VIETNAM SCIENCE AND TECHNOLOGY ENTERPRISES: STATUS AND SOLUTIONS FOR DEVELOPMENT

Dr. Nguyen Van Anh
Ba Ria - Vung Tau Province DOST

Nguyen Hong Ha
Local Science and Technology Development Dept., MOST

M.Sc. Le Vu Toan
Science and Technology Management Institute, MOST

Abstract:

Development of science and technology (S&T) enterprises is one of the important tasks defined and implemented with full efforts by the Party and the State of Vietnam. Up to recent time, however, the development works face certain difficulties and troubles. The paper provides an overview of the development status of S&T enterprises in actual context and, then, proposes solutions to push up the establishment and development of this specific type of enterprises in Vietnam in the future.

Keywords*: Science-technology enterprises; Spin-off; Start-up.*

Code*: 14082501*

1. Concepts and conditions for certification of status of science and technology enterprises

S&T enterprises appeared in the world since the middle XX century on basis of spin-off(s) and start-up(s) which were established in industrial developed countries. Spin-offs take their start from universities (they were separated as independent units from universities) and those persons who created S&T assets took part in management of the newly established enterprises. Start-up is the notion which indicates the initial stage of newly established enterprises on basis of S&T results [34, 35]. Despite differences between spin-off and start-up, these types of enterprises have some similar points, namely: (1) Initial stage of a newly established enterprise on basis of S&T results; (2) Capabilities to carry out innovations and commercialization of S&T results to provide products and services required by consumers.

In order to encourage the development of spin-off and start-up, the governments of the countries in the world issued various policies to support the development, such as incentive measures for establishment of technology

incubators, centers for technology transfer, centers for licensing of IP rights, venture funds, angel funds, private investment funds and etc. [32, 34, 35]. These measures were taken to support the establishment and development of S&T enterprises. According to data from Association of Universities of Technology Management (AUTM), the US, during the time period from 1980 to 2000, there has 3,376 S&T enterprises (spin-offs) in universities. This trend experiences a highly increasing rate during recent years. In the UK, there are 1,307 S&T enterprises in universities by 2007 and they add 219 enterprises from 163 universities by 2008. The average increasing rate is 70 S&T enterprises per year from 102 universities in the UK [33].

In Vietnam, the term of S&T enterprises was introduced for the first time in 1980. It was noted in the conclusion documents of the VI-th Conference of the Party Central Committee, IX-th Session which stated: "Transferring gradually S&T organizations in charge of research for technology application and development to the mechanism of financial self-governance and operation models of enterprises" [5]. The above defined tasks were embodied in details in Resolution No. 115/2005/ND-CP dated 5th September 2005 by the Government (called shortly afterwards as Resolution 115) which stipulates the mechanism of self-governance and self-liability of public S&T organizations: "S&T organizations can choose the transfer to the form of S&T enterprises" (*Article 4, Resolution 115*). After that, the Government issued Resolution No. 80/2007/ND-CP dated 19th May 2007 (called afterwards as Resolution 80) and Resolution No 96/2010/ND-CP dated 20th September 2010 (called afterwards as Resolution 96) which includes an article to indicate clearly the concept of S&T enterprises: "S&T enterprises are enterprises established, managed and operated by Vietnamese organizations and/or individuals, foreign organizations and/or individuals which have legal rights to own or to use results of scientific researches and R&D activities, in conformity to Law on Enterprises and Law on S&T. These enterprises are to conduct main activities of production and business of commodities on basis of R&D results they have legal rights to own or to use, and to carry out S&T tasks. S&T enterprises are entitled to carry out other activities of production, business and service in conformity to legal regulations" (*Article 1.2, Article 2, Resolution 80; Article 2, Resolution 96*). In 2013, the regulations towards S&T enterprises were presented in a legal document of higher values, namely Law on S&T [1]. Law on S&T, however, cannot be applied in full powers because of lack of a Government Circular to guide the implementation.

Enterprises, in order to get the status of S&T enterprises, need to satisfy certain conditions which are stipulated in detail in Inter-ministerial Circular

No. 17/2012/TTLT-BKHCN-BTC-BNV (called afterwards as Circular 17) of the three concerned ministries, namely: Ministry of Science and Technology (MOST), Ministry of Finances and Ministry of Interior Affairs: "Those who established S&T enterprises and completed the incubating and mastering of technologies raised from S&T research activities are entitled to legal ownership and use of those technologies for direct production in the fields: (1) Information technology-communication, particularly information technology softwares; (2) Bio technologies, particularly the ones to be applied in agriculture, aquaculture and health care; (3) Automation technologies; (4) New material technologies, particularly nano-technologies; (5) Environment protection technologies; (6) New energy technologies; (7) Space technologies and some other technologies as defined by MOST. They are also entitled to technology transfer or direct production of products on basis of incubated, mastered or legally owned technologies in conformity to legal regulations in the above noted fields". (*Article 1.2, Circular 17)*. So, the status concept of S&T enterprises defined by Vietnamese legal documents relatively remain in conformity to the existing ones applied in the world. The conformity is said "relatively" because they are in good agreement in the following aspects: (1) Management model is the one applied for enterprises; (2) These enterprises are capable to conduct innovations; (3) Activities of production and trade are based on S&T research results. However, there is a difference. Namely, in the internationally accepted concept, S&T enterprises have to be "newly established" (spin-off, start-up) while the Vietnam concept does not deal with this aspect. The Vietnam approach, in fact, meets the actual context of Vietnam where the enterprises newly established on basis of S&T results face so many risks. The operation of this type of enterprises requires very high qualifications of managers in various fields: management knowledge, practical experience of management work, IP related knowledge and practice, professional expertise for absorption, mastering and application of new technologies. All of these qualities should be integrated and mobilized to make their enterprises produce benefits. In the advanced countries, on basis of their long tradition and practice, there exists already a system (capitals, techniques, management, trade and etc.) to support the development of technological incubators (spin-offs, start-ups). Actually, in Vietnam, S&T enterprises have almost to manage themselves. They need to rely mainly on potentials of existing enterprises to get supports for practical application of S&T results.

In the actual interpretation of valid legal documents (*Resolution 80, Resolution 96, Circulation 06, Circular 17)* we could see that the concept scope of "S&T enterprises" is broader than "the conditions for

establishment of S&T enterprises". This "broader" is related to the term of "S&T results". The conditions the enterprises need to meet to get the status of S&T enterprises, as noted in Article 1.2, Circular 17, accept only "S&T results" of 7 fields, namely: (1) Information technology-communication; (2) Bio technologies; (3) Automation technologies; (4) New material technologies; (5) Environment protection technologies; (6) New energy technologies; (7) Space technologies and some other technologies as defined by MOST. Therefore, this regulation deprives the rights to establish S&T enterprises of those organizations or individuals which produce S&T results not listed in the above noted fields. We can give an example from Ba Ria - Vung Tau Province. In this case, a person did himself investments for research and he invented his "salt field trolley" which reached a very high level of novelty, creativity and applicability. The advanced solution won the first prize of the Technical Creativity Contest of Ba Ria - Vung Tau Province, 2013. The owner of the solution established his enterprise to produce "salt field trolleys" not only for salt farmers in his province but also in other localities. However, the solution of "salt field trolley" was classified as S&T result in the field of mechanical engineering and, according to actually valid legal regulations, he is not entitled to get the certificate of "S&T enterprise" for his enterprise. But if we take the new regulations of S&T enterprises as stipulated in Law on S&T, 2013 (*Article 58.1, 58.2)* we could see that the above noted limitation had been adjusted. We can see that it was a new progress of Law on S&T. But, at this point, a new barrier was raised with the condition that S&T enterprises have to meet: "turnovers from production and trade of products raised from R&D results must achieve the level fixed by the regulations" (*Article 58.2.c, Law on S&T, 2013).* It is, in fact, a new barrier to prevent those enterprises which want to enter to the State authority recognized category of S&T enterprises. This is really very hard for enterprises newly established on basis of R&D results. According to the view of the authors of this paper, we should not have the item of "turnovers from production and trade of products raised from R&D results must to achieve the level fixed by the regulations" to be listed in the conditions to get the status of "S&T enterprises", but in the regulations to get incentive taxation rates, as stipulated in Inter-ministerial Circular No. 06/2008/TTLT-BKHCN-BTC-BNV dated 18th June 2008 and the actually valid Circular 17. The argument here is easy to be understood: in business, no one can secure the turnover volume as wanted. It is particularly right for newly raised products which have always hidden risks and need certain time before the market accepts them largely. More than that, some new products have to wait the issue of new regulations, specifications and standards from authority agencies, and to be certified as to meet them before being qualified for market sales.

2. Actual status of S&T enterprises

2.1. Global view

There is no agreement accepted for the number of S&T enterprises made public actually in Vietnam. There is a very large difference in the interpretation of concepts of "S&T enterprises" or "satisfying the conditions to get the certificate of S&T enterprises". Namely, Pham Van Dien [27] said: "By 2011, Vietnam has about 2,000 S&T enterprises". Pham Duc Nghiem [28] stated: "By October 2013, Vietnam has about 2,000 enterprises operating on models of S&T enterprises". Tran Van Dich [30] confirmed: "By 2013, over the whole country, we have about 2,000 enterprises operating on models of S&T enterprises in the fields of information technology, propagation of studs and seedlings, post-harvest technologies, engineering-automation, electronics, informatics, medico-pharmaceutics and etc. Up to now, 123 enterprises were recognized to be S&T enterprises and 40 applications were submitted and wait for certificates to be delivered". Pham Hong Quat [29] considered: "Up to now (2014), Department of S&T (DOST) in provinces delivered more than 100 certificates of "S&T enterprise" and are doing appraisal works of hundreds of applications from enterprises". The official figure provided in the Report by MOST for 2013 [15] makes clearly: "By June 2013, more than 65 enterprises have got the certificate of "S&T enterprise". One of the reasons of the difference of these figures is related to the unified interpretation of these concepts: "S&T enterprises" and "satisfying the conditions to get the certificate of S&T enterprises", as noted above. Being given that the actual conditions to get the certificate of "S&T enterprises" do not meet the real practice yet, we find difficult to be sure of the situation where the difference of figures made public is too big and they are coupled with difficultly interpreted terms of "S&T enterprises" or "enterprises operating on models of S&T enterprises". The given figures are difficult to be verified and lacked of credibility which could lead to vague interpretation. The problem gets more serious in actual context of Vietnam when there are problems with data in Vietnam S&T statistic reports. Naturally, we cannot do surveys, every year, of all the enterprises over the whole country just for identification of S&T enterprises. From another side, we, authors of this paper, can say that we get involved directly to State management activities in connection to S&T enterprises. We note that, every year, DOSTs, in their reports, give only the statistic number of the enterprises having got the certificate of S&T enterprises and the number of applications under consideration for certificate of S&T enterprises. We have no chances to take part in any statistic report of the number of "enterprises operating on

models of S&T enterprises" of any competent unit of MOST. Therefore, the figure of "2,000 enterprises operating on models of S&T enterprises" provided by the authors in [28, 30] surely is not complete because they, at least, did not deal with the statistic data from Ba Ria - Vung Tau Province.

Actually, there are many units in MOST to take State management duties of S&T enterprises including Department of Development of S&T Market and Enterprises, Local S&T Development Department, Hoa Lac High Tech Zone Management Board, High Tech Department, Office of Certification of High Tech Activities, Organizational and Personnel Department (implementing the Program of supports for development of S&T enterprises according to the Prime Minister's Decision No. 592/QD-TTg dated 22nd May 2012 on approval of the Program of supports for development of S&T enterprises and public S&T organizations to implement the mechanism of self-governance and self-liability). However, Department of Development of S&T Market and Enterprises, being the State authority agency assigned for duties to develop technological markets and to support the establishment and development of S&T enterprises, is not involved directly to the issuance of licenses to establish S&T enterprises. Its activities remain to collect data from provincial DOSTs on the certificates delivered to local enterprises. The Department had been established in 2011 and it turns easy to understand from where comes the difference in the data of S&T enterprises made public by some officials of the Department. According to the view of the authors of this paper, the enterprises would proceed immediately to start the formality procedure to get the certificate of S&T enterprise if they find that it can bring them benefits and increase their trade turnovers. From another side, the data made public have to be identifiable. In the actual situation of statistic data in Vietnam, from this point on, we will deal with "S&T enterprises" under optics of "enterprises granted of the certificate of S&T enterprises". Here we should keep in mind that, if the enterprises get granted, by the State competent agencies, of a certificate of the validity power equivalent to the certificate of S&T enterprises, then they get considered "S&T enterprises". In this case, a question should be necessarily put down: "Is it right that actually (by September 2014) we have only 123 S&T enterprises and the 2009 year is the first time Vietnam had a S&T enterprise?" [30].

In efforts to look for the answer to this question, we need to return back to the old time of 2001 when, for the first time in Vietnam, we had Ho Chi Minh City based Quang Trung Software Park to be established and introduced to operation and S&T related legal documents to be issued. Then we would see a bigger number of S&T enterprises in Vietnam and an earlier date of their foundation than the public made figures are [30]. This is

related to the concepts of high techs and Law on High Techs of Vietnam. During our exchanges of views, we get numerous controversial comments from S&T management agencies and officials including the ones from central and local levels.

We find necessary to add the number of high tech enterprises, which are located in High Tech Zones (including High Tech Agriculture Zones, Centralized Information Technology Zones or Software Parks) in conformity to regulations by Law on High Techs [2], Law on Information Technology [3], enterprises newly established from investment projects for high tech products, high tech enterprises located outside High Tech Zones granted of licenses by MOST in conformity to regulations by Circular No. 32/2011/TT-BLHCN dated 15th November 2011 (called afterwards as Circular 32), to the total statistic number of S&T enterprises. This recommendation is based on the following arguments: (1) "High techs" are a specific type of technologies but well included in global concepts of "science and technology"; (2) High Tech Zones are hubs to gather and to connect R&D activities, high tech application, incubations of high techs, incubators of high tech based enterprises, training facilities of high tech human resources, production and trade of high tech products, provision of high tech services" *(Article 31.1, Law on High Techs)*; (3) High tech enterprises produce high tech products, provide high tech services and conduct high tech R&D activities" (*Article 3.4, Law on High Techs)*; (4) High Tech projects are those projects which satisfy one of the following conditions: "Using R&D results for technological innovations, innovations and enhancement of added values of products to give contributions to modernization or a formation of new production sectors and services in Vietnam" (*Article 2.1.b, Circular 32)*. According to regulations stipulated in Decision No. 49/2010/QD-TTg by the Prime Minister dated 19th July 2010, the sectors of high techs and high tech products which get priorities for development actually are included in the list of the 7 fields governed by Circular 17.

In the above noted context of legal regulations, high tech enterprises (inside or outside High Tech Zones) and enterprises newly established on basis of investment projects for high tech products need to satisfy fully the conditions applied to S&T enterprises. This view matches with the one of some local authors, namely Nguyen Quan, 2006 [21]; Vu Cao Dam, 2006 [23]; Nguyen Thi Minh Nga, 2006 [24]; Bach Tan Sinh, 2005 [22], 2006 [17]; Nguyen Van Phu, 2006, [26]; Nguyen Thi Minh Nga and Hoang Van Tuyen, 2006 [25]; Hoang Van Tuyen, 2005 [18] and some others which consider high tech enterprises and enterprises in High Tech Zones and S&T Parks as S&T enterprises.

On basis of the above noted interpretations, S&T enterprises are not only the ones granted of the certificate of S&T enterprises by provincial DOSTs but also enterprises in other forms, namely: (1) Enterprises granted, by MOST, of the certificate of high tech enterprises (including high tech enterprises and enterprises established on basis of investment projects of high tech products but located outside High Tech Zones); (2) Enterprises granted, by High Tech Zones, of license of operation in High Tech Zones. It happens in some cases that certain enterprises, while operating in High Tech Zones, do not do formalities to get the certificate of S&T enterprises (granted by local DOSTs) or high tech enterprises (granted by MOST) because they already have got incentive benefits for their high tech activities from management boards of High Tech Zones or high tech related investment on basis of Law on Investment, Law on High Techs and other related laws.

Therefore, in addition to the 123 S&T enterprises as publicly made actually [30], we need to take to account more than 400 high tech enterprises operating in existing High Tech Zones of Vietnam (including Ho Chi Minh City based Quang Trung Software Park, Ho Chi Minh City High Tech Zone, Hoa Lac High Tech Zone and etc.) on basis of the regulations of Law on High Techs, Law on Information Technology, and more than 20 enterprises granted, by MOST, of the certificate of high tech enterprises and enterprises newly established on basis of investment projects of high tech products but located outside High Tech Zones on basis of Circular 32. According to data collected by the authors of this paper, in total we have about 500 high tech enterprises.

The backgrounds for establishment of S&T enterprises are: (1) Doing self-investments for scientific research and technological development (R&D activities) or coordinating with universities and research institutes (for example: Quang Ninh Province Joint Stock Company of Seedlings, Thai Binh Province General Company of Seedlings, Central Joint Stock Company of Seedlings, Joint Stock Company of Urban Water Drainage (BUSADCO) and ect.; (2) Absorbing foreign transferred new technologies (Vietnam-Czech JSC); (3) Conducting investment activities in Vietnam according to Law on Investment, Law on High Techs, Law on Information Technology and others of Vietnam.

Actually, S&T enterprises are established mainly in the two biggest cities of Vietnam, Hanoi and Ho Chi Minh City. These cities have strongly focused on S&T potentials coupled with numerous universities, research institutes and High Tech Zones. Majority of S&T enterprises have small and medium size and operate in the sectors in conformity to actual regulations. All the

S&T enterprises exhibit high interests to the establishment and protection of IP rights for their produced S&T results and products (e.g., Ngan Ha Trade-Production-Import-Export Co. Ltd. Has been granted of 12 patents of Industrial Design of domestic and international protection power; An Sinh Xanh S&T Company has been granted of 8 patents of inventions of domestic and international protection power, Thai Binh Province General Company of Seedlings submitted 15 applications for plant species and more than 30 applications for trade marks).

The 2013 Annual Report by MOST[1] [15], stated that: "The average turnover of S&T enterprises is VND59.8 billion, the average benefits are VND6.4 billion. The average income of staffs of S&T enterprises is VND5 million per month. In some successful cases, the average monthly income of staffs can come up to the volume of VND10 million. Products of many S&T enterprises get high appreciations of domestic and foreign markets. Some S&T enterprises export 75-80% of the produced volume of products and get the certificates from prestigious international organizations to export their qualified product to highly demanding markets of Europe".

2.2. Incubators of technologies, incubators of S&T enterprises

One of the sources to create S&T enterprises are incubators of S&T enterprises. For example, Software Technology Incubator of the Center of Software Technologies of Ho Chi Minh City National University is the first incubator among S&T enterprises in Vietnam (2002). After that, CRC Incubator (2004) of the Center of Research, Consulting and Management of S&T, Hanoi Univesity of S&T was established. The two incubators, for various objective and subjective causes, do not exist anymore. Actually, over the whole country, there exist only 11 operating incubators which were established since 2007 up to now. Similarly to the case of S&T enterprises, majority of incubators are based in Hanoi and Ho Chi Minh City. All the incubators established in Vietnam get financial supports from the Government sources or international sources. They may come from MOST, Ho Chi Minh City DOST, World Bank, Microsoft, USAID, Qualcomm and Hewlett-Packard, InWent (Germany) and etc. Domestic and international organizations and agencies provide various supports including finances, experiences for construction and operation of incubators.

Incubators are facilities equipped with technical infrastructure and service which favorably facilitate the establishment and development of S&T enterprises. Forming incubators are one of addresses of supports for scientists and patent owners to get familiarized with trade activities for

[1] Data collected from 65 S&T enterprises on basis of statistic reports from provincial DOSTs in 2013.

development of their own products. Forming incubators give also contributions to settlement of troubles and shortages of start-ups. Some incubators get successful in their activities to upgrade and commercialize technologies which lead to higher prestige of trade-marks of Vietnam technologies. Many technologies were commercialized in small scale and get the initial market access, namely: on-line search engine IZOMI, EDOVE 2.0 software for management and dispatching of taxi, on-line schools, high nutritious soup (CNC Incubator, Hoa Lac High Tech Zone, Hanoi), Nola - fruit juices and young vegetable (Xuan Thanh Enterprise), Biom - agricultural engineering, compost fertilizers (Nong Lam Tien Enterprise, Nong Lam Incubator, Ho Chi Minh City University of Sylviculture-Agriculture) and etc.

3. Some barriers to establishment and development of science and technology enterprises in Vietnam

Some research works report that, in the Netherlands, there are 6-8 S&T enterprises among every 100 enterprises (making 5-8%) [31]. The US Stanford University actually has 1,000 spin-offs. Averagely, every spin-off has 20 staffs. The total turnover of spin-offs are USD100 billion which is a half of the total turnovers of Silicon Valley, USA [36]. Being permitted by laws, every patent of invention/utility can grant the license of use to various users to establish S&T enterprises. We need to make know that actually in Vietnam there are 421 universities/colleges [19]. Over the whole country, there are about 375,000 enterprises [20]. The total number of patents of inventions/utilities granted from 1981 to 2013 is 23,388 [16]. But we have only about 500 S&T enterprises. These figures show well the gap. Many policies has been issued to promote the development of S&T enterprises including incentive tax rates, reduction of fees, offers of credits, use of S&T services[2] and etc., but up to now we are experiencing a too small number of S&T enterprises and S&T incubators, much smaller than potentials can permit. The quality and the service offered by incubators remain limited then cannot facilitate the establishment and development of S&T enterprises. Here we identify some main barriers as follows:

First, legal regulations related to S&T enterprises are not integrated with Laws in some concerned fields (e.g. Law on Lands). This situation leads to prevent S&T enterprises from getting some incentive benefits offered by laws. Namely, many S&T enterprises could not get incentive benefits in terms of land use, low price of use of infrastructure and lands, it concerns

[2] See additionally: Nguyen Van Anh. (2013) *Some mechanisms and policies actually applied to S&T enterprises.* Bulletin Political-Administrative Science, Center of Scientific Information, Ho Chi Minh National Academy of Politics-Administration, No. 1, 2013.

particularly S&T enterprises outside High Tech Zones. In addition to that, State taxation policies applied to some sectors and fields are not found reasonable to encourage the development S&T enterprises. For example, in some cases the tax rate applied to imported materials are higher than the one applied to imported products which cannot be manufactured by domestic enterprises. If S&T enterprises make investments for research and production of these products they have to pay a tax rate (for import of materials) higher than the one import-export companies do (for import of completed products) which, even in some cases, gets down to 0%. The competition cannot be said faire.

Second, there is a lack of documents to guide the implementation of issued mechanisms and policies which prevent incentive measures from being implemented in practice. For example, there is no regulations related to fees and applications for evaluation of S&T researches and R&D activities which S&T enterprises mobilize themselves investment sources. Also, there is no regulations related to the set-up and application of new standards and specifications of new materials and technologies.

Third, the capital market in Vietnam does not develop yet, particularly the establishment and mobilization of venture funds and investments. The stock market develops only for shares of enterprises but not for technologies as it is the case of developed countries. Then, capital sources cannot be mobilized for investment in incubators of technologies and incubators of S&T enterprises.

Fourth, the Program of supports for development of S&T enterprises [8] has been set up 2 years ago but the Program is actually conducting the inception stage because it has to wait for implementation guidelines to be issued. Also, the Program has some points which do not match the demands and practice of almost all the local entities, particularly in the regulations related to incubators of S&T enterprises.

Fifth, Vietnamese enterprises are mainly small and medium sized with limited capacities for innovations. The State does not issue yet effective mechanisms and policies to link universities, research institutes and enterprises or to help enterprises to absorb new S&T results for establishment of S&T enterprises. This move should offer additional financial sources for R&D activities of scientists.

Sixth, the enforcement of Law on Intellectual Properties is not conducted seriously in many localities and the IP right infringement actions occur in many cases. This situation limits also the mobilization of R&D investment in Vietnam. More than that, Law on S&T does not make new regulations towards S&T enterprises. In some cases the issued regulations do not match

the real context of Vietnam as presented above. Some laws do not have accompanied Circulars to guide the implementation which makes new barriers establish and develop of S&T enterprises in the actual time.

Seventh, MOST actually has so many units having functional duties of State management of S&T enterprises, but does not produce decisive measures to develop the system of S&T enterprises. According to Resolution 115, one of the development directions to be implemented is the shift of public S&T organizations to the mechanism of self-governance and self-liability or to the model of S&T enterprises. The shift is conducted very slowly and out of control. From another side, incubators of S&T enterprises experience a lack of assistance from professional consulting experts and, then, cannot make "seeds" germinate and develop.

4. Some solutions for development

As measures to remove the barriers to development of S&T enterprises in Vietnam, the following recommendations are proposed.

First, rechecking the legal system to improve the mechanisms and policies, to create the integrated system, to secure their feasibility for purpose to encourage the establishment and development of S&T enterprises. Related documents should be early issued to regulate matters of fees and applications for certification of S&T results obtained through enterprise invested R&D activities. This formality is part of necessary conditions to grant the certificate of S&T enterprises.

Second, rechecking the State management system of S&T enterprises in MOST, to define clearly and reasonably the functional duties of assigned units. At the same time, it is necessary to establish the hubs, central and local, with well-defined functions, powers and authorities on basis of full capacities and qualifications to settle timely difficulties and troubles raised from practical activities of S&T enterprises. Hub organizations need to accelerate the shift of S&T organizations to the mechanisms of self-governance and self-liability or establishment of S&T enterprises in conformity to by the Prime Minister's regulations. Also, these hub organizations would play active roles in creation of links between universities, research institutes and enterprises which would provide supports for technological innovations by enterprises. From another side, it is strongly needed to have the objective and exact views and assessment for the number of existing S&T enterprises and, then, to issue right and suitable solutions for development of S&T enterprises.

Third, establishing venture funds in conformity to Law on High Techs and to encourage and to attract foreign venture funds. These measures are

important to support innovations in Vietnam. Studies should be conducted for pilot trials of technology bonds which need to become a type of commodities of market transaction. This would be a new capital source to create driving forces for development.

Fourth, conducting studies and building models of incubators of S&T enterprises on basis of local real conditions. One of the possible models for consideration is to establish incubators of S&T enterprises in every region to support the enterprise invested development of new technologies in the region. The regulations stipulated in Decision No. 592/QD-TTg dated 22nd May 2012 [8] should be improved to match with the demands and status of development of incubators of S&T enterprises.

Fifth, promoting the implementation of mechanisms and policies towards S&T enterprises and IP practice by various ways and measures, such as training workshops of S&T State management authorities, magazines and media. Tough controls and fines should be put to practice to prevent IP right infringement. These measures would encourage organizations and individuals to make investments for S&T activities.

Sixth, amending and issuing early legal documents and regulations towards S&T enterprises. They need to simplify formality procedures, to secure applicability and to take lessons and experiences from advanced countries in development of S&T enterprises.

Seventh, conducting studies to build up the discipline of S&T economy and management in universities, particularly in technical and technological universities. This move would help to form and to develop the team of professional experts which would play important roles for development of technological incubators and services of evaluating, pricing, transferring, consulting and transfer broking of technologies. These experts should have qualified knowledge and necessary skills in fields of techniques, technologies, law(particularly IP rights) and economy to make plan of S&T policies, to take part in work of control, management, organization of implementation of tasks in S&T organizations and S&T enterprises in conformity to socialist oriented market mechanisms in Vietnam./.

REFERENCES

Vietnamese:

1. *Law on Science and Technology* No. 29/2013/QH13.
2. *Law on High Techs* No. 21/2008/QH12.
3. *Law on Information Technology* No. 67/2006/QH11.

4. *Law on Investment* No. 59/2005/QH11.
5. The Party Central Committee, IX-th Session. (2002) Conclusions No. 14/KL-TW dated 26th July 2002, VI-th Conference.
6. Resolution No. 115/2005/ND-CP dated 05th September 2005 on the regulations of mechanisms of self-governance, self-liability of public S&T organizations.
7. Resolution No. 80/2007/ND-CP dated 19th May 2007 on S&T enterprises.
8. Decision No. 592/QD-TTg dated 22nd May 2012 on approval of the Program of supports for development of S&T enterprises and public S&T organizations to implement the mechanisms of self-governance and self-liability.
9. Resolution No. 96/2010/ND-CP dated 20th September 2010 by the Government to amend and to add some articles of Resolution No. 115/2005/ND-CP dated 05th September 2005 on the regulations of mechanisms of self-governance, self-liability of public S&T organizations, and Resolution No. 80/2007/ND-CP dated 19th May 2007 on S&T enterprises.
10. Decision No. 1244/QD-TTg dated 25th July 2011 on approval of main S&T directions, objectives and tasks, 2011-2015 period.
11. Decision No. 418/QD-TTg dated 11th April 2012 on approval of Strategies for S&T Development, 2011-2020 period.
12. Inter-ministerial Circular No. 17/2012/TTLT-BKHCN-BTC-BNV dated 10th September 2012 MOST, Ministry of Finances, Ministry of Interior Affairs to amend and to add Inter-ministerial Circular No. 06/2008/TTLT-BKHCN-BTC-BNV dated 18th June 2008.
13. Inter-ministerial Circular No. 06/2008/TTLT-BKHCN-BTC-BNV dated 18th June 2008 MOST, Ministry of Finances, Ministry of Interior Affairs to guide the implementation of Circular No. 80/ND-CP.
14. Circular No. 32/2011/TT-BKHCN dated 15th November 2011 MOST on the regulations of definition of indicators for projects of high tech application, investment projects of high tech products and appraisal of applications for certificate of high tech application activities, newly established enterprises on basis of investment projects of high tech products and high tech enterprises.
15. MOST. (2013) Documentation of the Conference of Development of S&T Enterprises, Hanoi, November, 2013.
16. Intellectual Property Office. (2013) Annual report of IP activities, 2013. Hanoi, S&T Publication House.
17. Bach Tan Sinh. (2005) *S&T enterprises in Vietnam: Conceptual background and initial assessment*. Bulletin *Studies of Science-Technology Policies*. National Institute for S&T Policy and Strategy Studies, No. 10, June, 2005.
18. Hoang Van Tuyen. (2005); *Studies of forms of financial investment for S&T enterprises.* Final Report of Studies, National Institute for S&T Policy and Strategy Studies.
19. http://www.moet.gov.vn/?page=11.10&view=5251;

20. http://baodientu.chinhphu.vn/Home/Ca-nuoc-co-375000-doanh-nghiep-thuc-te-dang-hoat-dong/20126/142110.vgp;

21. Nguyen Quan. (2006) *S&T enterprises - new producing forces.* Magazine *Hoat dong khoa hoc* (Science Activities), October 2006.

22. Bach Tan Sinh. (2006) *Studies of establishment and development of S&T enterprises and the shift of some Vietnam R&D organizations to operation models of enterprises*. Proceedings of research results of strategies and policies of S&T of 2004-2005 period, National Institute for S&T Policy and Strategy Studies, Hanoi, Labor Publishing House.

23. Vu Cao Dam. (2006) *Discussing again matters of S&T enterprises*. Magazine *Hoat dong khoa hoc* (Science Activities), October 2006.

24. Nguyen Thi Minh Nga. (2006) *Studies of legal aspects of S&T enterprises*. Proceedings of research results of strategies and policies of S&T of 2005-2006 period, National Institute for S&T Policy and Strategy Studies.

25. Nguyen Thi Minh Nga, Hoang Van Tuyen. (2006) *Support policies for development of S&T enterprises - Experiences from European countries.* Bulletin *Studies of S&T Policies*, National Institute for S&T Policy and Strategy Studies, No. 12, December 2006.

26. Nguyen Van Phu. (2006) *Some experiences learnt from study of practical activities of S&T enterprises - representative models of direct S&T application in production*. Bulletin *Studies of S&T Policies*, National Institute for S&T Policy and Strategy Studies, No. 13, December 2006.

27. Pham Van Dien. (2012) *Exchanges of views on S&T enterprises.* Documentation of S&T training courses, Binh Duong Province, 23rd October 2012, S&T Management Institute, MOST.

28. Pham Duc Nghiem. (2014) *Three groups of solutions to push up the development of S&T enterprises*.
http://www.nhandan.com.vn/khoahoc/khoa-hoc/item/23299202-ba-nhom-giai-phap-day-manh-phat-trien-doanh-nghiep-khoa-hoc-va-cong-nghe.html

29. Pham Hong Quat. (2014) *S&T enterprises: Opportunities and Challenges*. http://baodatviet.vn/khoa-hoc/doanh-nghiep-khampcn-co-hoi-va-thach-thuc-3039541/

30. Tran Van Dich. (2014) *Concepts, paths and development of S&T enterprises*. Documentation of the Conference on implementation of "S&T program of supports for enterprise to enhance productivity and quality of products and commodities of Ba Ria - Vung Tau Province, 2014-2020 period", Ba Ria - Vung Tau Province, 10th September 2014.

English:

31. Yvonne Bernardt, Richard Kerste, Joris Meijaard. (2002) *Spin-off, Start -ups in the Netherlands*. Strategic Study B200106, ISBN: 90-371-0854-7, Netherlands Ministry of Economic Affairs, Zoetermeer, May, 2002.

32. Masayuki Kondo. (2004) *University spin - offs in Japan*. Tech monitor, Mar-Apr 2004.

33. Thomas Astebro, Navid Bazzazian, Serguey Braguinsky. (2011) *Startup by Recent University Graduates versus their Faculty- Implications for University Entrepreneurship Policy*. available at: www.andrew.cmu/user/sbrag/ABB.pdf

34. Barbara Bigliardi, Francesco Galati, Chiara Verbano. (2013) *Evaluating Performance of University Spin - Off Companies: lessons from Italy*. Journal of Technology Management & Innovation. 2013, Volume 8, Issue 2, ISSN:0718 - 2724 (http://www.jotmi.org), Universidad Alberto Hurtado, Facultad de Economia y Negocios.

35. Tindara Abbate, Fabrizio Cesaroni. (2014) *Market Orientation and academic spin-off firms*. Working Paper, ISSN 1989-8843, January, 2014, Universidad Carlos III de Madrid.

36. http://www.stanford.edu/home/stanford/facts/