What Exactly Is Technology Transfer? TRIPS, IP and Technological Development: Issues Emanating from the WIPO Development Agenda Process

Submitted by: WIPO
From Mind to Market: The Highs and Lows of Technology Transfer

What exactly is Technology Transfer?

TRIPS, IP and Technological Development: Issues Emanating from the WIPO Development Agenda Process

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The ‘Commercialization Pipeline’
How are commercialisation strategies actually chosen?

- Ability to exclude incumbants
- Complementary asset environment
- Others
  - Go where the easy money is
  - Past Experience
  - Internal constraints & politics
  - Business network of the entrepreneur
  - Risk adversity
  - Market forces
  - etc

A Simple Process?

No

Idea → Invention → IP → Commercialisation Decision →

- Easy money
- Experience
- Network
- Do it yourself
  - Assign IP
  - Excl. out-license
  - Partner
  - Etc
- Excludability
- Complementary assets
  - Politics
- Risk
- Market forces
Build, Buy, Partner: Benefits and Tradeoffs

**Pros**

- **Build**
  - Most product control
  - Own the IP
  - Most profit opportunity
- **Buy**
  - Shorten time to market
  - Own the IP
- **Partner**
  - Shortest Time to Market
  - Conserves Resources
  - Try before you Buy
  - Lowest Switching Costs
  - Credibility and access

**Cons**

- **Build**
  - Longest time to market
  - Risk in market shifts
  - High development costs
  - Highest switching costs
- **Buy**
  - Acquisition costs
  - Integration costs
- **Partner**
  - Least Control
  - Integration Costs
  - Shared gross margins - Least Profit Opportunity

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‘Closed Innovation: Single Track’

Based upon ‘Open Innovation: Researching a New Paradigm’ (2006) Henry Chesbrough, Wim Vanhaverbeke & Joel West
‘Open Innovation: Three Lane Highway’

Based upon ‘Open Innovation: Researching a New Paradigm’ (2006) Henry Chesbrough, Wim Vanhaverbeke & Joel West

Dynamic Linkages: The National Innovation Systems Perspective

Legend:
- Linkages: deployment of resources
- Development of resources
- (Induced) flows of resources
- Environmental influences

Technology Transfer

- Definition
- Dictionary (Merriam-Webster)
- Encyclopedia Britannica
- Patents
- Protection of Technological Know-how;
  

Technological know-how

1. Technological know-how is not protected as an intellectual property right as such but may be considered to be a “complementary right”.
2. Technological know-how may be patentable. If so, the owner will have the option, where trade secret protection is sufficient, to either patent the technological know-how or to keep it secret. Indeed, there may be occasions where trade secret protection is preferable for a business to patent protection (which is necessarily limited in time).
3. If the technological know-how is not patentable, the owner will not have this option. It is here that proper trade secret protection must complement the patent system.
WHAT IS TECHNOLOGY TRANSFER?

1. FROM MIND TO MARKET
   - “THE PROCESS OF CONVERTING SCIENTIFIC FINDINGS FROM RESEARCH LABORATORIES INTO USEFUL PRODUCTS BY THE COMMERCIAL SECTOR,”
   - COMMERCIALLY DEVELOPING A PATENT TAKES 20 TIMES THE RESOURCES THAN IT DOES TO INVENT
     DANIEL P MCCURDY, CHAIRMAN OF PATENT FREEDOM

2. COUNTRY TO COUNTRY
   - “ASSIGNMENT OF TECHNOLOGICAL INTELLECTUAL PROPERTY, DEVELOPED AND GENERATED IN ONE PLACE, TO ANOTHER THROUGH LEGAL MEANS SUCH AS TECHNOLOGY LICENSING OR FRANCHISING.”

Traditional Paradigm Challenged

- Originally Tech Transfer thought of as “us giving them” codified knowledge (instructions and blue prints):
- Now: Tech Transfer concerned with the acquisition, assimilation and absorption of foreign technology: Tacit knowledge, expertise, know-how, “mastery”
- From passive to active: focus on capacity to innovate
Technology Transfer

- TT IS THE LICENSING OF COMPLETED TECHNOLOGY, TO INCREASE THE MARKET PENETRATION OF THE TECHNOLOGY OWNER, AND IMPROVE THE TECHNOLOGY LANDSCAPE IN THE TARGET COUNTRY

- TT IS ALSO THE IMPORTATION AND LICENSING OF TECHNOLOGY TO ASSIST THE TECHNOLOGY DEVELOPER IN THE CREATION OF YOUR OWN PATENTABLE TECHNOLOGY


TT = COOPERATION AND COMMUNICATION

- TECHNOLOGY TRANSFER REQUIRES COOPERATION AND COMMUNICATION, AS MUCH AS IPRs (Win-Win)
- IT IS LICENSING OF IPRs, BUT ALSO OF KNOW HOW, EXPERTISE AND EXPERIENCE
  - COOPERATION ON FURTHER DEVELOPMENT AND ADAPTATION OF THE TECHNOLOGY TO SUIT THE NEW MARKET
- COMPULSORY LICENSES ≠ ‘TECHNOLOGY TRANSFER’
  - ACCEPTED BY WTO-TRIPS AND WHO IN RELATION TO ACCESS TO ESSENTIAL MEDICINES
  - PROPOSED FOR CLIMATE CHANGE TECHNOLOGY
Mechanisms for TT

- Import of capital goods (knowledge embodied in machines)
- Supply chain learning: standards plus technical and financial assistance
- Foreign Direct Investment
- Technical assistance, consultancy, and migration (knowledge embodied in people)
- Licenses and IPR

Development and Diffusion of Technology: Model 1

- Most commercial and near commercial technologies fall under this model
- Developed in Developed Countries
- Commercialized in Developed Countries
- Transfer to Developing Countries (DCs)
  - Significant time lag, leaving DCs one or more tech generation behind
  - May not be sufficient for climate stabilization
Development and Diffusion of Technology: Model 2

- Applies mainly to technologies in the commercialization process
- Develop new technology in developed countries
- Commercialize in developed and developing countries
  - But commercialization is expensive ... what are ways in which the cost of new technology can be lower for developing countries?
    - Question of intellectual property rights – private companies want to recover R&D costs
    - How can property rights be protected, but costs lower for DCs?

Development and Diffusion of Technology: Model 3

- Applies primarily to technologies in the development and theoretical stages
- Jointly develop new technology in developed and developing countries
- Commercialize in both
  - More creative IPRs solutions possible
  - But techs can’t be developed in all DCs
    - Still issue of tech transfer to other DCs
    - Can be solved through IPR sharing
IPR sharing

- Industrialized and developing countries commit resources to international organization that coordinates and develops new technology
  - Organization holds IPR
  - Technology available to all
- Example: Consultative Group on International Agricultural Research (CGIAR) formed in 1971 by 24 DCs and 22 developed countries. CGIAR developed over 500 varieties of maize, wheat and rice. Has largest collection of plant genetic resources in the world. Works in 100 countries.
  - Budget in 2001 was $351 million
  - Hardly any private sector participation
- Similar international organization could be created for developing advanced climate technologies in which participating countries would have access to technology developed
  - Key question: level of funding needed
  - How to incorporate private sector while maintaining access to technology developed

TRIPS: Article 7: Objectives

- Protection and enforcement of IP rights should contribute to
  - the promotion of technological innovation and transfer and dissemination of technology
  - to the mutual advantage of producers and users of technological knowledge, and
- in a manner conducive to
  - social and
  - economic welfare, and
- to a balance of rights and obligations.
**TRIPS: Article 8 (2): Principles**

- Appropriate measures, provided they are consistent with the provisions of this Agreement, may be needed to prevent the abuse of IPRs by right holders or the resort to anticompetitive practices which unreasonably restrain or adversely affect the international transfer of technology.

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**TRIPS: Section 8.1; Article 40**

- Control of Anti-Competitive Practices in Contractual Licenses
- Members agree that some licensing practices or conditions pertaining to IPRs which restrain competition may have adverse effects on trade and may impede the transfer and dissemination of technology.
TRIPS: Article 66.2

Developed country Members shall provide incentives to enterprises and institutions in their territories for the purpose of promoting and encouraging technology transfer to least-developed country Members in order to enable them to create a sound and viable technological base.

THE EU AND TECH TRANSFER

DG-RESEARCH STUDY: “TECHNOLOGY TRANSFER AND INTELLECTUAL PROPERTY IN THE EUROPEAN UNION”

- CONTINUING PROJECT
- MOST RECENT DRAFTS - JANUARY 2009
- http://www.eutechnologytransfer.eu/
TOPICS:
- Identification of IPR/TT awareness and training activities
- IPR co-ownership provisions
- IPR provisions applicable in the Community framework programmes
- Legislation applicable to technological know-how

SOME PRELIMINARY FINDINGS
- 80% of students finish their academic career without ever being exposed to the basic principles of intellectual property law.
- Differences in legal treatment create a considerable amount of legal uncertainty in cross-border research.
- Effective but simple IPR provisions are necessary in research framework agreements order to reconcile competing interests, especially those of SMEs.
- Variations in protection of technological know-how could have an impact on cross-border research in the context of intra-EU trade.
THE TECHNOLOGY MARKETPLACE

- EFFECTIVE TT CREATES A MARKET FOR TECHNOLOGY – INCREASING THE VALUE AND RETURN ON IP ASSETS
- THE TRICK IS TO CREATE AN EFFECTIVE MARKET FOR TECHNOLOGY TRANSFER
  - THE AVAILABLE MONEY IS NOT BEING UTILIZED
  - IP IS A MARKET TOOL: YOU NEED A SPECIFIC MARKET DEMAND TO ACTIVATE IT
  - TARGET – “APPLICATION TECHNOLOGY”

TECH TRANSFER AND IP PROTECTION

- NECESSARY TO CREATE THE RIGHT CLIMATE FOR TECHNOLOGY TRANSFER
- LESS OF AN ISSUE NOW
  - TRIPS AGREEMENT
  - EU LEGISLATION
  - BILATERAL AGREEMENTS
  - SOME ISSUES STILL EXIST, E.G., PATENTABLE SUBJECT MATTER
Technology Transfer and Enforcement of IPRs

- Critical for Technology Transfer
  - Creates a secure climate for investment
  - Insures return on investment

- IPR Enforcement Relies on:
  - National laws, agencies, and courts
  - ACTA – Anti-Counterfeiting Trade Agreement
  - WTO – TRIPS Agreement
  - WIPO – Advisory Committee on Enforcement of IPRs
  - WCO

Technology Transfer

- In the presence of an inefficient market-place, intangible assets, in particular patents are highly illiquid assets

- Valuation of IP assets is a challenge
High Tech Products

- High Tech Products with many technologies
- High-tech sector has a large investment in patents
  - Routine use of a large numbers of patents in new products requires extensive cross-licensing and creates exposure to infringement allegations
- IP Strategies usually require a mix of offensive and defensive licensing approaches utilizing a common skill set

Technology Transfer

- Restrictions on Transfer (Dual Use)
- Sell or License?
The Problem of Royalty Stacking

- Royalty stacking is becoming a serious problem because products use an increasing number of technologies
  - High transaction costs
  - High cumulative royalties

- So far only partial solutions have been proposed
  - Disclosure requirements during standard setting
  - Ex-ante maximum royalties

- Solutions should also address the high transaction costs
  - Formation of patent pools with as many licensors as possible (including those that were active in standardization)
  - Create product licenses that cover all standards used in a certain product

Patent Pre-clearance

- Different approach by different companies:
  - Wait and see - invest in extensive pre-clearance studies

- Checklist for pre-clearance study:
  1. New product based on an old product? IP claims received?
  2. New features added to old product?
  3. IP landscape search in that technology/feature area?
  4. IP agreements with companies that own relevant IP?
  5. New product complies with a standard?
  6. Basic patents known in the industry?
Three New Business Models

- **Patent Brokers** - assisting patent owners in finding buyers.
- **IP Auction** - proposing for IPRs marketplace what famous auction houses like Christie's and Sotheby's did for the antique.
- **On-Line IP Marketplace** - dot com website-based model entities that function like the business-to-business (B2B) for the sales of IPRs.

yet2.com® - Overview

- Founded in June 1999 to help technology companies realize value from their Intellectual Property through Licensing / Technology Transfer – Advisory Board includes: AGFA, Air Products, Bayer, DSM, DuPont, Philips, P&G
- Privately held, worldwide organization - Offices in USA, Europe & Asia.
- Operate largest Global online marketplace/business forum for technology transfer.
- *yet2.com®*: internet presence is unique resource to facilitate deals – 120,000+ registered users, 40,000 companies, Network of 12,000+ smaller companies ($10-500m)
- Intellectual Asset Management solution provider - Developed proven value extraction methodologies to align Intellectual Property initiatives with Corporate R&D Strategy.
- Full range of consulting services to assist clients in licensing and technology acquisition – upfront prioritization through to deal negotiation support
Technology Transfer Needs
Qualified Buyers & Sellers

- **Buy-side** (Technology Acquisition)
  - Sourced innovation
  - Patent acquisition
- **Sell-side** (Licensing / Technology Commercialization)
  - Technology platforms for non-strategic applications
  - Leading edge innovations from SMEs
  - Patent selling

Factors For Successful Technology Transfer

1. Well described & accurate Technology Needs and Technologies - upfront advance preparation of content, understanding of strategy and expectations
2. Access to a diverse, cross industry global community – not just the size of the network but the diversity that enhances idea fertilization
3. Personal contact and relationship building is key to closing deals – the marketplace makes you the connection quicker but be ready to engage
4. Entrepreneurial technology and technology need owners – deal orientated, variety in what a deal looks like
5. **Use experienced facilitators to help create partnerships** - understand the nuances between large companies and smaller technology innovators, ensure successful partnerships for both sides.
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The Challenge

- Websites managed by USPTO, EPO, Google Patents, Delphion, only provide published IP, and do not state if IP is available, in which field(s), any contact information, or easy-to-understand descriptions.
- Academic institutions or research laboratories may have websites that are not always user-friendly, only list their own, so you must visit many of them (which ones?), and all have different navigation and features (update frequency, searching methods, groupings, prepublication IP, etc.). Keywords and alerts (if available) have to be entered on each website.
- So, we created www.TechTransferOnline.com.
Key Features

- The largest database of AVAILABLE IP in the world (over 50,000 and adding at least 1,000 per month).
- Just a listing service - buyers and sellers “meet”, contact each other, directly. External partners can offer additional services.
- Sellers can see who clicked on their IP and get leads that way.
- Buyers get alerts every time new IP of interest appears on the site, based on their search criteria.
- Best quality: Government agencies, large corporations, universities, national laboratories. Individuals’ IP is screened.
- Free to list IP for everyone - No listing fees, no success fees, transaction fees or finder’s fees.

Experience

- Between 50 and 100 transactions per month. Buyers and sellers prefer to deal directly. Pricing depends on motivation of buyer: defensive, nice-to-have, critical, etc.
- Some research groups “rent” their own area (logo, link, etc.), especially organizations that do not have IP listings on their websites.
- Distributors looking to add products to their offering.
- Companies looking to build their portfolio.
- Investors looking for IP.
- Potential partners (product development or contract manufacturers) looking to commercialize innovative products.
Strong patents help create markets for technology

- Under weak patents, R&D tends to concentrate in large, established incumbents
  - Postwar Japan and Korea
  - The early German chemical industry
- These are not always the best sources of fundamental inventions
  - Critical ideas often come from external sources (Eric Von Hippel)
  - Incumbents tend to avoid disruptive invention that cannibalizes their existing product portfolio (Christensen)
- Strong patents allow for trade in intellectual assets
  - In 19th century America (Khan and Sokoloff)
  - In the U.S. semiconductor industry of the 1990s (Hall and Ziedonis, 2001)
  - More broadly within and across countries (Ashish and Gambardella, 2002)
- Strong patents allow for a separation of manufacturing, basic research, applied research, and development
  - Allows for specialization and gains from trade in ideas (Khan and Sokoloff)
  - Prevents a choking off of the innovation process (Klepper, 2002)
Strong patents also disproportionately reward breakthrough inventions

- The economic value of inventions is highly skewed - most patents are worthless

- Fundamental inventions may require years of refinement before they can be embodied in a commercial product

- Patents can be important mechanisms of appropriation in this context

The full emergence of high-tech industries in Taiwan and South Korea came after patent reform

- Technological achievements driven primarily by domestic firms

- South Korea came to dominate DRAMs in the 1990s

- Taiwan emerged as a force in semiconductor “foundry” manufacturing, ASICs, OEM production of computers and peripherals

- Hard to demonstrate conclusively that stronger patents drove these transitions...

- But they clearly did not stop them!
Recap

- Strong patents are neither necessary nor sufficient for general technological catch-up

- But they may play an important role in fostering markets for technology
  - This can help integrate local firms into transnational innovation systems
  - And encourage the development of an efficient division of labor within emerging economies

- And they may be an essential part of a reward system for “fundamental” or “basic” innovation
  - Important for advanced developing countries that are beginning to transition from investment-driven to knowledge-driven growth

WIPO Development Agenda – Origins
The Beginning...

- Basic concern – to ensure that WIPO activities and discussions are driven towards development-oriented results
  - IP: not end in itself, but as a means for
    - Promoting public interest;
    - Innovation; and
    - Access to S&T
  in order to ensure material progress and welfare
- Misconception that development dimension of IP synonymous with technical assistance and that it should be provided for enhancing enforcement measures in receiving countries

The Beginning...

- Credibility of IP system undermined by promoting benefits of protection, without acknowledging public policy concerns
- Integrating development dimension will strengthen credibility and encourage its acceptance as a tool for innovation, creativity and development
- Hence, the need for a WIPO Development Agenda
The Development Agenda Process: Three Phases

**General Assembly 2004**

- Four Areas
- Technical Assistance
- Norm Setting
- Technology Transfer
- Role/Mandate of WIPO

**PCDA Process (Two Sessions)**

**General Assembly 2005**

- 1. Exploration
- 2. Consolidation
- 3. Negotiation

**IIM Process (Three Sessions) 2005**

**General Assembly 2006**

- African Group
- Bahrain + 10 countries
- Chile
- Colombia
- "Friends of Development" (3)
- Kyrgyzstan
- Mexico
- United Kingdom (2)
- United States of America (2)

**PCDA Process (Two Sessions) 2007**

2007 - Preparatory meetings and PCDA Sessions

- Member States engaged intensively
  - among themselves to seek common ground and better understand perceptions and concerns
  - with the Secretariat to review on-going activities and assess extent to which their concerns were being met

- Proponents voluntarily agreed to amend/withdraw some proposals and merge few with similar ones presented by others

- Debate resulted in agreement on all proposals
PCDA - 2007:
Main Recommendations to 2007 GA

- Recommended 45 proposals for action
- Chair to identify proposals for immediate action
- **Committee on Development and IP** to be established immediately to:
  - develop a work-program for implementation
  - monitor, assess, discuss and report on the implementation of all recommendations adopted
  - discuss IP and development related issues as agreed by the Committee, as well as those decided by the General Assembly

Clusters and Proposals

- Technical Assistance and Capacity Building (14)
- Norm-Setting, Flexibilities, Public Policy and Public Domain (9)
- Technology Transfer, Information and Communication Technology (ICT) and Access to Knowledge (9)
- Assessments, Evaluation and Impact Studies (6)
- Institutional Matters including Mandate and Governance (6)
- Other Issues (1)
WIPO Development Agenda

  - Technical Assistance and Capacity Building
  - Norm-Setting, Flexibilities, Public Policy and Public Domain
  - Technology Transfer, Information and Communication Technologies and Access to Knowledge
  - Assessment, Evaluation and Impact Studies


Proposals on Technological Development
Proposals on Technological Development

- To explore IP-related policies and initiatives necessary to promote the **transfer and dissemination of technology**, to the benefit of developing countries and to take appropriate measures to enable developing countries to fully understand and benefit from different provisions, pertaining to flexibilities provided for in international agreements, as appropriate.
- To encourage Member States, especially developed countries, to urge their research and scientific institutions to enhance cooperation and exchange with research and development institutions in developing countries, especially LDCs.
- To explore supportive IP-related policies and measures Member States, especially developed countries, could adopt for promoting **transfer and dissemination of technology to developing countries**.
- To include discussions on IP-related **technology transfer issues** within the mandate of an appropriate WIPO body.
- WIPO should cooperate with other intergovernmental organizations to provide to developing countries, including LDCs, upon request, advice on how to **gain access to and make use of IP-related information on technology**, particularly in areas of special interest to the requesting parties.
- To undertake initiatives agreed by Member States which **contribute to transfer of technology to developing countries**, such as requesting WIPO to **facilitate better access to publicly available patent information**.
WIPO -

Examples of some on-going activities

- Training programs on licensing/tech transfer
- Working with universities/research institutions to develop IP policies/enhance ability to transfer technologies for distribution/commercialization
- Publication of a user friendly manual (*Exchanging Value - Negotiating Technology Licensing Agreements: A Training Manual*) focusing on the practical business needs and concerns of non-specialists: national versions prepared providing information on local laws, regulations, policy, infrastructure and experiences in the area of technology licensing
- Currently compiling an on-line, searchable database of biodiversity-related Access and Benefit-Sharing Agreements, with a particular emphasis on the intellectual property aspects of such agreements
- *Successful Technology Licensing* - booklet aimed primarily at businesses, technology managers and scientists who deal with licensing questions in the course of their work
- *PatentScope*: facility to search 1,308,710 international patent applications