Beyond Europe:
A look at Developing Countries

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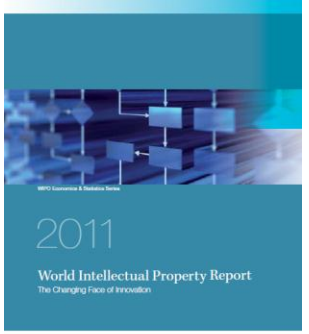
Background



- World IP Report Chapter 4: **Harnessing Public Research for Innovation – The Role of IP**

- Statistical work and academic papers are very much focussed on developing world, more specifically on the United States of America (and thanks to your work!) Europe
  - Still centred on binary pro and con Bayh Dole.

Harnessing public research and tech transfer is one of single most important topics for developing countries

- PROs – rather than universities – are often the main R&D actors in low- and middle-income economies, where – in many cases – industry often contributes little to scientific research
- R&D is also essentially conducted by PROs. For example, In Argentina, Bolivia, Brazil, India, Peru and Romania the share of public-sector R&D often exceeds 70 % of total R&D.
- In low- and middle-income countries for which data are available, public research is also responsible for the majority of basic R&D

Structure of work and presentation

1. What policy frameworks are in place?

2. What does the data tell us about university and PRO patenting and licensing?

3. What are opportunities and challenges?

1. WHAT POLICY FRAMEWORKS ARE IN PLACE?

ANNEX

SURVEY ON INTELLECTUAL PROPERTY AND TECHNOLOGY TRANSFER ACTIVITIES BY UNIVERSITIES IN DEVELOPING COUNTRIES[91]

Name of contact : _____
Job position: _____
E mail : _____ Telephone: _____

I. General Information of the University

1.1. Name of the University: _____
1.2. Classification: Public University□ Private University □
1.3 Number of researchers in university: _____
1.4 Total of research budget (Research and development expenditure) in USD:
In 2009: _____ In 2010:_____

II. National preconditions (please cross (X) the relevant case)

2.1. Is technology transfer part of the national economic strategy in your country?
Yes □ No □

2.2 Is there an adequate intellectual property (IP) system in your country with updated IP laws and regulations?
Yes □ No □ In process □

2.3 Is there a national IP and innovation strategy governing IP ownership of publicly-funded research results and researcher's rights on inventions developed under public funding in your country?
Yes □ No □ In process □

2.4 Are there sufficient sources of public and private funds that could enable an effective technology transfer system in your country?
Yes □ No □

2.4 Are there research capabilities in your country strong enough to allow the development of new technological competences?
Yes □ No □

2.5 Is there adequate university-industry collaboration involving technology transfer activities in your country?
Yes □ No □

Diversity over uniformity: Four policy frameworks for technology transfer

Four distinct sets of countries.

(i) First model with no explicit regulation, but rather general rules defined in the law – mostly in patent acts – or legislation regulating research institutions or government funding.

(ii) A second model consists of laws in the form of national innovation laws.

(iii) A third, adopted in Brazil, China, and more recently in economies such as Malaysia, Mexico, the Philippines and South Africa, builds on the model of high-income countries which confers IP ownership to universities and PROs, spurring them to commercialize.

(iv) Fourth, some countries, for example Nigeria and Ghana, have no national framework but rely on guidelines for IP-based technology transfer.

Table A.4.1: Technology transfer frameworks and legislation in selected low- and middle-income economies

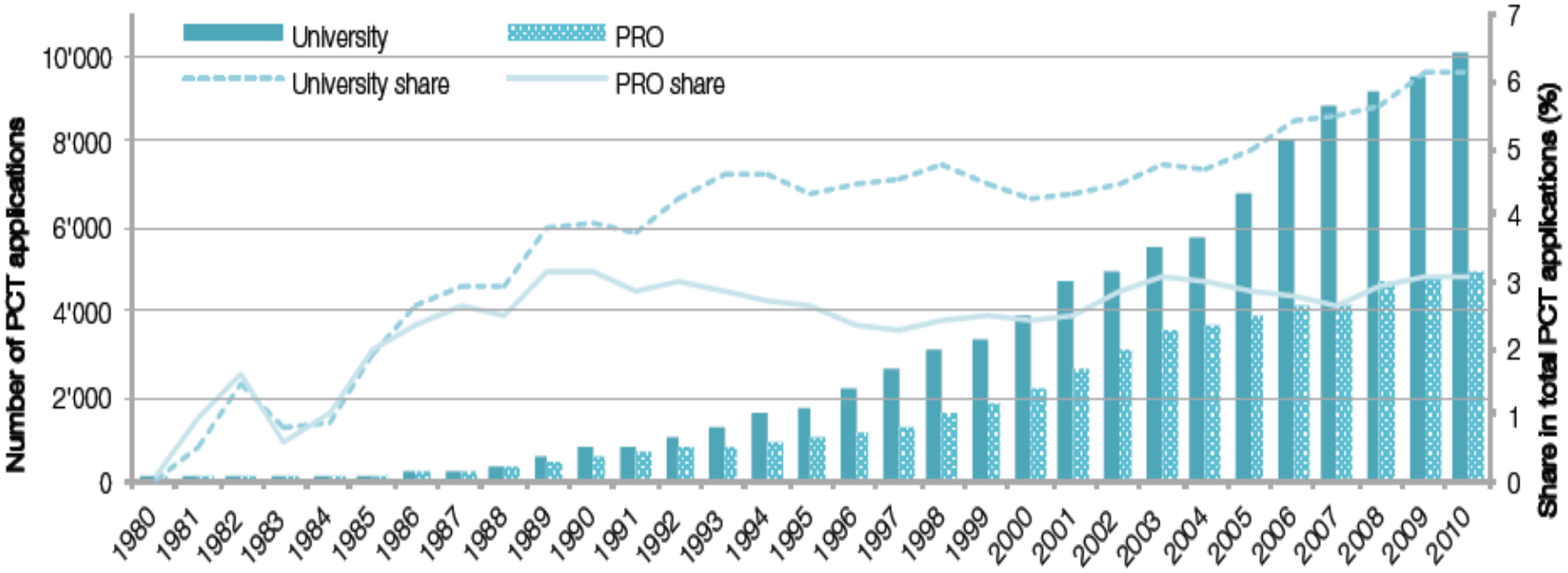
	Law/Policy/Decree entitling ownership & inventor rights	Innovation and related policies	Inventor compensation	Mandatory TTO creation
Brazil	Ownership: 1996 Patent Law (Law 9279) Inventors: 1998 Law on Industrial Property (Art. 93): maximum of one-third of the value of the invention	2004: Innovation Law (Law No. 10.973) Incentives for R&D, collaboration and technology transfer	**YES** 5% to 33% of royalties or licensing income	**YES** At each institution or shared among institutions
Russian Federation	Ownership: 1998 Decree and 2003 Revision of the Patent Law	2007-2012: R&D in priority fields of science and technology development in the Russian Federation for 2007–2012 2002: Technology Transfer Network	**NO**	**NO** Not mandatory but encouraged
India	Ownership: 2000 Governmental Ruling Inventors and clarification of ownership rules: Utilization of Public Funded Intellectual Property Bill 2008 (under approval)		**YES** At least 30% of licensing income	**NO** Not mandatory but encouraged
China	Ownership: 2002 Measures for Intellectual Property Made under Government Funding (entitling patenting) Inventors: S&T Findings Conversion Law	1998: the S&T Advancement Law and the S&T Findings Conversion Law 2002: Opinion on Exerting the Role of Universities in S&T Innovation	**YES** Varies according to type of transfer	**NO** Not mandatory but encouraged
South Africa	Ownership: Patent Law Ownership and inventors: 2010 IPfrom Publicly Financed R&D Act	National Research and Development Strategy (R&D Strategy)	**YES** At least 20% of licensing income	**YES** Mandatory
Other countries				
Argentina	Ownership: 1995 Law of Patents of Invention and Utility Models (Joint ownership by the university and the centralized agency CONICET)	1995: Law on National Higher Education 2002: National Program for the support and fortification of university linking with industry	**YES** Up to 50% (patent law)	**NO**
Chile	Ownership: 1991 Industrial Property Law	National Innovation Plan	**NO** (statuary rules left to institutions)	**NO** National TTO
Malaysia	Ownership and inventors: 2009 Intellectual Property Commercialization Policy for Research & Development Projects Funded by the Government of Malaysia	Second National Plan for Science and Technology Policy 2002-2020	**YES** Varying shares according to value of revenue	**YES** For public sector R&D institutions
Mexico	Ownership: 1991 Industrial Property Law Inventors: Federal Law of Labor and Innovation Law of 2010	2002 Science and Technology Law 2010 Innovation Law: inventor compensation and TTOs	**YES** Up to 70% of income	**YES** Not mandatory but encouraged
Nigeria	Ownership: 2004 Scheme of Service for Nigeria's Federal Research Institutes, Colleges of Agriculture and Allied Institutions	Guidelines on Development of Intellectual Property Policy for Universities and R&D Institutions	**NO** (recommended; left to institutions)	**YES**
Philippines	Ownership and inventors: 2009 Technology Transfer Bill	1997: Magna Carta for Scientists, Engineers, Researchers, and other S&T Personnel in the Government (for researchers at PROs) and 2002: National Science and Technology Plan	Only available for governmental institutions 60% (PRO)-40% (inventor)	**NO** National TTO (1997)

Source: Zuñiga (2011) and WIPO.

2. WHAT DOES THE DATA TELL US ABOUT UNIVERSITY AND PRO PATENTING AND LICENSING?

4.2.2 Measuring the increase in university and PRO patenting

World PRO and university PCT applications, absolute numbers (left) and as a percentage of total PCT applications (right), 1980-2010



Source: WIPO Statistics Database, June 2011

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Figure 4.7: China and Brazil lead in university PCT applications

University patent applications under the PCT from middle- and selected low-income countries, country shares, in percent, 1980-2010

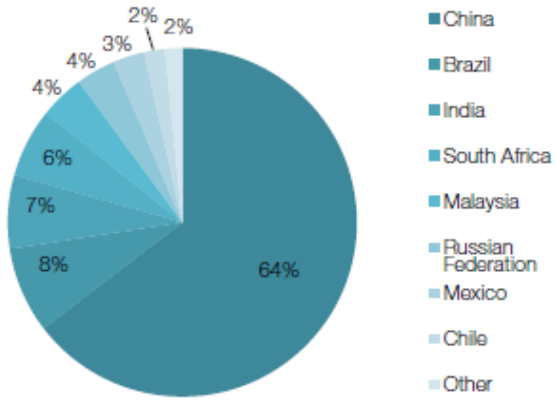
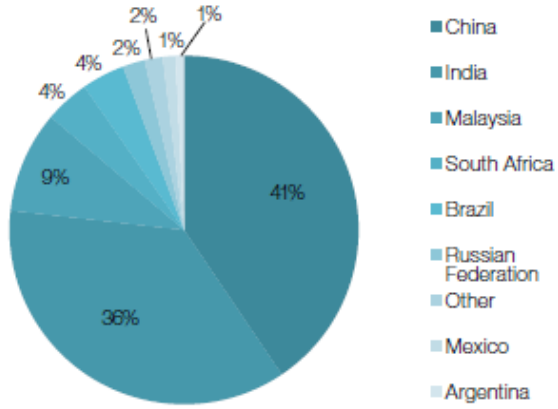


Figure 4.8: China and India lead in PRO PCT applications

PRO patent applications under the PCT from middle-and selected low-income countries, country shares, in percent, 1980-2010



Note: Some countries have been members of the PCT system for longer than others, which impacts on the comparability of some country shares.[45]

Source: WIPO Statistics Database, June 2011.

The highest rates of university PCT applications as a share of total patents under the PCT are in Singapore (13 %), Malaysia (13 %), Spain (12 %), Ireland (11 %) and Israel (10 %).

The countries with the highest participation of PROs out of total PCT filings are Malaysia (27 %), Singapore (19 %), India (14 %) and France (10 %).

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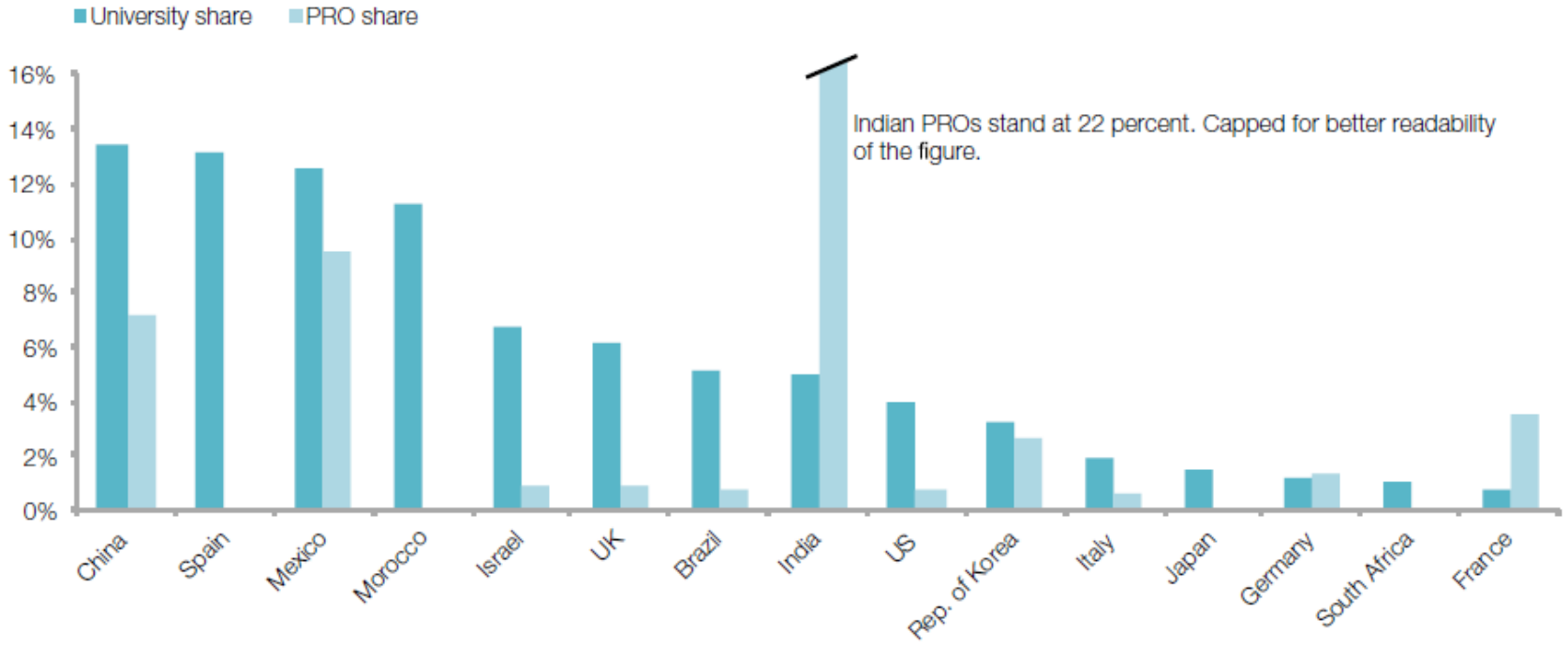
University and PRO patenting is prominent in China and India

University and PRO patent applications as a share of total national applications for selected countries (percent), for different time spans



Source: WIPO Statistics Database, June 2011

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Information on Licensing Revenue

- Available for China in an academic paper with surprisingly large figures, and more incidental data for South Africa and Brazil
- The scarcity of information also suggests that patents are used much less for technology transfer, due in part also to a lack of a culture and institutions supporting formal IP-based technology transfer
- Other forms of IP and knowhow are more commonly used to transfer knowledge (designs, know-how or secrets, rather than patents.

3. WHAT ARE OPPORTUNITIES AND CHALLENGES?

Two key questions

- (i) the impacts of technology transfer legislation enacted in high-income countries on less developed countries ;
- (ii) the impacts of the nascent home-grown technology transfer legislation of middle- and low-income countries

Table 4.13: Impacts on low- and middle-income countries

Potential benefits	Potential costs
1) All the same benefits mentioned above (see Tables 4.5 and 4.6) • This depends, however, on the capacity to absorb and further develop university inventions – either by domestic firms or by locally present multinational firms – and on whether these inventions are at all relevant to low- and middle-income country needs **2) Ability to contribute to local or global markets for university inventions** • This depends on the capacity to generate university inventions and to file patents • University inventions might also attract the presence of multinational companies and their associated complementary R&D • The strengthened science-industry links can help reorient research towards local needs	**1) All the same above-mentioned costs (see Tables 4.5 and 4.6), some of which are amplified given the greater resource constraints of less developed economies** • Reduced or no access to critical technologies owned by universities in high-income countries • Overemphasis on applied, lucrative projects may lead to less useful inventions from the point of view of low- and middle-income countries • The decrease in international scientific exchanges and a reduced eagerness of institutions in high-income countries to collaborate as a result of more complex IP ownership issues and secrecy

SURVEY ON INTELLECTUAL PROPERTY AND TECHNOLOGY TRANSFER ACTIVITIES BY UNIVERSITIES IN DEVELOPING COUNTRIES(bis)

V. Factors affecting Patenting at Institutions.

5.1 Please indicate (with a cross: X) the level of importance in each of the factors below noted.

	High importance	Medium importance	Low importance
Finance available for patenting			
Human resources and infrastructure available to screen invention disclosures (and evaluate patentability)			
Lack of patent information or search skills			
Difficulties to screen invention disclosures and asses technology value of inventions (lack of human resources and infrastructure)			
IP policy at the institution			
IP and IP management skills			
Incentives/institutional rewards for researchers (recognition in careers; economic stimulus)			
Awareness of the benefits of IP			
Linkages with industry (to identify market potential technologies)			
Inventions with good commercial potential			
Others (please specify) _____			

Survey partners

- Instituto Tecnológico de Costa Rica (ITCR), Universidad de Costa Rica (UCR), Durban University of Technology (DUT) in South Africa, 3 universities in Mexico, CCADET-Universidad Nacional Autónoma de México (UNAM), National Institute of Astrophysics and Opto-Electronics (INAOE) Instituto Tecnológico y de Estudios Superiors de Monterrey (ITESM), Universidade Minas Gerais (UFMG) in Brazil and Universiti Teknologi MARA (UTM) in Malaysia.
- University Putra Malaysia (UPM) +Universidade Estadual de Campinas (UNICAMP) in Brazil.

Identified constraints

- Problem is research base and critical mass in industry relevant research to begin with (and firms with absorptive capacity!)
- Technology commercialization is at the embryonic stage.
- Three most important factors affecting patenting as

i) (limited) awareness of the benefits of IP among researchers, awareness of new frameworks and limited incentives,

ii) (weak) linkages with industry, and little inventions with good commercial potential.

iii) the lack of specialized staff in technology transfer (IP and technology

An improved solar water heater with an elliptic integrated hot water storage tank.

Sri Lanka Patent No. 10320

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Biogas generator for market garbage disposing

Sri Lanka Patent No. 11086

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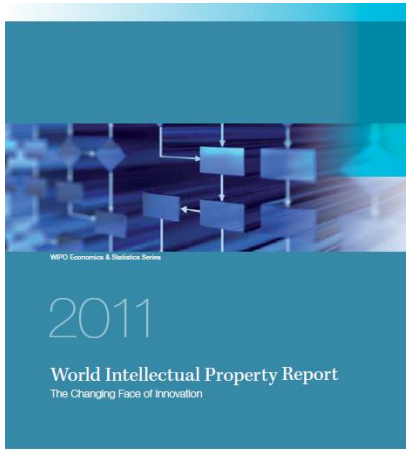

- Chapter 4 of World IP Report, Harnessing public research for innovation – the role of Intellectual Property

- WIPO Economics and Statistics - Working Paper 4, The State of Patenting at Research Institutions in Developing Countries: Policy Approaches and Practices (Pluvia Zuniga)

Both at http://www.wipo.int/econ_stat/en/economics/wipr/

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