Technology Transfer from a Technical University: A Case Study of IIT Delhi

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The paper touches upon the global perspective of technology transfer process from technical universities and academic institutions. The role of FITT (Foundation for Innovation and Technology Transfer), the technology transfer office of IIT, Delhi, is described. The different components of technology transfer process, some successful case studies from the institute are described. With globalisation of Indian economy, it is time that entrepreneurs and the industry at large in India should develop effective interactive relationship with the academia with a view to enhancing technological capability for competitive advantage.

Keywords: Technology transfer, intellectual property, technology business incubation, technology licensing, IIT

Transfer of technology and know-how licensing are means of acquiring technological knowledge and consequently play an important part in the development process. The question of transfer of technology or know-how licensing has been given a high level of importance by different governments with a view to: (i) developing the economic standards of those nations which lack technology, or (ii) transferring/disseminating knowledge. Technology transfer transactions also involve intellectual property issues, which need to be attended to at the time of entering into an agreement1.

What works in University-Technology Transfer?

Universities produce a large amount of groundbreaking inventions every year especially in developed countries like USA and are among the best source of intellectual property. The growing portfolio of companies who have successfully utilized university technology suggests that benefits may be gained from an insight into the nature and process of university technology transfer2.

Technology transfer rests on a strong foundation of university-industry research partnership. To thrive, a technology transfer office must have appropriate staffing, a clear articulated mission, a customer–friendly orientation, clear policies and procedures, and a supportive university culture. Other elements critical for success are an entrepreneurial staff, links to business and economic development activities, and access to capital2.

Start-ups are a major arena for innovative policies and programmes. Interestingly, many universities that are involved in early-stage capitalization, business incubations, and other approaches to nurturing start-ups are doing so in collaboration with state and local economic development organizations and as part of a larger university vision vis-à-vis the industrial community2.

Government’s Role in Promoting Technology Transfer

Steps like, encouraging university-technology partnerships, investing in entrepreneurial support organizations, enabling private-sector investment in new technologies and technology-based companies, removing legal barriers to university-industry technology transfer, attending to human resource and quality-of-life issues and monitoring federal policies and programmes affecting technology transfer, taken by the government can work wonders to promote participation by universities in technology transfers. Such steps to advance university-industry technology transfer contribute in a big way in building state economies.

University Technology Transfer Organisation (TTO)

The mission of a TTO is to facilitate the process of moving research from laboratory to the market place. The objectives of a TTO are to (i) create closer linkage and foster relationship with industry; (ii)
commercialize research for public good; (ii) reward, retain and recruit faculty scientists and (iv) generate resource for additional research and education.

Importance of Promoting IPR Culture in a Technical University

Currently, the level of maturity of technology from a university is low. A great deal of research and development effort is required, first to establish proof of concept and then to upscale. However, universities as storehouses of knowledge are ideally placed for creating new knowledge, converting knowledge to new technology and identifying newer applications. Joint effort and involvement are necessary between the technologist group in the client industry and scientists from the academic/laboratory. Academia-industry-government synergy for addressing technology development issues is essential today. Further, IPR ownership can be a strong motivator for the scientists and recognition enhancer in the S&T community. A very basic utility of technology transfer is the procurement of funds as patented technologies are vital to generating internal resources to the university and scientists.

Technology Transfer from IIT Delhi

IIT, Delhi is one among the 7 IITs of India with a mission to contribute to India and the world through excellence in science and technology, education and research, and to serve as a valuable resource for industry and society. The primary objective of the institute is to impart higher education and training to students.

The institute has a well-developed system for technology transfer in the form of an IPR policy, which was framed in the year 1994. All technology transfer activities of the institute are done by FITT, which is the industrial interface of the institute as well as its marketing arm. Notably, it is financially and administratively autonomous of host institute and among the first of its kind in India.

Thrust Areas of FITT

(i) Marketing, wherein, the basic functions are dissemination of information about faculty expertise to outsiders and creating links between the faculty and potential clients, (ii) formulation of proposals to negotiate terms of agreements and drafting contracts, (iii) providing logistical support to PI/CI (Principle Investigator/ Co-Investigator) in matters of purchase; import, tax exemptions/concessions and legal issues (iv) financial management, (v) assisting faculty members, students and research scholars in IPR matters by searching prior art for patents, filing documents, and training and organizing IPR related workshops.

One important function of FITT is to administer TBIUs (Technology Business Incubation Units) of IITD, which are the potential source of technology transfer from the institute and provides initial seed money to the student entrepreneurs of the institute.

TBIU, started in 2000, is a place where a technology entrepreneur starts converting his or her new ideas/concepts/ service of a product into a commercially viable business in technological association with members of the faculty and students of IIT Delhi. The necessary infrastructure is made available on campus for a limited duration to facilitate research and development to convert nascent technological ideas into commercial entities. While the start up business incubates; the firm may continuously develop and bring its products to market. Eventually, the technology firm matures to the point where it can graduate from the incubator and continue its growth as a viable enterprise. The TBIU program at IIT Delhi is aimed at promoting entrepreneurship among students, faculty and scientists and creating successful technology business enterprises of the future. Currently, there are 6 resident incubator units including four faculty-student led companies.

IPR Practice of the Institute

All the possible projects of IPR go to a standing committee on IPR, where each proposal is discussed in detail. Once the IPR standing committee clears the proposal, subsequent steps in IPR filing are taken care of by FITT. More than 120 IPRs have been filed by IIT Delhi in the form of patents, designs and copyrights. Most of these technologies have been developed out of master degree or Ph.D. programmes of students.

Rigorous investigation into several aspects is carried before filing a patent. Answers to the following questions are first sought before deciding the course of action:

Has it emanated from a student project? If so, is the faculty guide fully conversant with the invention for interfacing with a potential industry client at the time of technology transfer? Will the student be available at the time of filing the application?
Has this invention already been disclosed in a publication or in any public forum?

Will there be a provisional application? If so will this additional work be completed within the next 12 months for filing complete specifications?

What is the maturity status of the invention in the lab-to-market path?

To which industry segment will the invention be of interest? Has there already been an enquiry or two from potential industry clients?

Is the invention the outcome of a sponsored R&D programme? If so, has the NOC been obtained from the sponsor? Or, will it be a joint application? Has the original agreement been consulted?

Has adequate patent search been conducted to establish the prior art and novelty in the present invention?

Have all the technology claims for novelty been identified, preliminary drafted and verified?

Will the application be filed in India only or in other countries also? Will there be a PCT application?

### Commercialization/Distribution/Licensing Guidelines of IITD

The purpose of processing commercialization by IIT, Delhi, which is a non-profit organization, is to meet one of its stated objectives of disseminating the fruits of research and development for the benefit of public and society. Since any R&D effort is expensive and transfer of its results to users is a complex process, the motivation of the institute in commercial transaction is meant to sustain the effort of transferring the research from the laboratory to actual field of exploitation and not for making profit. Commercialization provides incentive to inventor and provides ‘technology push’ to the invention and couples it to the ‘market pull’. The institute usually grants non-exclusive license for commercialization. As far as revenue sharing is concerned, type of commercialization decides the royalty or payment terms to be negotiated by inventor (assisted by FITT, if necessary) and later approved by an appropriate committee. In terms of share, 60% of the royalty revenue goes to the author(s), 20% to the institute and 20% to the department/center/FITT. Where there is more than one author, the distribution will be decided by the principal investigator under whose direction the work was carried out.

### Technology Transfer Modalities

For sponsored projects, the IRD (Industrial Research Department) processes IPR cases as most of the time, the terms and conditions are dictated by sponsors. The necessary IPR clauses are considered by the IRD at the time of project initiation with sponsor or at the time of technology transfer. In case of industry sponsored projects and related know-how transfer from the institute, FITT handles the cases on commercial basis inclusive of any obligations related to IPR in the market. All public domain related IPR issues are handled by IRD. All inventions/know-how developed are declared to IRD, which after preliminary scrutiny, issues a docket number indicating registration of the claim. It then moves from the domain of IRD to that of FITT at an appropriate stage (except in the case of sponsored projects) when the technology know-how is established to be ready for transfer.

### Technology Transfer from IIT Delhi

Till date 33 technologies have been transferred from the institute to the industries, out of which 15 technologies have been IPR protected. Licensing policy adopted is flexible and may involve a one time lump sum payment or royalty (yearly turnover) + license fee or both. Licensing to industry is normally non-exclusive, however, some times an exclusive licence may be granted depending upon the case. Since 1997, 31 technology transfer agreements have been signed of which 10 (36%) have been successfully commercialized with marketing of the product. Six more products have been technically successful but yet to be marketed. Other products are still at the developmental stage. Of the technology transfers completed, 70% did not involve royalty. 57% were non-exclusive and 67% transfers involved SMEs.

### Success Stories

#### Rustgard Technology

A hi-tech cost effective rust converter technology, named, Rustgard technology developed at IIT Delhi, has been licensed to M/s Multitrade Transactions & Solutions Pvt Ltd, New Delhi, for commercial production at their facility in Noida-UP. The product has been developed as per international standard and continues to have certain key imported ingredients not available in the country.

#### Pilling Tester based on Digital Image Processing

This technology licensed to M/s Innovative Engitech (P) Ltd, pertains to development of an objective evaluation system of piling, using image processing techniques. A continuous scene of pilled
fabric sample is converted to digital image and stored in a memory by the image acquisition element. The gray image is converted to frequency spectrum by a transformation technique. The filtered transformed spectrum is then reconstructed and converted to binary by thresholding and thus pills are separated from the original image and used for estimation of a detailed geometrical analysis. Based on results obtained from image processing, a suitable grade is formulated to compare with the images taken from standard charts in the similar manner.

**Conclusion**

With globalisation of Indian economy, it is time that entrepreneurs and the industry at large in India develop effective interactive relationship with the academia with a view to enhancing technological capability for competitive advantage. In view of the established fact that maturity level of technologies from academic institutes is low, a concerted effort is necessary for mutual benefit of institutes and industry. Transfer technology offices like the FITT in IIT Delhi play a pivotal role in the creation of vibrant knowledge enterprises.

**References**

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