

## **Policies on science and technology activities in higher education institutions: current situation and solutions**

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### **Abstract:**

This article generally evaluates the policy system of science and technology activities in higher education institutions in Vietnam in terms of: investment in the development of science and technology potentials, incentives on science and technology activities, the mandates and powers of higher education institutions invested, and others. The paper outlines the basic advantages in implementing science and technology policies in higher education institutions, including the legal corridor for science and technology activities, and the autonomy of higher education institutions and policies on investment and remuneration to promote science and technology activities given higher education institutions facing many difficulties including lack of guiding documents, inconsistency and overlap of policies. The article, then, offers a number of proposals to complete the policy system focusing on synchronizing policies on science and technology activities, issuing guiding documents, amending investment terms, promoting science and technology activities in higher education institutions in Vietnam.

**Key Word:** science and technology activities, policies on science and technology activities, higher education institutions, developing science and technology potentials, encouraging science and technology activities.

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## **I. INTRODUCTION**

The past years have seen the establishment and then the improvement of the policy system on science and technology activities in higher education institutions in Vietnam. These policies comprise a key component in the policy system aimed to develop higher education institutions into science and technology research centers. The Party's resolutions, together with the State's policies issued on the development of science and technology activities in higher education institutions have made a positive impact on the formation of a contingent of scientists, research centers, including strong research groups, helping improve research conditions and increase published and applied research results.

For nearly 10 years of implementation, the system of policies on science and technology in higher education institutions has created favorable conditions for science and technology activities at Vietnam higher education institutions. However, for a number of reasons, the policy system on science and technology activities in higher education institutions reveals limitations and shortcomings, causing significant difficulties in implementing science and technology policies of higher education institutions. The article, therefore, makes an attempt to assess the current status of the science and technology policy system in higher education institutions in Vietnam through addressing the following issues. First, it reviews the policy system on science and technology activities in higher education institutions in Vietnam. Next, it assesses advantages and disadvantages of higher education institutions in implementing policies on science and technology activities. Finally, it proposes a number of proposals to overcome difficulties in the area in the coming time.

## **II. METHODS**

### **1. The system of policies on science and technology activities in higher education institutions in Vietnam**

Science and technology activities are formed as one of the two core activities of higher education institutions besides educational and training activities. The activity's content is specified in the Law on Higher Education (2012): "Scientific research, application of research results, technology transfer, formation of laboratories and research facilities, participation in selection, consultation, criticism, implementation of science and technology contracts and duties". The amendment Law on Higher Education 2018 (hereinafter referred to as Law No. 34) stipulates the State's responsibility for science and technology development in higher education institutions: "The State focuses on investment in developing science and technology potentials, creating mechanisms and policies to encourage investment in the development of science and technology potentials from

organizations and individuals, developing an innovative start-up system in higher education institutions for national development; giving priority to developing a number of branches and fields to regional and international levels". The Government has to regulate science and technology activities in higher education institutions.

Giving the importance of science and technology activities in educational institutions, the Resolution of the 12th National Party Congress has clearly indicated that Vietnam needs to "promote and strengthen the national science and technology potentials, focus on investment in developing a number of Science and Technology institutes and nation-level universities." This continues to be confirmed in the Prime Minister's Decision No. 418/QĐ-TTg dated April 11, 2012 on the approval of the science and technology development strategy for the period 2011-2020, which requires accordingly the enhancement of basic research capabilities of universities. Next, the Prime Minister's Decision No. 2245/QĐ-TTg dated December 11, 2015 on the approval of the scheme on restructuring the science and technology sector up to 2020, with a vision to 2030 states clearly the need to "Develop and promote the contingent of science and technology human resources in higher education institutions; build up scientific research groups with powerful technologies to solve practical problems of the economy; ... encourage enterprises to establish laboratories and connect with the system of laboratories at research institutes and universities. "

Decree No. 99/2014/ND-CP dated October 25, 2014 of the Government regulates the investment in the development science and technology activities potentials in education institutions (hereinafter referred to as Decree 99). This Decree is seen as the main legal document on the policy for science and technology activities in higher education institutions in Vietnam. In recent times, the Government and ministries and agencies have continued to build and promulgate many new detailed policies to promote the activities. For example, Decision No. 2469/QĐ-TTg dated December 16, 2016 by the Prime Minister approving the project on "Strengthening facilities, improving the scientific research capacity of teachers and renewing scientific research activities, technology transfer in higher and vocational education institutions for the period 2017 - 2025" (Hereinafter referred to as Decision 2469). Other decisions by the Prime Minister related to the policy of investment and development of science and technology potentials in higher education institutions are Decision No. 69/QĐ-TTg dated January 15, 2019 approving the Project on improving higher education quality for the period of 2019 - 2025 (hereinafter referred to as Decision 69) and Decision No. 89/QĐ-TTg dated January 18, 2019 approving the Project on improving capabilities of lecturers and managers of higher education institutions inline with basic, comprehensive reform of Education and Training for the period of 2019 - 2030 (Hereinafter referred to as Decision 89). Following this, a number of circulars have also been issued by relevant ministries and agencies.

Despite, the policy system on science and technology activities in higher education institutions has not been described as comprehensively and completely given inappropriateness of relevant legal documents. Any of issues related to the policy of science and technology activities in higher education institutions should be considered as follows.

### ***1.1. Investment in developing science and technology potentials in higher education institutions***

Science and technology development in higher education institutions is identified as the State's responsibility. This is legalized in Law No. 34. Specifically, Article 42 stipulates: "The State focuses on investment in developing science and technology potentials, creating mechanisms and policies to encourage investment in the development of science and technology potentials from organizations and individuals, developing an innovative start-up system in higher education institutions for national development; giving priority to developing a number of branches and fields to regional and international levels". Regulations on investment and financial mechanism for science and technology activities are stipulated in Decree No. 95/2014/ND-CP dated October 17, 2014. State investment in science and technology activities are stated accordingly: (1) spending on science and technology potential development, investment and support in building material and technical facilities for science and technology institutions with no distinction between economic sectors, (2) spending on science and technology careers such as spending on science and technology tasks, recurrent expenditures, funding for national funds...

Along with the State's investment, the higher education institutions themselves also make investments through their legal revenues. According to Decree 99, the investment in developing science and technology potentials in higher education institutions focuses on developing science and technology human resources, developing facilities and spending on science and technology activities with building and developing strong research groups, leading scientists, talented young scientists, building key national laboratories, purchasing intellectual property, supporting transfer and importing technology, offering financial support to publish articles in internationally recognized scientific journals.

In the official dispatch No. 230/BGDĐT-KH&CNMT dated January 16, 2015 on the implementation of Decree No. 99, the Ministry of Education and Training (Ministry of Education and Training) has provided guidance for higher education institutions in implementing the Decree. Accordingly, higher education

institutions should spend at least 5% from their legal revenue resources to invest in the development of their potentials and science and technology activities and to give priority to the implementation of grassroots level scientific research projects. Higher education institutions must also spend a minimum of 3% from tuition fees on learner scientific research. The State's investment is focused on potential/ key higher education institutions or those in regions with special socio-economic difficulties. At the same time, higher education institutions must meet the basic conditions of research potentials, research results and effectiveness, research units and international research cooperation. In particular, higher education institutions must have strong research groups, staff with 25% or more Ph.D. holders, science and technology enterprises or science research centers and research results applied with high socio-economic efficiency.

Decision 89 sets the target of Ph.D. training for about 10% of university lecturers and to attract to the country at least 1500 scientists and Ph.D. holders working abroad. Decision 69 addresses comprehensive policies on investment in human resources, facilities and equipment.

Decision No. 2469 has specified objects, principles, targets, tasks and ways to implement the Scheme. According to Decree 99 and Decision 2469, investment capital sources for science and technology activities of higher education institutions are mobilized from the State's budget, local budget, the revenue sources of higher education institutions, domestic and foreign organizations and individuals, national science and technology development fund, ministries, branches and enterprises. Thus, there has been an expansion of investment participants, including individuals and organizations. Enterprises are also enabled to engage in science and technology activities at higher education institutions for research projects or technology transfer contracts.

Decision 69/QD-TTg, dated January 15, 2019 of the Prime Minister, approving the Project on improvement of higher education quality for the period 2020 - 2025 has established ways to strengthen conditions for education quality assurance and higher education accreditation with focus on personnel training faculty based on the state budget and other funding sources, on investment in upgrading facilities and equipment to meet international standards in a number of higher education institutions, on incentive investment in information technology application and on the formation of a number of modern practical and experimental centers for all higher education institutions in the country.

Regarding direct investment funds for science and technology activities, there has been a low level of science and technology budget funding which seems to be lower year after year over the past years opposing an increasing number of scientists and science and technology products of higher education institutions. In terms of total investment, funding for education sector is lower than some ministries and sectors such as the Vietnam Academy of Science and Technology, the Academy of Social Sciences, the Ministry of Agriculture and Rural Development, the Ministry of Industry and Trade (by Science & Technology & Environment Department, National Assembly, October 6, 2015).

In fact, the amount of development investment for science and technology in higher education institutions is small. Specifically, on average, in the period 2011-2015, the yearly investment budget for research at 61 units under the Ministry of Education and Training is about 30-50 billion VND (Vu Van Tich and others, 2016). The allocation of science and technology career funding proves to be unreasonable, based mainly on the number of initial sums without a link to outcomes and the number of researchers. The way of fund allocation shows the egalitarianism, not really taking into account the efficiency of the fund use.

## ***1.2. Promotion of science and technology activities in higher education institutions***

### ***(1) Promotion of lecturers' scientific research activities***

The Law No. 34 stipulates in Article 42 "... creating mechanisms and policies to encourage organizations and individuals to invest in developing science and technology potentials, developing a creative startup system in higher education institutions" and in Article 5 " Giving teachers conditions to learn, participate in science, technology and entrepreneurship activities ...". More specifically, the Circular No. 47/2014/TT-BGDĐT of the Ministry of Education and Training stipulates: "Teachers must spend at least one third of their total working time during the school year doing scientific research tasks." Decree No. 73/2015/ND-CP of the Government stipulates: "For research-oriented higher education institutions, permanent teachers must spend at least 50% of their total working time as on scientific research activities." These new regulations set the basic level on, instead of encouraging teacher scientific research.

Decree 99 regulates the investment in the development of potentials and incentive scientific research activities in higher education institutions. The incentive teacher scientific research is done through the followings: (i) having preferential personal income tax on income from science research and technology development contracts in priority and key fields and contracts performed in mountainous, deep-lying and extremely difficult areas according to the provisions of law; (ii) A bonus of not more than 30 times of common base salary for one article published in a internationally recognised scientific journal in the ISI list. Bonuses are taken from science and technology career funding in the estimates assigned to higher education institutions; (iii) Support 50% of registration fee for copyright protection. Funding support is taken from the science and

technology career funding in the estimates assigned to higher education institutions; (iv) The equivalent of 20 hours of giving lecturers for one work published in a scientific journal with a score of 1 in the list of the State Council of Professors.

Lecturers who are leading scientists or outstanding young scientists in higher education institutions enjoy incentive and support policies in accordance with Decree No. 40/2014/ND-CP dated May 12, 2014 of the Government (hereinafter referred to as Decree 40) and Decree 27/2020/ND-CP dated March 1, 2020 amending a number of articles of Decree 40/2014/ND-CP (hereinafter referred to as Decree 27) regulating priority for researchers. After 5 years of implementing Decree 40, there is no record of registered leading scientists showing the failure of this policy. Decree 27 is amended but still requiring candidates to be the head of science department, laboratory or equivalent in higher education institutions. Moreover, the standards for annual outputs are still low.

Along with Decree 99, Decision No. 2469 also shows ways to improve scientific research capacity, technology transfer for teachers and researchers in higher education institutions such as comprehensively implementing the Ph.D. training program for qualified teachers at for universities and colleges; the state budget-based project of training and retraining science and technology human resources at home and abroad ...; orienting the improvement of capacity, qualifications, research methods and technology transfer skills for teachers and researchers by expanding links, diversifying forms of cooperation in higher and vocational education with foreign partners, implementing incentive policies for those teachers who have valuable publications, etc. In general view, the new policy works as a general orientation without details needed to make the difference between research fields.

Circular 37/2014/TT-BKH&CN (hereinafter referred to as Circular 37) with the aim to improve research capacity and form strong research teams provides regulations on basic research project management aided by the National Science Technology Development Fund mainly provides guidance on the regulation of topic management instead of guidance on improving research capacity or forming strong research groups. Similarly, Circular 22/2011/TT-BGDĐT promulgating regulations on science and technology activities in educational institutions addresses regulations on rewarding and handling violations not mentioning incentive teacher scientific research. Decree 99, the most convincing legal document on incentive teacher scientific research, does not address incentive group scientific research and solutions to procedural problems. As a result, lecturers face many difficulties due to the lack of provisions effective enough for their research, resulting in a few of them engaging in these activities at higher education institutions. This shows the failure to fulfill scientific research duties among lecturers as their average time amount in scientific research is low in the total teaching standardized time of the year (Dao Ngoc Canh, 2018).

(2) Promotion of investment from enterprises, individuals and organizations in the development of scientific potentials and science and technology activities

The promotion of investment from enterprises, individuals and organizations in higher education institutions in the development of scientific potentials and science and technology activities is stipulated by the Government in Article 11 of Decree 99: Exemption, reduction of corporate income tax, personal income tax, and tariff by means of pre-tax or after-tax profit, pre-tax income or after-tax income. Tax exemption or reduction is also applied to: the import of equipment, machinery and raw materials to invest in the development of science and technology potentials; the implementation of technology transfer activities from higher education institutions; and the application of scientific research results of higher education institutions to develop and renovate technology. The State recognizes and protects property rights, investment capital, income, other legitimate rights and interests of enterprises, organizations and individuals who invest in developing science and technology activities in higher education institutions.

Other policies, although addressing incentive investment in the development of scientific potentials and science and technology activities by encourage enterprises, individuals and organizations, merely stop at proposing tasks and solutions "in accordance with the law" as in case of Decision 2469.

### ***1.3. Duties and rights of higher education institutions invested***

Rights of science and technology organizations are stipulated in Article 13 of the Law on Science and Technology, including those on: (i) Autonomy and self-responsibility in science and technology activities in the field that has been granted an operation registration certificate. Science and technology public institutions operate on payroll granted by the State, (ii) Registration to participate as being selected or directly assigned science and technology tasks; Signing science and technology contracts, training human resources, fostering science and technology talents, (iii) Establishing science and technology organizations, affiliated science and technology enterprises or enterprises, representative offices, domestic and foreign branches to operate science and technology activities, (iv) cooperation, joint venture, and sponsorship by organizations and individuals; contributing capital in the form of cash, assets, value of intellectual property rights to scientific and

technological activities, production and business activities in accordance with law, (v) protection of intellectual property rights ; technology transfer and transfer of science and technology results of science and technology in accordance with the law on intellectual property and technology transfer, (vi) publishing science and technology results in accordance with the Press Law, the Law on Publication and Regulations and other legal regulations, (vii) proposing consultation to the State competent authorities to work out policies, laws, socio-economic development plans, science and technology development plans, ( viii) Participating in science and technology international integration, (ix) being partially or wholly transformed into a science and technology enterprise in accordance with the law.

Article 41, Law No. 34 has 9 clauses defining 3 tasks and rights of a higher education institution on: (i) signing contracts; (ii) performing tasks; and (iii) registering to participate as being selected to perform science and technology tasks. Thus, compared with the Law on Higher Education 2012, Law 34 replaces the phrase "self-responsibility" with "accountability" in signing science and technology contracts; performing science and technology tasks; registering to participate as being selected to perform science and technology tasks.

Related to the rights and tasks of higher education institutions are other important legal documents such as Consolidated Document No. 02/VBHN-BKH&CN dated January 6, 2015 on the Decree regulating the autonomy and self-responsibility mechanism of science and technology public organizations, Decree 99/2014/ND-CP, Decree 99/2019/ND-CP and Decision 70/2014/QĐ-TTg.

#### **1.4. Other issues**

##### *(1) Copyright and intellectual property*

The issue of copyright and intellectual property in higher education institutions is addressed in the Law on Intellectual Property 2005 and the Law amending and supplementing a number of articles of the Intellectual Property Law in 2009 on copyright and related rights; Decree No. 22/2018/ND-CP dated February 23, 2018 of the Government detailing a number of articles and measures to implement the 2005 Intellectual Property Law and the Law amending and supplementing a number of articles of the Law 2009 intellectual property rights on copyrights and related rights aiming to encourage creative activities, promote the process of exploitation and transfer of intellectual property rights and protect intellectual property of individuals and collectives and of higher education institutions; Decision No. 78/2008/QĐ-BGDĐT dated December 29, 2008 (hereinafter referred to as Decision 78) promulgating the regulations on the management of intellectual property activities in higher education institutions; Official Letter 4059/BGDĐT-KH&CNMT on guiding the implementation of intellectual property activities in higher education institutions.

##### *(2) Technology transfer*

Currently, technology transfer activities in higher education institutions is implemented in accordance with Decision 78 and Official Letter No. 1493/BGDĐT-KH&CNMT dated April 17, 2018 on technology transfer activities in higher education institutions. This activity is rarely carried out as transfer and application research need a more open mechanism and stronger sanctions. Higher education institutions need to establish science and technology enterprises, start-ups with more specific capital contribution mechanism.

##### *(3) Organization and management of science and technology activities*

Educational institutions conduct science and technology activities under the 2013 Law on Science and Technology and the provisions of Articles 39, 40, 41 and 42 of the Consolidated Document No. 42/VBHN-VPQH of the Law on Higher Education. Article 19 of Circular No. 22/2011/TT-BGDĐT promulgating regulations on science and technology activities in educational institutions clearly defines the right of a higher education institution to establish science and technology departments, sections (collectively referred to as science and technology departments). Faculties, departments, institutes, research centers, enterprises, science and technology service organizations and serving science and technology activities organizations directly implement science and technology activities. Other bodies like Science and Training Council, Faculty Council... give instructions or advice on science and technology activities. Article 20 specifies 7 topics for the management of science and technology activities. Despite this, science and technology departments have no close connection with experts in higher education institutions, mostly doing administrative work instead of giving advice scientists in the unit on professional operation.

##### *(4) Establishment and operation of scientific research institutes, centers and businesses in higher education institutions*

Resolution 19-2017/NQ-CP of the Government dated February 6, 2017 on continuing to perform key tasks and ways to improve the business environment, enhance national competitiveness in 2017, with orientation by 2020, contains mechanisms and policies to create favorable conditions for the establishment of multi-owned

enterprises in higher education institution aimed at applying research results in public non-business services, but no instruction for implementation is mentioned.

## **2. Advantages and disadvantages of higher education institutions in implementing science and technology policies**

### **2.1 Advantages**

(1) The system of policies to develop science and technology activities in higher education institutions has been formed and rather systematically completed over the years. In the light of the Party's resolutions, the policy system includes laws following decrees, decisions, resolutions, circulars, directives etc. with the Law on Science and Technology as a key. These legal documents have established the basic legal basis for science and technology activities, including investment in the development of science and technology potentials of higher education institutions which aims to implement science and technology activities, to identify rights and responsibilities of higher education institutions in science and technology activities with some breakthrough contents.

(2) Science and technology activities at higher education institutions are oriented towards the realization of important goals in accordance with the higher education development strategy in particular and Vietnam's education in general, gradually reducing the imbalance between training and science and technology activities in higher education institutions, reducing the dependence on income from training.

(3) Science and technology activities at higher education institutions have been promoted by supportive policies for collectives and individuals, bonus and remuneration policies contributing to forming research groups including strong ones, increasing the number of articles published in internationally recognized journals, and promoting scientific research activities in general in higher education institutions.

(4) The higher education institutions have more rights on autonomy in funding science and technology activities. Funding scientific research at all levels has increased significantly thanks to proactive funding taken from 5% of legal income sources of higher education institutions. Spending on learner's scientific research also has significantly increased compared to the period before Decree 99. As a result, an increasing proportion of important topics are recorded in the total number of scientific research topics resulting in valuable application products, science and technology activities promotion and higher science and technology activities based revenues.

### **2.2 Some disadvantages**

In addition to the above mentioned advantages, in the process of adopting policies on science and technology activities, higher education institutions face many difficulties. Some of them can be described below.

*Firstly, the system of science and technology policies in Vietnamese higher education institutions lacks synchronous, consistent and systematical establishment.*

Although the development of science and technology activities in Vietnamese higher education institutions has been mentioned in the Communist Party's resolutions and regulated in a number of laws such as the Law on Science and Technology, the Law on Higher Education and Government decrees, there is a lack of guidelines for implementation. Thus, higher education institutions have troubles adopting these policies as they can only rely on their own understanding or ability.

Second, the implementation of autonomy of higher education institutions in science and technology activities is hindered by the provisions of the laws that are in effect.

The 2013 Law on Science and Technology, the Law No. 34 clearly stipulate the autonomy of science and technology organizations in general and of higher education institutions in particular. More specifically, Decree 99 confirms that higher education institutions have autonomy to make decisions on training, recruiting, using and remunerating faculty, researchers and research management personnel, as well as to decide investment items in the total assigned investment capital for developing science and technology potential. However, they are hindered by provisions on recruitment, use and remuneration in the Law on Civil Servants (2019), the Law on Public Employees (2019) and the Labor Law related to foreign workers. Up to now, there is no decree on university autonomy specifying the autonomy of higher education institutions in science and technology activities.

The regulation on spending 5% of the legal revenue on scientific research activities is not appropriate for fully autonomous universities because of their right to make decision on this budget. Moreover, the concept of "legal income" is not specifically defined, making higher education institutions confused about determining the total amount of money collected from the so-called "legal" sources. In addition, due to the lack of specific guidelines for implementation, higher education institutions also have confusion or different ways of determining expenditures for student's scientific research, rewards for publications in ISI, SCI, SCIE journals as well as incentives for excellent research groups and researchers participating in international conferences and seminars within and beyond the country.

Third, difficulties in identifying intellectual property, technology transfer and commercialization of scientific products

According to Decree No. 70/2018/ND-CP dated May 15, 2018, "Assets formed through the implementation of budgeted tasks are public assets. The management and use shall comply with the Law on management and use of public assets, provided in this Decree and relevant laws." As such, this Decree does not allow the use of public assets as capital for establishing a business. Regulations on intellectual property are not encouraging enough for many useful inventions and solutions to be registered. Policies on commercialization of products are still strict. There are also no sanctions for distributing benefits of scientific products created based on the state budget upon commercialization and technology transfer. Basically, there is a lack of complete documents on the management of intellectual property activities and detailed instructions on practical issues, thus, technology transfer activities have not been promoted. In fact, there are three major problems. The first one concerns the treatment of copyright for scientific and technology development products in projects within and beyond the university's budget (with written agreements). The second problem is to determine the proportion of intellectual property rights of lecturers and researchers using their official work time to create intellectual property. The third one is the distribution of benefits between the author and the owner in the commercialization of scientific products in higher education institutions.

*Fourth, difficulties in investing in the development of scientific and technological potential*

According to Decree 99, investment in the development of scientific and technological potential is prioritized for higher education institutions showing research potential, completing scientific and technological tasks, having science and technology enterprises or scientific research centers... However, current regulations on the allocation and management of science and technology budgets is still egalitarian, not associated with applied scientific products as well as the number of scientists in research facilities. Thus, the investment is fragmented without a focus and basis.

One of the major problems in investing in the development of scientific and technological potential in higher education institutions is to attract investment from organizations and individuals. This results from the lack of specific regulations on mobilization methods, incentive policies, and benefit sharing mechanisms, copyright and intellectual property... Businesses are not aware of the obvious and guaranteed benefits of investing in scientific research projects, application projects and technology transfer between them and higher education institutions.

Fifth, difficulties in building and developing research groups and strong research groups

One of the biggest problems is building research groups and strong research groups in higher education institutions. Although widely consulted by the Ministry of Education and Training in the entire system of higher education institutions in Vietnam and related bodies in 2019, the circular providing guidance for the development of strong research groups in higher education institutions remains a draft. While limited funding for research projects, slow allocation and complicated disbursement procedures are discouraging researchers, the investment in research groups is either insufficient or inconsistent or nowhere to be found. Funding to research groups from higher education institutions, if any, is also very modest, mainly a message of encouragement.

The regulations on the research group leader's age and powers over recruiting collaborators and using approved funds are limited by the provisions of the laws and other relevant legal documents, thus, creating no breakthrough. There is also a need to amend other regulations regarding the criteria of a strong research team, its leaders and key members, preferential regimes, procedures for accrediting and re-approving research groups... According to Nguyen Dinh Duc (2019), there are also great problems in the development of research groups, such as criteria for recognizing a research group at the grassroots, national and international level, and heavily administrative mechanism for funding, limited powers of the research group leader...

*Sixth, difficulties in investment in laboratory establishment*

The current system of documents lacks regulations on the criteria for evaluating the effectiveness of laboratories, and sanctions that clearly define the post-investment responsibilities of higher education institutions, which are left entirely to laboratories. There are no regulations on funding laboratories to conduct research as well as almost no post-investment "order" for research. Laboratories are managed through a "closed" mechanism, even to divisions within the same department and educational institution. There is no investment strategy and resources for needed higher education institutions, resulting in ongoing inadequate investment and the "ask-give" mechanism.

Seventh, problems in regulations on the operation of science and technology enterprises and scientific research centers

There are no specific guidelines on adopting current documents on the establishment and operation of scientific research institutes and centers as well as businesses in higher education institutions. Particularly, there is a lack of policies to further encourage scientific research institutes and centers as well as businesses to conduct scientific research and transfer the results in universities. There are no appropriate regulations to promote technology transfer through science and technology organizations in higher education institutions. In fact, many individuals have transferred technology outside higher education institutions.

*Eighth, difficulties in implementing science and technology activities*

The Circular No. 22/2011/TT-BGDĐT issuing regulations on science and technology activities in higher education institutions was introduced before Decree 99 was enacted and took effect. Some contents in this Circular are not suitable with current contexts and conditions. Specifically, Chapter III with Articles 10 to 18 regulates the implementation of tasks, the assessment, acceptance and announcement of results; intellectual property activities, transfer of scientific research results and technology development; training for scientific research managers, investment in enhancing research capacity ... These sketchy, simple and very general contents pose difficulties for higher education institutions. Many missions are specified without associated execution conditions. Currently, higher education institutions have yet to agree on names, functions, tasks, job allocation, and titles of personnel in research management bodies. There is also a lack of specific guidelines on adopting other legal documents, leaving them merely stated in the Prime Minister's Decree and Decision.

Finally, difficulties in university-business collaboration concerning scientific research and technology development

There is a lack of legal documents specifying the rights and responsibilities of the parties in collaboration concerning scientific research and technology development, and procedures for disputes between the parties. Recently, the Prime Minister issued Decision 844/QĐ-TTg dated May 18, 2016 (hereinafter referred to as Decision 844) approving the project "Initiative for Startup Ecosystem in Vietnam - ISEV" and Decision 1665/QĐ-TTg dated October 30, 2017 (hereinafter referred to as Decision 1665) approving the project "Supporting students to start their businesses to 2025." Both Decision 844 and Decision 1665 have not properly assessed the role of lecturers in higher education institutions in experimenting research ideas in laboratories before putting them into practice. Despite the interdependent relationship between higher education institutions and businesses, Vietnam has yet to have sanctions for the parties to actively collaborate. Research studies conducted by higher education institutions lack connection with businesses, thus, do not meet practical needs.

### **III. SOME RECOMMENDATIONS**

To basically overcome difficulties in adopting policies on science and technology activities in higher education institutions in Vietnam in the coming time, it is necessary for State administrative agencies to conduct more comprehensive, systematic and detailed studies. This article would like to propose some solutions as follows.

*Firstly*, to issue documents providing guidance to the legal implementation of science and technology activities in higher education institutions, especially the Decree on science and technology activities in higher education institutions. Regulations related to implementing autonomy of higher education institutions should be synchronized in a single legal document.

*Second*, to complete legal documents on investment for science and technology activities in higher education institutions, including policies to attract private investment, policies to build specialized and multidisciplinary laboratories; policies to establish research teams and strong research groups in higher education institutions. In particular, it is necessary to introduce specific regulations on criteria to classify laboratories and evaluate their performance as well as sanctions for their operation. There is also a need to specify and bring in regulations on criteria for selecting research team leaders, classifying research groups and identifying prioritized research fields...

*Third*, to develop policies to promote the relationship between business - university - society in technology transfer and scientific research activities. In particular, there should be sanctions for businesses' use of their Fund for science and technology development to order higher education institutions to study, improve, develop and renovate technology and/or to receive technology transfer from higher education institutions. At the same time, specific regulations on the operation of science and technology enterprises and scientific research centers, which clarify the operating mechanism, responsibilities and powers of the parties as well as the distribution of benefits or damages during their operation.

*Fourth*, it is necessary to have differentiation policies for research groups in different fields. Investment policies should be reasonable. Research groups can be divided into three categories: university research groups,



national research groups, and international research groups. However, it is necessary to clarify the criteria and scientific basis for classifying research groups, thereby issuing appropriate investment policies and outcome standards. Planning and top-down approach are necessary for the development of research groups in higher education institutions.

*Fifth*, to encourage higher education institutions, officials, employees and learners to produce solutions for establishing spin-offs, and to promulgate regulations on transferring spin-offs to organizations and individuals outside higher education institutions, thereby promoting patent registration. The use of patented invention is allowed to contribute capital to build a business then transfer it to enterprises to generate revenue for higher education institutions.

#### **IV. CONCLUSION**

The system of policies on science and technology activities in higher education institutions in Vietnam has been established and implemented when higher education in particular and the entire education system in general undergo reforms and renovation for development. This policy system has created a legal corridor for science and technology activities, enabling them to gradually become one of the two essential activities of higher education institutions. Difficulties in adopting policies on science and technology activities are not completely resolved. Thus, there is a need for this policy system to continue to be adjusted to ensure the success of higher education institutions in both "training" and "doing scientific research", complying with the goals of comprehensive development of higher education

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