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Legal Rules on University Technology Transfer From Comparative Perspective Between Vietnam and the USA

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Under the context of the economic globalization, to foster the competitiveness of start-ups and enterprises, the technology transfer and the exploitation of invention from universities to enterprises are very necessary. Therefore, the importance of policy and legal rules relating to the transfer of technology is enhanced. In order to ensure the purpose of the university technology translation, the policy of each country with a tendency individual development will create specific legal mechanisms. However, it cannot deny that with the development of science and technology, the building of coherent and synchronized legal mechanism is imperative. Author does not have expectation to analyze all legal rules relating to university technology transfer in general. Therefore, this paper will research the regulations, in particular, on the ownership of technologies which are created from State budget and on the technology transfer management capacity at universities, to promote university technological transfers of two countries with contrasted economies and scientific-technological levels (USA—an industrialized country and Vietnam—a developing country). Through the analyses, we can see the differences from current relevant legal frameworks and have some discussions about the impact of these legal rules in practice between two countries.

Keywords: technology transfer, university technology transfer, intellectual property, innovation, commercialization

Introduction

In many countries, developed or developing ones, the relationship between technology transfer (TT) at universities and the economic development is of the special importance because there is more and more less foreign investment in the technology area. Scientific researches from universities are the main source of new inventions to be patented and commercialized. University technology transfer (UTT) is the process promoting and encouraging the creation of new technologies. The use, protection, commercialization of intellectual assets and intellectual property (IP) knowledge, innovation management at universities become the concern of governments and universities. The Government needs to encourage the innovation and cooperation activities between universities and enterprises through TT as well as consultations, training on IP and providing information about results of publicly funded scientific and patented researches in order to give enterprises various options. On their side, universities will positively promote the process of scientific research and intellectual asset creation as well as TT for industries to receive more financial support from enterprises.

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National innovation system is not made overnight and needs to be evolved over generations. No one can deny the role of UTT in the national policies. The most important issue is to understand clearly who will own the intellectual assets which are created from universities by using State funds (the Government or university or other party) and to understand the capacity, mechanism of university's IP, and TT management (via the establishment of management unit and the policy to boost IP and TT activities at universities). The paper will provide briefly the relevant legal rules on UTT from Vietnam and from the Bay-Dole Act of the USA and then have some discussions about the impacts of these regulations.

Vietnam's View

Vietnam has had an underdeveloped economy. Since its renovation and shift to an open economy, it has seen more progress. New technologies are necessary for national economic development, in particular after Vietnam's accession to World Trade Organization in 2006. However, Vietnam lacks technology. The IP commercialization and TT are very important to promote and encourage the creation of new technologies, are important step for the set-up of technology market, and are important role for the socio-economic development. Basic research from universities and research institutes is the main source of new inventions to be patented and commercialized. In particular, UTT is the main process for promoting and encouraging the creation of new technologies.

The first legal rules on TT in Vietnam were the Ordinance on the Transfer of Foreign Technology into Vietnam, dated on December 5th, 1988. However, at that time, the concept of TT was a little bit misunderstood and defined by lawmakers as "the sale and purchase of license" in the Decree No. 201/CP of the Government guiding the implementation of the previous Ordinance, dated on December 28th, 1988. Therefore, licensing was understood as the sale and purchase of rights. The definition of TT in the relevant laws is not so clear about the activities. According to the Article 3.8 of Law on TT in 2006 and Article 2.7 of Law on TT in 2017 (amendment of Law on TT in 2006), *technology transfer* means the transfer of the right to own or the right to use a technology from the party that has the right to transfer the technology to a technology transferee. The regulations also divided TT into three different kinds of TT: *Domestic technology transfer* means the transfer of technologies, which is carried out within the territory of Vietnam (UTT in Vietnam is mainly implemented by this type); *transfer of technology from abroad into Vietnam* means the transfer of technologies across borders to the territory of Vietnam, and *transfer of technology from Vietnam to abroad* means the transfer of technologies from the territory of Vietnam across borders to foreign countries.

In addition, the term of technology was separated from IPRs and rather understood as a kind of know-how, trade secrets than patent. This explains the reason why technology was referred clearly as potential assets for capital contribution in joint venture or in enterprises in addition to tangible assets, land use right, IPRs. The explanation was also shown in the Civil Code (1995, amended in 2005 and 2015) and Law on technology transfer (2006, amended in 2017). Pursuant to the Article 4, Clause 1, the Law on technology transfer in 2017, the technology objects which are eligible for transfer as follows: (a) Technical know-how, technological know-how; (b) technical information about technology is eligible for transfer in the form of technological plans, technological processes, technical solutions, formulate, technical specifications, drawings, technical maps, computer programs, and information files; (c) solutions for production optimization and for innovation of technology; (d) machine(s), device(s) which are attached with one of the above mentioned (a), (b), or (c). In

Clause 2, Article 4, Law on technology transfer stipulates that in the case the above-mentioned technology objects in Clause 1 are protected by IPRs, the transfer of IPRs is made according to the IP laws. This means that technology could be attached or unattached to IPRs for being transferred but the UTT and transfer of IPRs from universities are governed by different laws and thus controlled by different competent authorities. As mentioned above, the following part will show the Vietnamese legal rules on the ownership of technologies and UTT management unit.

Ownership of Technologies

Even though the patent system was known in Vietnam in the later part of the 18th Century at the early stage of the French colonization (Christopher Heath, 1999), and was adopted with the Soviet model of inventor certificate in 1981[1], the concept of TT and its influence are not really familiar with policy makers, judges, business persons, and scientists. Adopting the whole Soviet economic law concept since early 1960s, the intellectual property rights (IPRs) were considered as the inalienable property rights.

Regarding the transfer of technologies created from state budget-funded research and development, Article 40, Clause 1, the Law on TT in 2006 stipulated that "Unless otherwise provided for by law, the State shall transfer the right to own a technology created from state budget-funded research and development to the organization in charge of researching and developing that technology". It means that the technologies which are created from universities by the State budget could be owned by these universities if the ownership is transferred to State-run universities by the competent authorities by the competent authorities. The Article 36.2.a of the Law on TT in 2017 also confirms the above-mentioned transfer of right to own technologies which are created from State funds to promote commercializing scientific research and technological development results. However, there are not any detailed provisions in sublaws relating to the transfer of rights, i.e., methods, conditions, technical fields, exclusive or unexclusive licensing, duration of ownership, etc.

In the case where technologies are protected under IPRs, like many other countries, universities can hold title to inventions funded in full or in part by State budget. In fact, the Article 9.1 of the Decree No. 103/2006/ND-CP of the Government detailing and guiding the implementation of a number of articles of the Law on IP regarding Industrial Property, provides that when an invention, or industrial design, or layout topography is created on the basis of full financial, material, and technical investments by the State, the right to the invention or design or layout belongs to the State. The organization (it can be a state-owned university) or state agency assigned by the State to act as the investor represents the State in exercising that right to registration. It means that public universities keep the title to filing or registration only. The transfer right of these technologies as IP objects needs to be controlled by the State.

This management method of transfers of State budget funded technologies is shown in other relevant sublaws. The Circular No. 15/2014/TT-BKHCN of the Ministry of Science and Technology providing the process, procedures for the assignment, usage right transfer of scientific research, and technological development results using State budget, dated on June 13th, 2014 requires clearly that all organizations demanding for the assignment or licensing of above-mentioned results under intangible assets have to prepare documents and submit to the State science and technology competent agencies. The competent authorities will examine for

[1] See the Decree No. 31/CP of the Government on improvement and invention dated on January 31, 1981.

approval and value the technologies. It means that the organizations including public universities could become owner or have the right of technology license with some conditions.

It is understandable that such broad provision of transferring the right to own a technology created from state budget research and development to the organization in charge of researching and developing that technology, cannot or hardly work. The relevant sublaws tried to broaden the State control in economic and commercial transactions. In addition, they made rather more confusion in regard of approval. The under-law regulations are not officially binding documents but they are guidance for Governmental officials to implement the law.

Technology Transfer Management Unit

In developed countries, the protection and commercialization of IPRs become the customs in the scientific researches. In terms of business, the organizations which have a lot of commercial transactions relating to IPRs such as universities and research institutes set up a functional unit to manage these activities. The organs are often called the technology transfer office (TTO) or technology licensing office (TLO). In some ASEAN countries, such as Malaysia, Indonesia, and Singapore, offices managing IP and TT also have been set up at universities. These offices are responsible for managing IPRs, supporting in licensing IPRs, and searching patent information, etc. with an aim at developing the national economy based on knowledge. Thanks to a judicious policy and significant efforts, Malaysia, Indonesia, and Singapore have become technologically and economically developing countries in Asia. With longer-term strategies, many universities considered IPRs as resources, and appointed an Intellectual Capital/Asset Manager who is responsible for integrating these resources into development strategy.

To manage in a unionized manner, organize, and implement the UTT and IP activities at the technical universities in Vietnam, the set-up the offices specialized in UTT and IP management according to the model of TTO or TLO are very necessary and urgent. The offices at Vietnam's universities should have the following functions: Set up councils to evaluate, select the technologies for the patent filing to transfer and commercialize technologies; Search and exploit patent information; Support the university's researchers and bodies in filling patent; Manage protected IPRs; Build up the database on patent information and patent map; Build the programs, projects; Hold the seminars, curriculum and teach IP subjects; Seek financial resources for R&D activities; Direct the research activities for key research group, etc.

Thanks to the raising awareness about the importance of IP and TT management at universities, based on the practical experience of some public technical universities, with the strong recommendations of some IP and TT experts from universities, the Minister of Education and Training issued the Decision No. 78/2008/QĐ-BGDĐT dated on December 31st, 2008, providing management of IPRs in universities and educational institutions, including: Establishment of specialized body on management of IP; Establishment of procedures for IP identification and commercialization; Establishment of ownership of generated IP; Establishment of allocation percent between inventors, university, and others. As one of the recommenders as well as drafters and revisers of this Decision, the author of this paper feels that the ministerial policies contributed actively to building internal regulations on management of IPRs and TT within Vietnamese universities although not all universities issued IP policy and not many universities established management bodies for UTT and IPRs.

In order to operate successfully the UTT and IP management bodies, it could not lack human resources. To build more management capacities of UTT, the Government launches the National Program Supporting Intellectual Assets development 2016-2020 (Program 68) with the aim being: Raising the awareness of organizations and individuals on IP in the international economic integration of Vietnam; Training profession and expertise of IP for around 1,000 individuals; Focusing on research institutes, universities, and businesses; Supporting exploitation and application in practice for at least 50 patent/utility solutions in Vietnam; Supporting the protection, management, and development of IPRs for at least 70 products of local characteristics, products bearing famous villages; Assisting at least 100 businesses and organizations in science and technology to build and deploy management model and develop IP; Supporting registration of protection of IPRs at home and abroad for national products by the Prime Minister for approval.

It can be shown that the establishment of specializing units to manage UTT and IPRs and human training policy are partly encouraged by sublaws, which promises the development of TTO or TLO in Vietnam.

US's View

Unlike Vietnam, the USA is the very developed and advanced country with the top economic position in the world although her history lasts some hundred years. Thanks to efforts from the former presidents Thomas Jefferson, Abraham Lincoln, the US, with the common law system, has had the patent act in 1790 and patent system at very early time. The US highlights the property rights and individual creative freedom rights. The country is well known globally with the rapid scientific and technological development.

Other key differences about UTT between the USA and Vietnam should be noted. The US and many other advanced countries recognize that technology, whether or not patented, is transferred by contract or invested in a company according to the comparative law survey of the IP protection mechanism which was conducted in many advanced countries such as the US, Belgium, Germany, Italy, the Netherland, Spain, and Japan (Cohen-Jehoram, 1972).

In addition, American universities have been transferring their technology to industry for nearly a century. The first formal TT program was started in University of Wisconsin in 1924. The situation in Vietnam is quite different. In fact, American universities have been transferring their technology to industry since before World War II. The universities annually receive in total more than $1 billion in royalty payments, and are the recipients of more than 3,400 US patents (Myers, 2005, p. 2). In addition, American university researchers have another path to wealth. Sometimes called spin-offs, this refers to companies started by entrepreneurial researchers based on their research. American universities create hundreds of new start-up companies every year (Myers, 2005, p. 6).

In the mid 1970s, the American Congress concerned about the failure to use patents which were owned by the federal Government to encourage product development stemming from federally funded research and development. There were only 5% of total 28,000 patents owned by the federal Government that had been exploited while about 25%-30% of the patents which were owned by the industries were used[2]. The Congress

[2] US General Accounting Office (1998), *Technology transfer administration of the Bay-Dole Act by research universities*, RCED 98-126, Washington, DC. p.3.

concluded that the barriers were too great while the incentives were too small for universities or the private sector to develop technology from the patents which were created from Federal funds. The Bayh-Dole Act (officially Amendments to the Patent and Trademark Act, P.L. 96-517) and Stevenson-Wydler Technology Innovation Act (P.L. 96-480) were issued to overcome the situation by creating a uniform licensing system for all federal agencies, reducing the necessary steps to grant licenses. Stevenson-Wydler Act, pertaining to intramural research in government laboratories, set up TT as a federal agency mission, creating rules by which federal agencies could license discoveries for commercial use and receive royalties and fees while Bayh-Dole Act, pertaining to extramural research outside of government laboratories, extended these powers to other organizations performing federally sponsored research, including universities (US General Accounting Office, 1998). In 1982, the Government provided the guidance on the implementation of the Act as well as implementing standard reporting requirements and issued extended Act to all federal contractors. In 1984, the Government removed limitations on exclusive licenses. In 1987, there was the consolidation of regulations for all of the rights and obligation for inventions which were created from the Federal support. In 2000, there was the modification to streamline the process where federal agencies commercialize inventions made by their employees. Therefore, the papers will examine the Bayh-Dole Act (effective in 2002) which is considered as the most important legal rules on UTT in the USA, especially on the regulations on technology ownership and UTT management unit.

Ownership of Technology

The legal rules on the ownership of patents which were created from federal funds can support TT from universities to the public. Similar to Vietnam, prior 1980, the title (ownership) to any patent which was created by using federal funding was owned by the federal Government. There was not uniform policy among federal agencies for the transfer of the invention into private sector for commercialization. The Government controlled the patents, did not grant exclusive licenses and separate inventors from their inventions, the American Government held titles to federally funded inventions, and only a small percentage were actually commercialized. The Bayh-Dole Act provided the option of ownership of inventions to the universities that received money from the Government in exchange for efforts toward commercializing federally funded researches. The situation changed beyond 1980.

The Sec. 202. (a) of Bayh-Dole Act stipulates that “Each nonprofit organization or small business firm may, within a reasonable time after disclosure as required by paragraph (c)(1) of this section, elect to retain title to any subject invention...”. According to Sec. 202. (c). (1) relating to Disposition of rights, scientists must disclose inventions arising from federally funded research to the university (i.e. via TTO) within a reasonable time. Within two months after an inventor discloses an invention to the TTO, the institution is required to disclose the invention to the Federal Government. In addition, another key change is that the Bayh-Dole Act was to authorize federal agencies to grant exclusive licenses to inventions owned by the federal government (Latker & Norman, 2000).

Before the Bayh-Dole Act, the Federal Procurement Regulation required the use of a patent rights clause that in some cases required federal contractors or their inventors to assign inventions made under contract to the federal government unless the funding agency determined that the public interest was better served by allowing

the contractor or inventor to retain principal or exclusive rights (Subcommittee on Domestic and International Scientific Planning and Analysis of the Committee on Science and Technology U.S. House of Representatives, 1976). With these policies, American universities are increasingly exercising their property rights over inventions. These new policies were a key change made by Bayh-Dole Act because by the procedures, federal contractors that acquired ownership of inventions made with federal funding could retain that ownership and grant exclusive licenses. There was no such legislation relating to the disclosure of invention in Vietnam although as above stated, the current Law on IP of Vietnam states that inventions of employees who may reasonably expect to make inventions are clearly owned by the employer (the investor).

Technology Transfer Management Unit

Section 202. (c). (7) states that in the case of a nonprofit organization such as universities,

> ...; (B) a requirement that the contractor share royalties with the inventor; (C) except with respect to a funding agreement for the operation of a Government owned-contractor-operated facility, a requirement that the balance of any royalties or income earned by the contractor with respect to subject inventions, after payment of expenses (including payments to inventors) incidental to the administration of subject inventions, be utilized for the support of scientific research or education; (Bayh-Dole Act 35 U.S.C $200-212. Another source of Bayh-Dole Act is AUTM link to the actual legislation: http://www.autm.net/aboutTT/aboutTTbayhDoleAct.cfm)

and that

> (E) with respect to a funding agreement for the operation of a Government-owned contractor-operated facility, requirements (i) that after payment of patenting costs, licensing costs, payments to inventors, and other expenses incidental to the administration of subject inventions, 100% of the balance of any royalties or income earned and retained by the contractor during any fiscal year up to an amount equal to 5% of the annual budget of the facility, shall be used by the contractor for scientific research, development, and education consistent with the research and development mission and objectives of the facility, including activities that increase the licensing potential of other inventions of the facility; provided that if said balance exceeds 5% of the annual budget of the facility, that 75% of such excess shall be paid to the Treasury of the United States and the remaining 25% shall be used for the same purposes as described above in this clause (D);... (Bayh-Dole Act 35 U.S.C $200-212. Another source of Bayh-Dole Act is AUTM link to the actual legislation: http://www.autm.net/aboutTT/aboutTTbayhDoleAct.cfm)

Before 1980, there were no national policy and federally governmental funds for TTO at universities in the US. However, the Bayh-Dole Act which was codified in the US Code of Federal Regulations provides a legal basis for TTO funding by stating that income recorded from the commercialization of federally-funded research results only can be used for three purposes: to fund the TTO administration, to divide the share of income to the inventor as an incentive for TT participation, and to encourage education and further research and development activities at universities. In addition, universities are free to determine the percentages of income division for relevant parties after the successful technology commercialization (Young, 2007).

Discussions and Conclusions

In the USA, the TT which was developed by universities had been spurred by the enactment of the Bayh-Dole Act in 1980 (Grimpe & Fier, 2010). The American TT system was fundamentally changed by enabling universities to retain title to inventions and take the lead in patenting and licensing groundbreaking discoveries. It could be noted that the Bayh-Dole Act is as fully viable today as it was in 1980. The Act is good for the American economy—helping the US maintain its competitive edge—and it spurs job creation. The rapid

development of TT activities at American universities had contributed significantly to the American economy. More than 200 American universities have TTO (the number of these offices is eight times higher than in 1980). The number of patent filling from universities is much higher. In 1980, there were about 250 filed patents, but the number was of 3,933 in 2002. Total revenue from UTT in 2003 was of 1,306 billion of USD, increasing 5.7% in comparison with 2002. There were about 27,322 university licenses from 1980 to 2006. In particular, there were 4,783 new licenses in 2004. UTT contributed about 40 billion USD to the American economy and created 270,000 jobs (Fraser, 2006). Since 1980, American universities have spun off more than 4,000 companies. According to recent survey data by the Association of University Technology Managers (AUTM), in fiscal year 2012 alone, $36.8 billion of net product sales were generated and startup companies started by 70 academic institutions employed 15,741 full-time employees, 591 new products originating from university research were introduced to the marketplace by companies. The majority of startup companies born from university technologies are located in the university's home state[3].

Consequently, since the enactment of the Bayh-Dole Act, there has been an explosion of TTO across the US within or associated with universities (Piroozi, 2017). The basic source for information covering American UTT is found in the annual surveys of AUTM. In brief, a large majority of US institutions have a licensing office. Their main function is normally to negotiate research contracts with foundations, industrial companies, and the government. More recently, spin-offs have emerged as an additional form of TT. The UTT management units support spin-off creation, going beyond patent licensing units, and are specialized in commercializing technology. As a result of a complex evolutionary process, nowadays they are both TT and commercialization units (Condom, Llach, & Bikfalvi, 2011).

Vietnam is one of the fastest-growing economies in Asia, with average annual GDP growth of around 6.5% over the last decade. The structure of the economy has changed rapidly in the last 10 years, with a steady increase in the share of industry and services in the GDP, and a steady decrease in the share of agriculture. Greater diversification in industrial production and services is laying the foundations for sustained output and employment growth. The low labor costs and young labor workforce have made Vietnam a manufacturing hub in Asia[4].

We can say that the success of Vietnam's economic development has resulted mainly from the investment and innovation of technology for enhancing productivity and product quality, which creates new, highly competitive products, satisfying domestic needs and export. Vietnam has more than 200 universities and colleges, most of them are State-owned universities. The UTT to enterprises is fruitful. Price of domestic technologies is reasonable in comparison with the price of imported technologies and appropriate with Vietnamese conditions. This is because only in technical and agricultural universities, 10,250 TT contracts are signed with the total amount of more than 1,000 billion VND (1 USD = 16,500 VND) during the period 2001-2006 (Phan, 2006). However, Vietnam still lacks technologies. In reality, there were not many real transferred technologies. According to statistics on the technological development level of Vietnamese industries, 10% of industries have used technologies in the 1970s, 30% in the 1980s, and 50% in the 1990s. More than 90% of Vietnamese

[3] See https://autm.net/AUTM/media/About-Tech-Transfer/Documents/BayhDoleTalkingPointsFINAL1193.pdf, accessible on May 11th, 2020.
[4] World Bank in Vietnam, https://www.worldbank.org/en/country/vietnam/overview, accessible on May 4th, 2020.

enterprises are small and medium in size (Le, 2005). There are even very small ones in Vietnam, and of course they too are short of technologies.

One of the crucial conditions to protect results of scientific researches, promoting TT, appealing to investors for science and technology development, is the protection and enforcement of IPRs. In recent years, the people's, business persons', and governmental officials' awareness about IPRs protection is raised. According to Annual Report of National Office of Intellectual Property, the number of filing applications is larger. However, in comparison with trademark and industrial design, the number of patent/utility solution filing applications and granted certificates is very small, which is not commensurate with their potential. For example, regarding the certificate number, according to the Annual Report of IP activities in 2018, the trademark certificates which are issued from 1982 to 2018 is 312,523, that of the industrial design certificates from 1989 to 2018 is 27,772 while the number of patents from 1981 to 2018 is 20,403, that of utility solution certificates during the period 1989-2018 is 1,970. However, more than 90% patents are granted for foreigners and patents granted for Vietnamese universities accounted for only 4% among total Vietnamese patent and utility solution certificates. In addition, although the filing applications are increased, the commercialization of IP assets via the transfer, assignment and licensing of IP assets are not developed. For example, the total number of successful patent and utility solution transfer contracts is about 20-30 per year, which is so small (National Office of Intellectual Property, 2019).

At present, there is not TTO at most Vietnamese universities. Therefore, researchers who have inventions are in an embarrassing situation in applying for patent protection and in exploiting and commercializing their intellectual assets.

In conclusion, the promotion of IPRs protection and UTT in R&D activities is vital in Vietnam. There are many reasons why UTT is not developed in Vietnam. Whether or not, experience from the US is very useful for Vietnam at the time being. Vietnam still lacks legal rules on IP policy for universities to encourage innovation and UTT promotion, such as announcements of R&D results, division of income from UTT for inventors, etc. Vietnam also lacks university units which specialize in the commercialization of research results or patents like models of TTO in the US and lacks encouragement and incentives such as financial policies, funds for innovation for technology receivers, and persons who apply technologies to production, remuneration, and bonuses for parties successfully executing UTT contracts, etc. Universities are the important patent suppliers. For this reason, the American policy of technology ownership and TTO development according to Bayh-Dole Act should be implemented in Vietnam.

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