “to focus on the training of highly qualified personnel,... trainings that are responded to the needs of technological development and the development of sectors,...”; therefore, the tasks assigned for the development of teaching staffs are also very specified, such as “to develop a clear planning for training of lecturers that is tied to the demand on socio-economic development... The lecturers at universities and colleges require to obtain master degree or higher; and they have to be trained and regularly retrained their professional ability...”.

To concretize these guidelines of the Party, the Government issued an action plan to implement the Government's Resolution No. 29-NQ/TW (Resolution No. 44/NQ-CP dated on 09th June 2014). For the development of S&T human resource in universities, the government will “proceed building and implementing programs of training for lecturers at higher education institutes in order to meet the requirements of educational innovating”, “Develop expert teams and leading educators at all educational and training levels that are consistent with Vietnamese conditions and gradual international integration...”, “Build capacities on scientific research for lecturers, staffs and researchers at higher and professional education institutions”.

In particular, Decision No. 2469/QD-TTg dated on 16th December 2016 of the Prime Minister further confirmed the policy of the Party and the State on the capacity building for lecturers and researchers in higher and professional education institution in the period of 2017-2025, through the synchronous implementation of the two projects: (i) Training of lecturers with doctoral degree qualification for universities and colleges and (ii) Training and fostering S&T human resource both inland and abroad by using the state budget. It means that in addition to the Project No. 911 as mentioned above, lecturers and researchers will continue being supported to capacity building through other schemes.

Also, through protocols between the governments, various scholarship programs, many Vietnamese scientists and researchers have had many opportunities for learning, researching and participating on researches overseas.

2.1.2. Policies on recruitment and utilization of human resources

Recruitment and appointment of S&T human resources

The principles on recruitment and utilization of lecturers and S&T human resource in universities specified in the Resolution 29-NQ/TW are that the recruitment and utilization “have to be based on capacity assessment, professional ethics and task effectiveness... the mechanism of dismissing, assigning another jobs or resolutely rejecting off the fields would be applied for those who are insufficient in quality and capacities to meet requirements of the assigned tasks”.

The Decree No. 40/2014/ND-CP issued the preferential policies for individuals working on the field of S&T, irrespective of those within the university or outside the university, as specified as: To be exceptionally appointed to a higher scientific or technological titles without the promotion exam, regardless of seniority (Article 6). To raise salaries at least one level in the pay scale for those that obtain achievements in S&T activities (Article 7). Young talented scientists are considered to be exceptional recruited to work in public S&T organizations without entrance exams (Article 24).

Prolonging working duration after the retirement age

The guideline on the extension of working duration and the regulations on reasonable retirement age for highly qualified personnel in higher education institutions were mentioned in the Resolution No. 29-NQ/TW. Concretizing these guidance of the Party, the extension of working duration to high qualified S&T human resource has stipulated in Article 9 of Decree No. 141/2013/ND-CP and Article 9 of Decree No.40/2014/ND-CP. The legislation issued the provisions that those who are a professor, an associate professor; those who hold the scientific and technological title Level 1 with doctoral degree qualification; those who hold the scientific and technological title Level 2 with doctoral degree qualification⁴ (including S&T human resource in universities) could extend his/her working duration after the retirement age if he/she is in sufficient health condition for working and the organization has the demand on his/her contribution and agrees to extend the contracts.

2.1.3. Policies on incomes and salaries

On incomes

⁴ Job titles in the field of S&T were issued in the Joint Circular No. 24/2014/TTLT-BKHCN-BNV dated on 01st October 2014.

Income policy for S&T personnel have formed very early, especially after the Reform period (1986). Experiencing a long way for nearly two decades, after the Law on S&T was issued with a number of documents guiding the Law as well as other policies on incomes of S&T human resource, many great progress has been recorded.

Decree No. 81/2002/ND-CP dated on 17th October 2002/10/2002 of the Government on detail regulations on the implementation of some articles of the Law on S&T in 2000 has issued that “The revenues from the transfer of R&D results will be divided to the scientists who produce the results, to the results’ owner, to the scientists’ S&T organization and to the brokers. The divided rate was agreed upon in the S&T contract between these parties. (Article 33, paragraph 3).

The Intellectual Property Law No. 50/2005/QH11 dated on 29th November 2005 has stipulated that the authors of invents, industrial designs, designs of integrated semiconductor layouts which were granted protection titles and used state budget for research will receive the minimum remuneration equals to what the IP owner must pay to the authors (Article 135, paragraph 2).

The Technology Transfer Law No. 80/2006/QH11 dated on 29th November 2006 has stipulated rate of distribution of income from technology transfer activities generated by the state budget (Article 42, Article 43).

To concretize the resolutions of the Party and the Government⁵, Decision No. 2469/QD-TTg provided regulations on the revision of policies to create favorable conditions for educational institutions in the management, exploitation and benefit division from the intellectual properties generated from R&D activities.

On salaries

The guidelines and policies for salaries of lecturers and S&T staffs at universities were outlined in details in the Resolution No. 29-NQ/TW and the Resolution No. 44/NQ-CP. Lecturers' salaries are prioritized at the highest rank in the pay scale system in the domain of administrative careers with extra allowances depending on the nature of work or regional areas; seniority allowances are calculated on the teaching duration. In particular, salary policies are to encourage and attract high qualified human resources in education and training sector.

⁵ Resolution No. 20-NQ/TW dated on 11th January 2012, Resolution No. 46/NQ-CP dated on 29th March 2013, Resolution No. 29-NQ/TW dated on 11th April 2013 and Resolution No. 44/NQ-CP dated on 09th June 2014.

In addition to the provisions in Decree No. 99/2014/ND-CP, S&T human resource and lecturers in higher education institutions are also entitled to the policies stipulated in Decree No. 40/2014/ND-CP (Article 7), in which those who are appointed S&T titles in public institutes and carry out S&T activities could raise their salary no more than two levels in the pay scale of the same class title and no more than two times continuously.

At the same time, Decree No. 40/2014/ND-CP has issued that leading scientists could receive monthly preferential supports that equal to 100% of their current salary (Article 18); the scientists who are assigned to particularly important national level S&T tasks could receive the salary that is equivalent to senior experts Level 3 with monthly preferential supports that equal to 100% of their salary prior to being assigned to these tasks (Article 21).

On income tax

Lecturers in higher education institutions are entitled to personal tax incentives to the income raised from the R&D contracts in the prioritized or key areas or from the contracts carried out in the mountainous, remote and extremely difficult areas as identified in specified legislative provisions (Article 10, Decree No. 99/2014/ND-CP).

2.1.4. Policies to honor and reward

In order to timely motivate and encourage S&T staffs to promote their creativity and the application of S&T achievements into production and daily life, the Party and the Government have issued many forms of awards to honor the S&T personnel who have many outstanding achievements in S&T activities. Rewarding S&T staffs is not only to honor to the achievements that are creative, hard-working and meticulous of the awarders given the acknowledgement of the collective and the social, but also to cheer and encourage others striving to win these awards; rewarding would be a propaganda to all social classes on meriting policy of the country, creating a lifestyle that appreciates talented people.

The current rewarding system involved to S&T in Vietnam includes: Ho Chi Minh Prize in S&T for especially outstanding S&T projects; National Award for S&T for outstanding S&T projects; Medal “for the S&T career” for those working in the field of S&T and made great contributions to the S&T career; Vietnam Fund for Scientific and Technological Creations (VIFOTEC) for ideas, technical innovations, rationalized and creative production solutions with high value applications; Ta Quang Buu Award that is held annually by the Ministry of Science and Technology (MOST) to

encourage and honor the scientists who have outstanding achievements in basic research in the fields of natural sciences and engineering, contributing to the integration and development of S&T in Vietnam; Kovalevskaja Prize that is the prize for those individuals, groups of women who have outstanding achievements in research and scientific applications in Vietnam.

2.1.5. Policies that create favorable environmental and working conditions

In general, individuals working on S&T activities are provided favorable working conditions:

- Vehicles, equipment, materials, experimental laboratories and other necessary conditions are funded from function-based activities of S&T organizations in order to carry out the assigned S&T tasks (Article 8, Decree No. 40/2014/ND-CP);
- Information access and S&T database to carry out the task (Article 8 of Decree No. 40/2014/ND-CP);
- Depending upon the scientists' title (either scientific, technological Class 1 or young talented scientists,...), the scientists are considered to have financial supports in using specialized key national laboratories or interdisciplinary laboratories to carry out the S&T tasks (Article 8 of the Decree No. 40/2014/ND-CP; Article 10 of the Decree No. 99/2014/ND-CP).

2.1.6. Other policies for S&T activity encouragement

The Resolution No. 29-NQ/TW has mentioned on “the policies that support young lecturers on accommodation, on learning and scientific research to ensure equality between lecturers in public and non-public universities on honoring and training and professional fostering opportunities, to create conditions for oversea Vietnamese experts to participate in teaching and research in educational and training institutions in the country”.

The Resolution No. 44/NQ-CP on the “development of mechanisms to encourage scientific researchers involved in teaching and teachers involved in scientific research”, “building mechanisms and policies to send Vietnamese experts and lecturers abroad for improving teaching and scientific research skills...”. Besides of policy incentives for S&T human resource in general as stipulated in Decree No. 40/2014/ND-CP, lecturers in universities who could produce publications of scientific research results are also entitled to the following incentives:

- To be considered for financial supports: to participate in national and international scientific conferences; to publish the S&T results on

reputable international scientific journals; and to register IPR protection in the country and abroad for patents and plant seedlings (Article 8 of Decree No. 40/2014/ND-CP);

- To be awarded an amount of bonus payment that does not exceed 30 times of the base salary for 01 publications in the prestigious international scientific journals in the category of ISI, SCI and SCIE; to be supported by 50% of the registration fee of copyright protection; to be considered for financial supports to participate in national and international conferences and symposiums in the fields of their expertise (the source of funding comes from the state budget for S&T as estimated and assigned to higher education institutions) (Article 10, Decree No. 99/2014/ND-CP).

2.2. The policies on financial investment for scientific research activities in universities

The policies on financial investment for scientific research activities in universities are also within the framework of financial investment policies for S&T in Vietnam in general. The sources of funding for scientific research activities in Vietnamese universities are primarily through a number of channels: the funding for scientific research activities as prior planned to the line ministry; S&T key programs; S&T independent national level projects; S&T Development Fund. In addition, other sources of funding for scientific research activities in universities also come from student tuitions, foreign sponsorships and aids from inland and abroad individuals and organizations,...

Applying current policies, every year, scientific research activities in public universities are granted by the line ministry through S&T missions at all levels in the forms of projects as plans approved.

The funding sources from the S&T development funds at national, sectorial and local level: These funding can be considered suitable financial for scientific research activities in universities in the context of globalization. There has currently been a number of S&T funds for scientific research activities in universities, such as the National S&T Development Fund (established on 22nd October 2003 under the Decree No. 122/2003/ND-CP) with the function of sponsoring and lending to carry out S&T tasks as proposed by individuals and organizations.

Recently, the Decree No. 99/2014/ND-CP has given the regulations that tertiary education institutions yearly spend a minimum 3% of funding from tuition fees of students to carry out scientific research activities (Article 12).

2.3. The policies to develop S&T infrastructure, equipment and information resource in universities

With the aim of contributing to the development of S&T potential resources in Vietnam in general and the S&T potential resources in universities in particular, the Government have paid attention to investment on infrastructure facilities, equipment, laboratories,... to many universities. Many line ministries have had the projects that focused to upgrade infrastructure and equipment for the universities (including foreign loans projects). Some universities have invested on books, textbooks, magazines, on building reading rooms, libraries, computer rooms, on upgrading the ability to access and search for online international research materials in order to build capacity on training and scientific research, simultaneously connected to worldwide R&D organizations and higher education institutions.

The Government has issued many policies on investment in constructing and developing of the national key laboratory system (up to now, there have been 16 laboratories that was invested in construction, in which many laboratories are located within the universities) (Decision No. 850/QD-TTg).

In order to improve the capacity of scientific research institutions, in which priorities on investment are put on focal point scientific research institutions, key laboratories in universities, the Prime Minister has issued the Decision No. 711/QD-TTg.

Infrastructure for universities have been strengthened by: supporting the universities on land policy; creating conditions for universities to actively exploiting these resources invested to renovate their technical facilities and equipment; capacity building and improving the quality of library activities in universities; forming an online library system that connects neighboring universities at local, regional and national scale; establishing a global information network and expanding international exchanges for all universities and colleges in the country; building several key national laboratories belonging to key leading universities and schools (Decision No. 121/2007/QD-TTg and Decision No. 37/2013/QD-TTg).

The management and development of S&T information have been also strengthened (Decree No. 11/2014/ND-CP) by: Building national key laboratories and laboratories that are specialized, interdisciplinary and modernized; Building the system of libraries, magazines, information infrastructure and databases on S&T; Purchasing intellectual property, copyright, S&T database access overseas; Purchasing technologies,

supporting the transfer of technology imported from abroad as regulated by legislative provisions (Decree No. 99/2014/ND-CP).

The issue of infrastructure investment for universities has been continued to be emphasized in Decision No. 2469/QD-TTg. To develop and implement the supporting plans for strengthening and upgrading equipment for scientific research and technological development in the educational institutions; Priorities of upgrading and supporting are given to the educational institutions that have strong human resources in research and technological application and that achieved many achievements in scientific research and technology transfer. To develop mechanisms to encourage the development of joint labs between the educational institutions and local and foreign partners... To develop information infrastructure and S&T databases to support scientific research activities.

2.4. To encourage investments on potential resource development and scientific research at universities

In recent years, the encouragement and investment incentives on S&T potential resource development in universities in Vietnam have been reflected in the following policies: To prioritize investment in the construction and development of “key universities” (Decision No. 47/2001/QD-TTg dated 04th April 2001 of the Prime Minister).

Encourage the establishment of universities and the attraction of reputable foreign universities to joint linkages or build a division, local campus or organize training programs of S&T human resource in Vietnam (according to Decision No. 272/2003/QD-TTg dated 31st December 2003 of the Prime Minister).

Focus on investment in building world-class or key universities under Decision No 121/2007/QD-TTg dated 27th July 2007 of the Prime Minister.

Improve in quality and efficiency of research and S&T application, particularly educational science and management science (Resolution No. 29-NQ/TW). Focus on the investment for capacity building, quality improvement and operational efficiency of national educational and scientific research institutions. Improve the quality of research staffs and educational experts. Be closely linked between training and research, between training institutions and production facilities and business.

Encourage enterprises, organizations and individuals to invest on the potential resource development and S&T activities (Article 11, Decree No. 99/2014/ND-CP).

However, these policies have not actually been effective; the investment has been spread to a number of universities (21 key universities) with the encouragement mainly focused on public universities.

3. Some remarks and suggestions on additional policies

As mentioned in the section 2, the Government has issued a number of policies to develop the S&T potential resources in general and the S&T potential resources in universities; however, more extensive research are still needed to form scientific rationales to build additional policies for the development of S&T potential resources in universities in the coming period. This article will propose some of the policies as follows:

3.1. The development of scientific research human resource in universities

3.1.1. Supporting young scientists

Currently, there have not any specific mechanisms to support young staffs, enabling young researchers to practicing their skills and maturity prior becoming scientists. Almost postgraduate students and PhD researchers in the country have carried out “vegetarian” research - which means there are neither mechanisms nor subjects assigned in their master or PhD research that is in association with what they currently did in universities or research institutes.

Paradoxically, the candidate would be 100% financial supported by the Government if he/she enrolls overseas universities (including monthly allowances, accommodation, travel fees, tuitions, insurance,...); whereas if he/she enrolls Vietnamese universities, there are only financial support on tuition fee by the sent organizations with no any other supports.

Currently, the MOST has been implementing a research program called potential research projects. However, the implementation of this research program is still at the beginning stage of piloting, therefore, there are still a number of issues that still need to be further developed.

In order to change the situation, more extensive and practical research should be conducted to provide rational policies that support young researchers widespread, not just limited to those who are outstanding. Scholarship funds for inland PhD students and postdoctoral (a limit of 3-year duration for a post-doctoral scholarship). Mechanisms to support research projects for young researchers conducting PhD studies in the country could be formed.

Funding criteria for young scientists also need to change; since if they are necessarily required research publications for being funding reviewed, it would be entangled in a vicious circle of financial support/funding consideration and scientific research achievements. On the other hand, once a researcher had great scientific curriculum vitae, whether he/she would be still in a group of young researchers (?). The importance of the grant application is a matter of research issues and whether they should be organized to study or not - in other words, what is important the funding proposals themselves.

3.1.2. Enhancing the mobility of S&T human resources between sectors (R&D-university-business) and attracting international scientific and technological human resources

The mobility of S&T human resources between the sectors

Mechanisms of job mobility of S&T human resources between R&D institutes, universities and enterprises (right from recruitment, working mechanisms,...) should be developed. Appropriate mechanisms should also be developed to promote S&T human resources (including in-house R&D of companies) to be involved in teaching at universities, and vice versa promoting teachers and students in universities to participate in research activities in R&D institutes and enterprises.

To develop mechanisms to encourage S&T human resources working at R&D institutes and universities to participate in the S&T activities with the business sector and technological brokering organizations to strengthen the S&T work forces for these organizations.

Previously we had had policies for concurrent personnel in various organizations, however, at present this working form is no longer popular. Therefore, further detailed studies are needed to develop specific policies for those who work concurrently both in institutes/universities and businesses. Specifically, S&T personnel can be invited for concurrently working in universities, businesses and other institutions in such some forms as: S&T personnel in research institutes may concurrently hold a leadership specialist of scientific subjects at universities or the position of scientific and technical management and production business in enterprises; or vice versa, human resources in universities and enterprises can concurrently hold various positions in research institutes.

Attracting international S&T human resources

The attraction of international S&T human resource includes both S&T personnel who are Vietnamese living in overseas and foreign scientists. These attraction measures include:

The financial supporting policies to encourage and attract scientists and S&T personnel in other countries, which are in the following forms: professional fellowship programs, research project funding, scholarships, travel and living allowances and research project-based per diem.

Special Immigrant Settlement Policies: Besides of financial incentives, further studies are needed to develop suitable immigration policies to attract S&T personnel working in Vietnam. These policies could include: optimized simplicity of procedures facilitating international mobility of S&T personnel, including their accompanied family members; special visas granting for scientists.

Creating favorable environment for the foreign experts' research activities: In addition to the immigration policies and financial support, in order to "retain" the international S&T experts who have already worked in Vietnam, professional environment for S&T research should be developed.

3.2. The increase in financial investments for scientific research in universities

3.2.1. Diversification of financial resources

The diversification of financial resources to invest on universities, especially research universities, is an extremely important task. In addition to the funding from the government budget, funding raised from other sources (such as international financial support, joint cooperation projects, research contracts with enterprises, technology transfer agreements,...) have currently been a matter of urgency for the S&T research activities in universities in Vietnam.

3.2.2. The increased applications of competitive funding mechanisms in scientific research

Currently, a number of scientific research tasks in universities have mainly been funded through the management mechanisms of: (i) the line ministries, (ii) national - level S&T programs that are under the management of the MOST, (iii) some financial funding sources.

Compared to international practice of funding mechanisms, S&T tasks should be funded by using competitive funding mechanisms such as the S&T Development Funds at the national, ministerial and sectorial level.

Undoubtedly, the studies on how to construct and amend the funding mechanisms for each kind of funds, in a manner of funding agencies to react to each type of scientific research, would be time consuming and an important issue in practice in Vietnam.

Specialized financial support programs for collaborative research between universities, R&D institutes and enterprises would be needed. The research subjects, criteria and procedures for the program approvals should be ensured to approach to targeted audiences of interests. This program will be useful not only to mobilize investments of the industrial areas, but also to promote the applications and transfer of research results and technologies produced in research institutions /universities into enterprises.

3.3. Strengthening equipment and information resource for scientific research in universities

On the viewpoint of the Government, it is suggested that the Government would increase its investment on infrastructure and equipment sufficiently once the scientific and technological research fields are in targeted priorities.

Also, the policies and mechanisms are also needed to mobilize investments from other sources of the society. The mechanisms should be created for the universities to invest on modern machineries, equipment, additional laboratories and research facilities, especially the universities in specified majors of technical science and technology.

Relevant information sources for scientific research activities, such as libraries, the database system of books, magazines, and especially computer networks connected to international database sources (digital libraries) are important conditions for Vietnam universities in scientific research activities, exchanging information and promoting knowledge.

Currently, the National Agency of Science and Technology Information (MOST) has provided links to international organizations (OECD, EU,...), websites (Thomson Reuters,...) and a number of prestigious scientific journals worldwide; therefore, it would be useful for the universities to collaborate with the Agency to joint use of these information resources.

Furthermore, it is necessary to mobilize the resources of the whole society (from the government, universities and other resources of society) to invest extensively on computer networks that are connected to the database of international scientific research so that scientists, lecturers and researchers could access to the latest scientific publications in the world and exchange scientific information with international scientific communities.

Another important task is the need of developing a number of scientific journals in English with sufficient international reputation; these journals would form “channels” of information or “forums” for academic debates between scientists in Vietnam and other scientists around the world./.

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