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Need for a Legal Framework to Enable Public-Funded Organizations in India to Build a New Paradigm for Innovation and Utilization of Intellectual Property (IP)

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The Protection and Utilization of Public Funded Intellectual Property Bill, 2008 [hereinafter referred to as "the Bill"] was to provide a standard framework through which the universities and academic and research institutions are supported to build larger pools of knowledge which can seamlessly and efficiently be transferred to the industries. The Committee set up to make a recommendation highlighted specific contentious points and the absence of the recommendations put forth by the Committee in the Bill led to its withdrawal from the Rajya Sabha on December 8, 2014. The empirical study indicated that 64% of the participants in the study, emphatically, favor adopting an Act like the Bayh-Dole Act (of 1970 enacted by the United States of America) with modifications made to suit Indian requirements. Government of India (GOI), then, should consider modifying its draft Bill-2008 to bring it in line with the aspirations of India in 2022 and take guidance from Bayh-Dole Act and table the modified PUFUP Bill-2020 in the Indian parliament. Enactment of such a law will positively contribute to furthering science and technology, promoting leading research, make Indian organizations more efficient, and have a meaningful impact on the economy and quality of life of people in India. This research paper presents a section by section proposed amendments to the Bill of 2008.

Keywords: Public Funded Intellectual Property Bill, Bayh-Dole Act, University Patents, IP in Public Sectors

The socio-economic growth of a country directly correlates with investments made in Research & Development (R&D). This has been borne out in developed and developing countries alike, with evidence to substantiate that R&D investments have a direct impact on a country's manufacturing capacity, product innovation, health, security, productivity, exports, employment and capital formation. For this reason, countries around the world, and particularly developed countries, have made a long-term sustainable choice to dedicate a portion of their budgets to promote R&D.

Although India's R&D investment[1] has been growing consistently over the years, it has recently amounted to only 0.88 percent of its GDP when compared to the more than 2 percent of GDP seen in developed countries like the US (2.8), China (2.1), Israel (4.3) and Korea (4.2). Public expenditure to drive R&D in India dominates—a marked contrast to other innovation hubs, where the private sector is the driving force. For instance[2], about 74 percent of expenditure on R&D is met by a government source in India and is more than twice (about 30 percent share by the Government) than countries like China and the US.

The Government of India (GOI), for its part, has attempted to increase R&D activities in the country through the Science and Technology Policy (S&T Policy) of 2003 (raising R&D expenditures to 2 percent of GDP) and the National IP Policy of 2016 (providing incentives for generation, protection, and commercialization of intellectual property IP).

However, some gaps remain. Currently, in India, the IP created by government-funded research institutions is governed by the terms of its funding agreement. Because of this, domestic innovators must commercialize products on a case-by-case basis.

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Some policymakers have signaled the need for fixes. The 11th Five-Year Plan of India[3], for instance, states that an appropriate legislative framework is required for incentivizing inventors and commercializing publicly funded R&D. Further, the National KnowledgeCommission (NKC) formed by the GOI recommended that it isrequired to enact a law, which enables organizations such as universities and research institutions, which receive the state funding, to own the IP generated by such organizations. The Protection and Utilization of Public Funded Property (PUPFP) Bill, 2008 (Bill-2008) was proposed to incentivize IP creators by focusing on ownership, protection, and commercialization of IP. Because Bill-2008 lapsed in Rajya Sabha in 2014, there is no uniform law in India that controls the ownership of state-funded inventions.

It is necessary to understand (i) the reasons for lapse of Bill-2008 in Rajya Sabha; and (ii) the extent of awareness that Fund Receiving Entities (FREs)[4] have about existing state funding. Such an understanding may provide insights in formulating a revised Bill. Furthermore, the indicator of level of awareness, if low and confusing, can provide a strong basis regarding the ways a revised Bill could standardize processes for innovations in India.

Recent Developments

Current challenges—such as COVID-19—and future flashpoints of climate change and sustainable energy resources need committed, collective, and urgent action. To find a solution to such challenges, the GOI launched the Vaishwik Bharatiya Vaigyanik Summit[5] to formulate a 2020 action plan for the following themes: 'Ideation through Virtual Associations', 'Complementary Research' and 'Collaborative Development'. Rapid solutions to the challenges faced by the global ecosystem can be achieved through 'Interdisciplinary Innovations' and 'Extensions of Research'. This collaborative initiative by S&T and the academic organizations of India will enable deliberations on thought process, practices and R&D culture with a problem-solving approach[6] to big challenges by:

(i) Convening 3000 Indian luminaries in academic institutes and R&D Organizations across the world, on a single platform to debate (1500 panelists to debate on 80 plus topics spreadacross 18 major themes) the collaboration mechanisms and methods to strengthen the S&T base in India, with their counterparts working in India.

(ii) Bringing together varied experiences and proficiency of diverse academic cultures to push forward the research outcomes.

(iii) Strengthening GOI's "AatmaNirbhar Bharat" initiative for High End Research in Science and Technology.

The Government of India believes that a systematic and objective-oriented collaboration between local Indian luminaries and international academics with Indian roots will provide a fast track for the country's advancement in academics and scientific research. At the same time, greater collaboration can encourage the adoption of best practices, as well as a global knowledge exchange in academic experiences and research.

Such recent developments can only become fully successful if there is a uniform understanding about the ownership of state-funded inventions and the IP generated thereof. Thus, there is a need for the GOI to focus on enacting such a uniform law to complement this work.

Current State of Public Funded Research in India and the Ownership of Intellectual Property (IP) Arising Thereof

Motivation

This study draws motivation from the fact that the awareness:

(a) about public funding by the Government of India (GOI) in Research and Development (R&D); and

(b) generation, protection, and use of the IP and handling ownership of IP--especially in universities, small and medium scale Enterprises (SMEs), Technology Business Incubators (TBIs), start-ups, and public enterprises (collectively referred to "fund receiving entities (FRE)") – is low. Such low awareness is hindering the innovation in FREs and therefore impacting the economic and societal progress of India.

So far, there have been short discussions on Bill-2008 ("Arguments Against the PUPFIP Bill," for example), which primarily focus on discussing or explaining the meaning of the sections and some issues and challenges associated with the draft bill. However, what is missing in the current body of knowledge is an empirical study on the awareness among FREs about public funding by the GOI and its utilization, obligations of the receiving entities, ownership of IP and commercialization of such IP, sharing of rights and benefits and the societal obligations of utilizing such public funding. Further, the

above studies or discussions have not focused on collecting feedback from FREs on the operational aspects of implementing (including delivery of funding) the objectives stated in Bill-2008.

An empirical studywas conducted to collect responses to a carefully crafted set of questions from a sample size of 161 participants mostly belonging to the FREs, analyze the data, and draw conclusions/inferences based on that data. Further, at least some of these questions provide insights into how (including means and methods) the FREs prefer to consume such GOI funding facilities.

Overview of the Study

This empirical study discloses that awareness about public funding is low i.e., only about 65% of the participants disclosed that they are aware of the public funding by the GOI. However, about 79.5% of the participants in the survey disclosed that they have received funding from the GOI. The difference between 65% being aware of the public funding and 79.5% receiving such funding clearly indicates that there is a gap in the general understanding about public funding by GOI.

Further, a substantial percentage (82%) of participants revealed that GOI does not have a standard procedure for granting public funding for R&D and about 72% want GOI to adopt a standard procedure for granting public funding. While only 65% of the participants disclosed that they are aware of the public funding and 82% of the participants reveal that GOI does not have a standard procedure clearly indicates that there is a lack of awareness about public funding. Further, 64% percentage of the participants reveal that a Bayh-Dole-like framework (i.e., US-style framework) should be adopted by India. Another interesting outcome of this study is that about 80% of the participants strongly feel that the GOI or state governments should commercialize the IP arising out of public funding. These inconsistencies succinctly indicate that there is a need for a modernized and forward-looking Act enacted by the parliament of India. Such an Act would bring needed attention to public funding-- its utilization, generation, protection, monetization of IP and attendant ownership and licensing challenges.The following paragraphs are dedicated to explaining these results in further detail.

Empirical Study

Sample Size

One hundred and sixty-one (161) individuals participated in the empirical study and these 161 participants included: six (6) from financial institutions; thirteen (13) from industry chambers; twenty-three (23) from an innovators' pool; sixteen (16) from public institutions; thirty-our (34) from the start-up community; thirty (30) from TBIs; and thirty-nine (39) from universities. It may be debatable whether a sample size of 161 is large enough to provide meaningful insights.

However, given that the participants were drawn from different industries and academic sectors, the breadth of coverage will suffice. The responses provided by the participants appear to provide a range of insights and inferences that if addressed appropriately within the bill, will have a positive impact. Thus, increasing the sample size can only provide a marginal increase in the inputs while creating the huge burden of collecting, collating, and curating such data. Thus, the sample size of 161--with a given mix of participants--provides good cross-functional insights into the current state of public funding and the IP scenario arising out of such public funding.

In the authors' view, increasing the sample size may only change the results/insights marginally and such marginal changes in the result may not change the conclusions, in a significant manner. The reason to arrive at such an inference is that most candidate institutions considered in this study bear a significant overlap in the scope, structure, policies, etc., as compared to the non-candidate institutions in this study. Therefore, the responses from the non-candidate institutions are presumed to be substantially like that of the candidate institutions (i.e., FREs).

Awareness,Recipients of Public Funding and Need for an Act

Out of the total responses, most (39) were obtained from universities and the least number of responses (6) were received from the Financial Institutions category. Also, the responses were not uniform across the sub-class of FERs, for example, 86.66% of the total respondents from TBI sub-category replied affirmatively to the research question whereas 83.33% of the total respondents from Financial Institutions sub-category replied in the negative: stating that researchers are not aware of such funding opportunities. Respondents from Industry Chamber, Public Institution, University replied in balance i.e. just above 50% in affirmation and the rest in the negative. The start-ups, being a nodal subject matter of the research, were aware (67.64%) of the public funding by GOI.

Further, 80% participants responded in the affirmative that they had received the fund/grant from the government for their research work. However, a

lingering question remained: "*if only 64% of the participants are aware of the public funding for research isn't it unlikely that 80% of the respondents would have received the funds without being aware of the public funding*?" It is also important to note that 34 (of the 39) Universities responded that they have received the public funding, however, only 20 (of the 39) Universities were aware of the public funding. Another contrasting point is that 7 (of the 16) public institutions responded that they were not aware of the public funding but, 2 of these 7 responded that they have not received the public funding and the remaining 5 (who did not even know of the public funding) received the public funds. These inconsistencies, especially, in the responses from the universities and public institutions (where the level of understanding, education qualifications and reliance on government funding and awareness of public policies is expected to be high) clearly demonstrate that a lack of proper framework under an enactment passed by the parliament of India is one of the major contributors to inconsistencies in understanding basic parameters such as awareness and whether they have received the funds or not.

As the issues become more complex such as in generation, protection, and monetization of IP and ownership and licensing of such IP these inconsistencies can only grow exponentially. Thus, there is a pressing need for the parliament of India to enact a law focusing on publicly funded research and IP. Additionally, further development of a framework for streamlining or standardizing the process for granting funds, setting out a criteria and process for creation, protection, and monetization of IP and framing policies is needed to resolve the ownership and licensing issues. Over 80% of the participantsin the study believes that there are no standard processes for granting funds and without knowing the process it is unimaginable to think about how an organization would go about seeking such public funds.

Further, it is imperative to look at what other countries have done to resolve this issue, evaluate such efforts to customize and then adopt to meet the needs of India. In view of the above, the responses from 64%of the participants in the study, emphatically, favor adopting a Bayh-Dole-style Act (of 1970 enacted by the United States of America) with modifications made to suit Indianrequirements. Also, the positive impact of the Bayh-Dole Act is evident, and the data points prove the efficacy of such a law.

Thus, GOI of India should consider modifying its draft Bill-2008 to bring it in line with the aspirations of India in 2022, while taking guidance from the Bayh-Dole Act. From there, the modified PUFUP Bill-2020 could be tabled for discussion in the Indian parliament. Enactment of such a law will make India a progressive nation and a law like this can only positively contribute to furthering science and technology, promoting leading research, making Indian organizations more efficient, and improving the economy and quality of life of people in India.

The empirical study indicated that 64% of the participants in the study, emphatically, favor adopting a Bayh-Dole Act (of 1970 enacted by the United States of America) with modifications made to suit Indian requirements. The next section, therefore, analyzes the Bayh-Dole Act and its impact on the US economy, with insight on:

(a) whether Bayh-Dole Act has provided any positive impact on the US economy; and

(b) potential customizations to suit Indian requirements.

The Bayh-Dole Act (BDA) and its Impact on US Economy

The Bayh-Dole Act (BDA), enacted on December 12 of 1980 in the United States of America (U.S.), allowed universities to retain the title of and to license the products of federally funded research.[7]The immense impact of this act changed the entire country's system of technology transfer. The act, sponsored by Senators Birch Bayh and Robert Dole, ultimately helped the U.S. maintain its industrial relevance by promoting innovation and research. This paper will discuss the components of the repeatable, scalable U.S. model for technology transfer and will briefly introduce what is missing in the current system of technology transfer in India.

Pre BDA

Before the passage of the BDA, it is estimated that 30,000 technologies were shelved by the U.S. government with no plan for development or commercialization.[8] Much of the inertia surrounding these inventions was due to the confusion surrounding the use of federally funded research. Before Bayh-Dole's passage, an entity that wished to use a shelved technology had to navigate 26 different federal agency policies.[9] The process of navigating each of these laws made the tasks of licensing very difficult and onerous, leading to only 5% of the available

technologies being licensed.[10] Finally, in the 1980s a law, the BDA, was passed to provide clarity as to how results of federally funded research could be utilized or licensed.

Post BDA

Since the passage of the BDA, clarity of the technology transfer process in the U.S. has led to the following: the U.S. has seen $865 billion contributed to its GDP, 5.9 million jobs have been supported, over 100,000 patents have been issued, and over 200 drugs and vaccines have been developed.[11] Each of these can be linked to more efficient, collaborative uses of federally funded research.

The clarity and simplicity of technology management under the BDA has led to an era where innovation has thrived in the U.S. The BDA provided the groundwork for this clarity by allowing universities to retain title to the fruits of their research and by establishing technology transfer offices at research institutions and universities to license and manage the intellectual property created.[12] Now, instead of searching through 26 different policies, an entity can license technology directly from a university's technology transfer office--a much simpler process.

So, what were the key components that led to this thriving innovation in the US? The implantation of a modern, improved technology transfer system. The components of the U.S. technology transfer system include (1) the establishment of technology transfer offices at universities and research centers and (2) the existence of an inclusive ecosystem where technology transfer can flourish. Each of these components will be discussed in more detail below.

Technology Transfer - Background, Implementation and Discussion

Technology Transfer

Technology transfer is the process that is responsible for successful innovation management, corporate engagement, protection and licensing of inventions, new venture creation and incubation, and economic development.[13]

According to Tech Transfer Central, technology transfer is how research institutions and universities turn inventions and innovations into commercialized products. Typically, this is done through licensing technology to either startup companies or pre-existing corporations.[14] Some organizations such as the Vortechs Group utilize a moreinclusive definition of technology transfer by includingskills and knowledge, also known as trade secrets, in theirdefinition of transferable technology.[15]Overall, from thesedefinitions, it can be seen that technology transfersystems encompass all types of intellectual property: patents, copyrighted materials, trademarks, and tradesecrets.

Focusing on universities, they define technology transferas facilitating the movement of innovations anddiscoveries from university labs into the publicmarketplace.[16] University technology transfer offices, thepoint of contact for business opportunities, manage thisflow of innovation by evaluating invention disclosures,assessing the marketability of inventions or research,securing and maintaining intellectual property rights,achieving commercialization through local businessconnections, assisting university spin-out companies, andmanaging the licensing of university technologies.[17] Toensure that each of the previously mentioned functions isfulfilled, many technology transfer offices utilize acommon process for getting innovations from theresearch stage to complete commercialization.

Technology Transfer Process

The technology transfer life cycle, or process, encompasses the following stages: (1) research and development, (2) invention, (3) evaluation, (4) intellectual property protection, (5) marketing, (6) licensing, (7) product development, (8) public use and economic growth, and ultimate return to (1) research and development.[18] The process is cyclic, starting and ending with research and development as the revenue earned and public use of the invention in stage 8 inspires further research and development, starting the cycle back at stage 1.Princeton University provides a very succinct overview of the technology transfer process at universities. The five steps of the process are (1) universities obtain federal funding, (2) university faculty and students conduct research and make discoveries, (3) university technology transfer offices secure intellectual property rights to protect the discoveries, (4) university technology transfer offices aid in the transfer of the discovery to businesses, entrepreneurs, and startups, and (5) business, entrepreneurs, and startups turn the discovery into a product which results in the creation of jobs and the bettering of human life.[19] This process is very similar to the technology transfer life cycle, but it is much more condensed. Each of these steps helps to fulfill the functions of a technology transfer offices, discussed above.

Landscape or Ecosystem: Support to Technology Transfer Offices

The technology transfer process is driven by cultivating an inclusive environment of innovation and entrepreneurship that bridges the research community, industry leaders, and startup companies.[20] Allowing for an easier transfer of technology between research communities and industry, this inclusive, bridged environment includes the following components: (1) the Association of University Technology Managers, (2) Bayh-Dole legislation, and (3) industry support and connection. Each of these components will be discussed below:

(a) Association of the University TechnologyManagers (AUTM): Much of the inclusive, bridged ecosystem traces its roots back to the Association of University Technology Managers (AUTM). AUTM is a non-profit, member-based organization, comprising 3,000 members and 800 universities, that plays a part in each of the community aspects of the technology transfer program.[21] The main goal of AUTM is to encourage academic research and to increase innovation by providing support to technology transfer professionals and by bridging the gap between industry and university technology transfer offices Part of the support that AUTM offers includes surveys, tools, sample agreements, and other professional support. Many of these resources are available to download for free, but others require a membership.[22] Additionally, AUTM host events and webinars where technology transfer professionals can further their professional development and learn best practices for operating their technology transfer center.[23]

(b) AUTM provides a bridge between universities and industry leaders, including startup companies, by offering several of the following resources. First, AUTM offers the AUTM Innovation Marketplace database where industry leaders and others can view university technologies that are currently available to license. This supports universities by advertising their unlicensed technologies, but it also makes the licensing process a little easier for industry leaders because they can view many of the available innovations all in one place before making a licensing decision.[24]

(c) AUTM offers TransACT, a database containing searchable terms and conditions to help industry leaders and universities prepare for negotiations. The benefit of this database is that it offers comparable data to use during negotiations, can lead to the discovery of alternate pricing or deal structures, and can aid in the confirmation of the fair market value for licensing transactions. Essentially, this database can help ease the negotiation process and get technology in the hands of the buyer faster by making the transaction smoother.[25]

(d) Overall, AUTM is the bridge that connects industry leaders to university innovations. This is only one facet in the landscape/ecosystem that allows technology transfer offices to prosper in the U.S, the others will be discussed in the following sections.

Bayh-Dole Type Legislation

A second facet, and plausibly one of the most important, of the landscape/ecosystem is legislation that supports and encourages the utilization and dissemination of the results obtained from research. Such legislation, the Bayh-Dole Act (BDA), was implemented in the U.S. in the 1980s.

The significance of the BDA was that it gave universities and research institutions ownership of the products generated from federally funded research.[26] The legislation clarified and simplified the technology transfer process. Instead of searching through 26 different policies, industry leaders could now rely on technology transfer offices, the now one-stop-shop for university technologies, when they wanted to utilize or license the results of the university's federally funded research.

How significant was this change? As discussed above, the U.S. went from 30,000 shelved innovations with a licensing rate of only 5% to nearly 30,000 invention disclosures per year with a calculated licensing rate of 35.7%. The prior 35.7% was calculated based on 9,350 license deals in 2018 and 26,217 invention disclosures for that same year (9,350/26,217 =.357).[27]

To reiterate the point, the BDA legislation produced a huge change in the way the U.S. handled the commercialization of federally funded research. There was a 30% increase in the licensing rate. Further, the U.S. went from producing 30,000 innovations from years of research to producing nearly 30,000 innovations in a single year. With 30% of those yearly innovations being licensed, it is easy to see how the U.S. has an $865 billion contribution to its GDP as a result of innovation.

Further, the BDA legislation produced major changes in the overall perspective of innovation within universities. First, innovation became a key driver in the career development of faculty. Since licensing technologies and creating startups became a successful business model, faculty are now expected to engage in the process. In fact, innovation has become a benchmark

in the tenure process with universities looking to the number of issued patents under a faculty's belt as a measure of success.[28]

Secondly, as technology transfer is now among the top 5-strategies for university planning, the Bayh-Dole legislation has changed the way in which universities operate and plan.One way in which technology transfer has changed university planning lies in the way universities plan to differentiate themselves from their competitors as they recruit faculty and students.[29] Technology transfer is a key recruitment tool because faculty and students are just as interested in knowing their research can land them a patent and possibly a portion of the revenue from a licensing deal. After all, the number of issued patents and success as an innovator can make a difference in a faculty member's career advancement and is used by students to make their resumes stand out.

In summary, the Bayh-Dole act has changed the role that university innovation plays in the U.S. economy and has changed the way that universities conduct and plan their business activities. Overall, these changes show why the Bayh-Dole Act is possibly one of the most important facets of the landscape/ecosystem. Without the Bayh-Dole Act, the other facets would not have as strong of an impact.

While the Federal Technology Transfer Act (FTTA) was not discussed above, it is worth an honorable mention while we discuss legislation that supported technology transfer. The Federal Technology Transfer Act was passed in 1986 to bridge the gap between federal laboratories and non-federal organizations. While not directly related to the transfer of technology at universities, the act helped bring federally funded research to commercialization more efficiently and effectively.[30] Overall, the system of technology transfer in the U.S. would not be as successful without both the BDA and the FTTA.

Industry Connections and Support Therefrom

One of the other key facets in the landscape/ ecosystem of a successful technology transfer system in the U.S. is the symbiotic relationship that exists between industry and research institutions. This symbiotic relationship occurs as universities de-risk innovations in exchange for industry support via sponsored research or licensing of the de-risked innovations.

Industry Connections to Support Technology Transfer at Universities

There are several ways in which industry connections support a prosperous technology transfer office. This section will discuss two of those ways: sponsored research agreements and license agreements.

A sponsored research agreement is a contract in which the sponsor pays a sum of money to the university to support a particular kind of research. These agreements are typically the foundation of a symbiotic relationship wherein universities get funding for their research and wherein industry leaders, those who sponsor the research, have an option to license the fruits of the research.[31] This is one way in which industry sponsors university technology transfer offices.

The second way in which industry supports technology transfer is using license agreements. License agreements are the way in which universities license the results of their research to outside companies. The benefit to the university is that the licensee, here a business or startup company, often takes over the payments for patent costs as well as other financial payments to the university such as royalties.[32] This generates money for the university to then put back into continued research and development.

Technology Transfer Supports to Industrial Partners

As noted above, license agreements are beneficial to universities; however, they also have many benefits to the business that licenses the innovations. Such benefits include giving the business a leg up on its competitors, reducing the research and developmentcost/spending of the business, and reducing the time needed to take a future product to market.[32]

Much of the benefit that industry partners see stems from sponsored research agreements. Via sponsored research agreements, businesses can pay a university to conduct a particular type of research. This research can be something that the business would typically have their research and development team do, but the benefit of outsourcing to a university is that the business saves resources and money while de-risking their technologies.[33]

The business saves resources because universities will often apply their own leveraged funds to the research as well as those gained from the sponsored research agreement. According to VentureWell, universities leverage funding with a 40-time increase. Thus, if business sponsors research for $50,000 the university would leverage an additional 2 million. This allows the university to carry out the research rather than the business, but the business gets the first option to license the technology at the conclusion of the sponsorship period.[33] This is a situation where

everyone benefits because universities get the benefits from the license and sponsorship deals and businesses save money while de-risking their research.

Current System of Technology Transfer in India

Over the course of the last 15 years, India has seen an increase in government spending on research, increasing from Rs. 24,117 crores in 2004 to Rs. 1,04,864 crores in 2016. India has also seen an increase in the number of institutions for research and education. With the increase in funding available for research and the increase in the number of research institutions, why hasn't India seen the same impact the U.S. has?

If we look at India, we see a technology transfer system that is similar to the one discussed above. There is a Society for Technology Management (STEM) which was developed in 2005. There are a few technology transfer offices at universities and research institutions.[34] Yet, the portion of India's GDP which is affected by research has remained stagnant at 0.6-0.7%, a percent which is well below that of China, the U.S., Israel, and Korea.[35]

The answer to a better, more effective system of technology transfer in India is the implementation of Bayh-Dole type legislation and Federal Technology Transfer Act type legislation. Currently, this is one of the key differences between the U.S. and Indian systems of technology transfer. Passing these types of legislation would allow for further developments of additional technology transfer offices, which would result in the continued development of India.[36] The United States has created a prosperous system of technology transfer that is repeatable and scalable, but to fully experience the prosperity Bayh-Dole type legislation is needed.

Differences and Commonalities of the US Act and the Indian Bill on Bayh-Dole

The Indian Bill was transplanted from the organ, i.e., the US Act and thus, there were numerous similar provisions in both the texts. In order to comprehend the Bill in its correct sense, one needs to observe, analyze and understand how the provisions were transplanted, how they were molded in the Indian context, why they were shifted from one heading to another, what language was preferred, who was the target audience from the provisions, etc. The primary function of the table is an attempt towards such an understanding of the Indian Bill wherein the substantially similar provisions have been put against each other and further, remarks have been made on their usage of language, additions, implications, etc. The exclusive provisions in both the texts have been mentioned separately, however, taking note of what attributes could plausibly improve the Indian Bill. Further, the Indian Bill is drafted in a more compartmentalized manner and thus, in many parts of the table, where one US section substantially puts forth a feature, numerous sections of the Indian Bill put forth the same feature in a different manner. In order to navigate through the same, color coordination has been used in the table so the reader may catch the essence of different and common points conveyed through the Act and the Bill.

Indian Bill on Bayh-Dole and Non-US Jurisdictions

A comparison of similar Acts in the European Union (EU), Japan, China, and South Africa reveal that in 2005, EU proposed a "common approach" to promote both research investment and innovation.In 1998, Japan enacted a Japanese Bayh-Dole version to promote technology transfer from universities to private business operator.In 2002, China issued several regulations concerning IPR management of state scientific and research program result to improve the process of technology transfer.In 2008, South Africa, enacted IPRs from publicly funded research and development.All these efforts have paid off for those countries in bringing the university research to practice and it has served well for the society and the economy of these countries.There is an urgent need for India to unleash the university research for the good of the society and the economy of the country while protecting the rights of the inventors (or IPR holders).

Recent Developments

In Thailand, The Thailand Research and Innovation Utilization Promotion Act B.E. 2564 (2021) (TRIUP Act) came into force on May 7, 2022.Under this new law, inventions made with the government's funding belong to their inventors (e.g., universities and research institutes).TRIUP Act also empowers the prime minister to issue compulsory licensing orders for the exploitation of research and innovations resulting from the use of government grants in times of national emergency, such as needing to maintain the security and safety of the country or preventing or mitigating public disasters. TRIUP Fair 2022 was organized during 4-6 April 2022, to promote the utilization of research and innovation.

Conclusion

The main aim of The Protection and Utilization of Public Funded Intellectual Property Bill, 2008 [hereinafter referred to as "the Bill"] was to provide a standard framework through which the universities and academic and research institutions are supported to build larger pools of knowledge which can seamlessly and efficiently be transferred to the industries. Effectively, the Bill provides for patenting as an obligation, technology transfer as a responsibility and royalty as a right to the scientists. The impact of the Bill was to eliminate the scattered, or rather absence of a law that does not create any obligations for research and academic institutions to transfer a technology and replace it with a set of guidelines and institutional framework in academic and research institutions that promote innovation and research.

However, the Committee had certain opinions against the Bill which were explained in their Report. The following were pointed out by the Committee as the shortcomings of the Bill. Firstly, the Committee initially was of the view that the Bill was not actually benefiting the scientists as a framework was in place which was similar to what the Bill was aiming to provide. In fact, the regime then was more suitable for the scientists as it provided a degree of flexibility which this Bill failed to provide. However, when the Committee consulted the Secretary, Department of Biotechnology on this issue, the response was that only a few elite institutions had a solid framework in place and most of the other institutions were left with nothing. Furthermore, even the framework adopted by the elite institutions had lacunae and thus, could be improved with this legislation. Ultimately, the Committee concluded that such legislation could potentially help in overcoming the structural inequalities between institutions. Secondly, the Bill posed a practical problem at the execution level. The Committee believed clause 4 was problematic as it provided the scientists only sixty days to disclose all 'Intellectual Property' created by the scientist to the Intellectual Property Management Committee. Now, it is difficult for a scientist to analyze as to when the finding is reportable or not and putting a sixty-day time duration to the same makes it practically troublesome. Adding on to this, the Committee also realized that if the scientists started reporting every new finding, the volume of paperwork generated within each institution would get out of hand and possibly create bureaucratic difficulties. With this, therein lies a huge possibility of abuse and harassment of the scientists who may have been doing all the paperwork, while some of the scientists may have escaped it. This would create a piquant situation of unequal platforms. Thus, they believed the Bill was not facilitatory, rather merely prescriptive in nature. Thirdly, the Committee further stated that blindly patenting all the intellectual property created would not only create bureaucratic issues but also, did not account for the likelihood that not all of them may be potent enough to be converted into a product or a technology. Fourthly, another important, problematic aspect that was found by the Committee was the fact that the objectives of the Bill had the potential to commercialize knowledge and promote crass competitiveness away from the creativity in universities and institutions. The commercialization had the potential to tilt towards a "market driven model" rather than a "social sector model". This would result in promoting a profit-oriented motif as opposed to focusing on applied research or developing technologies rather than concentrating on basic science, academic or other fundamental research to develop models of understanding. The Committee realized that mandatory patenting of the public funded intellectual property and technology transfer would lead to commercialization of intellectual property and would further lead to the rise in prices of drugs and consequently, disadvantage the poor. It also added that all of this would make the essential drugs move away from the reach of the common man who cannot afford to pay market prices. In such cases, the Bill also failed to provide the government the right to revoke the license and acquire the patent to ensure overall societal benefit. Fifthly, the Bill was not only limited to patents, but also extended to copyrights, trademarks, designs, etc. and thus, took the scope of the Bill far beyond only inventions. Moreover, by bringing copyright into the ambit of the Bill, the information and technology sector would adversely be affected because free and open-source software activities would not occur. The Committee was of the view that since copyrights come into play with creation of work and do not need registration for validity, they should not have been a part of this Bill in the first place. Sixthly, para 3 of the Statement of Objects and Reasons hinted toward the withdrawal of the government from financing the institutions and promoting them to

become self-reliant. However, the Committee was of the view that such a forceful yet unfounded assertion on making the universities financially self-reliant created a wrong impression. At the same time, the government could not absolve itself of the responsibility to provide adequate funds to the universities and institutions. Seventhly, clauses 20, 21, 22 of the Bill imposed such harsh punishments on the researchers that it could have deterred them from taking on the challenges of innovation and hence, was counterproductive.

These reasons led to the conclusion of the Committee Report. Finally, the Committee in general, thought that to make the whole framework more transparent, the recipient/creator should mandatorily publish in their website, the details of the public funded intellectual property acquired, assigned or licensed and such other information as may be prescribed. It would make it easy to track the public funded IP from the patent and plant variety database, without the members of the public having to scour each individual website of government grant recipients. The Committee said that more transparency would allow the easy examination of the usage of public funds invested in research for technology.

These points of consideration highlighted by the Committee and the absence of the recommendations put forth by the Committee in the Bill led to its withdrawal from the Rajya Sabha on 8 December 2014.

The empirical study indicated that 64% of the participants in the study, emphatically, favor adopting an Act like the Bayh-Dole Act (of 1970 enacted by the United States of America) with modifications made to suit Indian requirements. GOI, then, should consider modifying its draft Bill-2008 to bring it in line with the aspirations of India in 2022 and take guidance from Bayh-Dole Act and table the modified PUFUP Bill-2020 in the Indian parliament. Enactment of such a law will positively contribute to furthering science and technology, promoting leading research, makes Indian organizations more efficient, and has a meaningful impact on the economy and quality of life of people in India.

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5 https://innovate.mygov.in/vaibhav-summit/#tab3.
6 The VAIBHAV initiative aims to bring out the comprehensive roadmap to leverage the expertise and knowledge of global Indian researcher for solving emerging challenges. By bringing the Indian Overseas and Resident academicians/scientists together a structure of association will be evolved. The aim of summit is to reflect in-depth on the collaboration and cooperation instruments with academia and scientists in India. The goal is to create an ecosystem of Knowledge and Innovation in the country through global outreach. This is a joint effort of all S&T and Academic organizations.
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