

**中华人民共和国科学技术部**

Ministry of Science and Technology of the People's Republic of China



CHINESE ACADEMY OF SCIENCE AND  
TECHNOLOGY FOR DEVELOPMENT  
(CASTED)



WORLD  
INTELLECTUAL PROPERTY  
ORGANIZATION

MINISTRY OF SCIENCE AND  
TECHNOLOGY OF THE GOVERNMENT OF  
THE PEOPLE'S REPUBLIC OF CHINA  
(MOST)

# Overview of project and main study elements

## An international Comparison of Knowledge Transfer (KT) Policies and Practices

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# Background

- Policies to support commercialization of publicly-funded research through formal transfer mechanisms are flourishing
  - ownership of intellectual property (IP), knowledge transfer offices, incentive schemes, spin-offs, etc.
- No unique public-private knowledge transfer (KT) blueprint is recognized as time-tested and optimal.
- Not straightforward for to determine which policies and practices work and which do not.

# Current challenge

Evaluation of knowledge transfer policies is still challenge. Three issues are at stake.

1. **Conceptual and evaluation framework** for identifying the possible costs, benefits, and impacts is missing.

2. **Data collection** is either sporadic or unavailable. Valid, international comparisons over time are hardly possible.

3. Combinations of policies which depend on specific characteristics – requires the use of **new analytical techniques**.

# Three objectives

1. Developing a **conceptual framework** for evaluation of knowledge transfer activities, practices and outcomes.
2. Identifying **optimal survey methods and metrics** which mirror the conceptual framework
  - single indicators such as uni patents do not capture full spectrum
3. Applying **analytical methods to test relationship** between policies and practices and economic outcomes
  - “What works best” under different conditions?

# Overview of outputs

## Conceptual Framework

### Literature

#### Review of Literature and Policy Evaluations

- Role of public research
- Stock-taking of policies and practices
- Academic literature review of approaches

### Data

#### Metrics study

- Data gaps
- Key metrics
- Survey instrument
- statistical assessment of university and PRO patenting

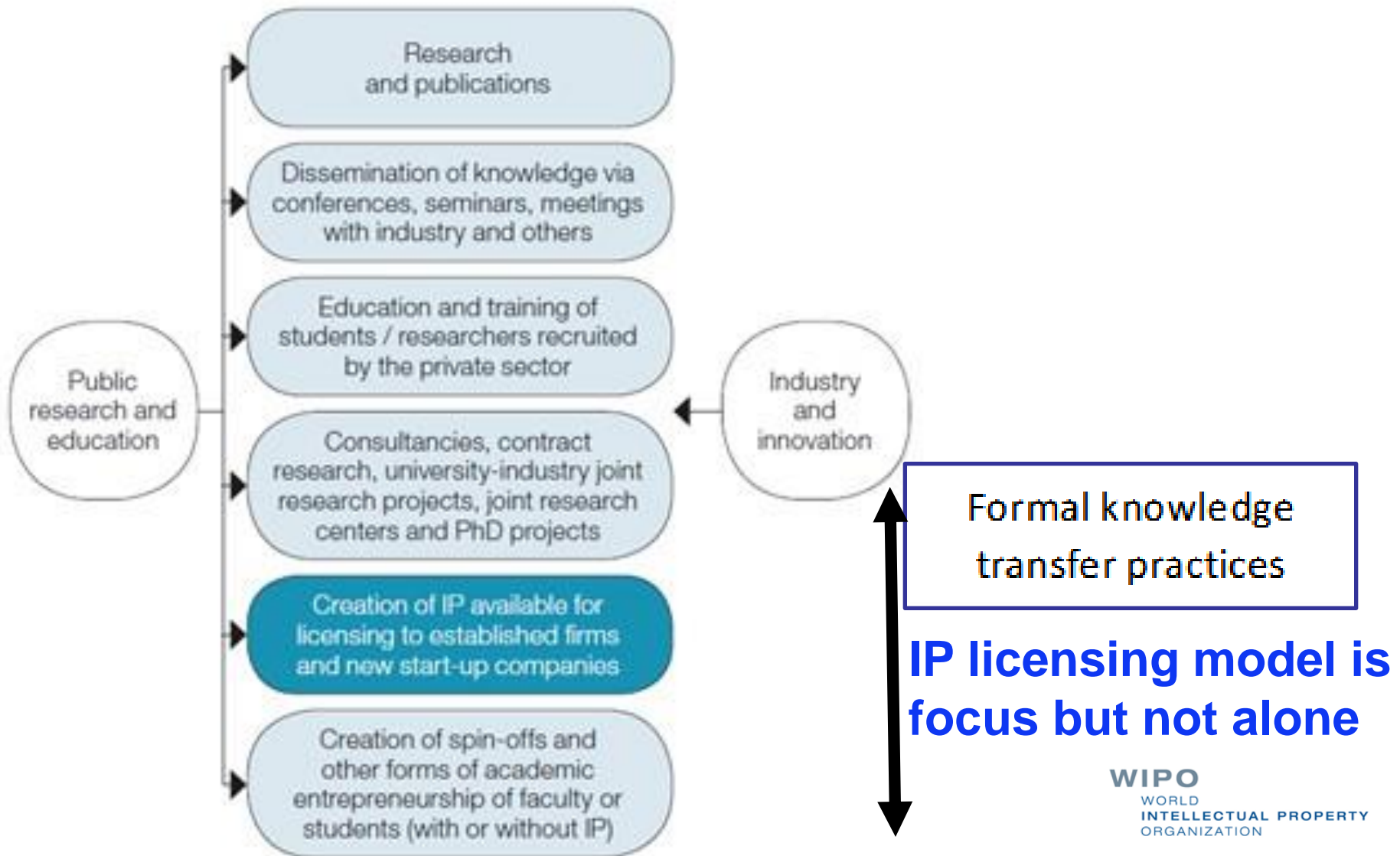
### Country studies

#### Draft country template

#### Institutional / Policy Questionnaire

#### Country studies on approaches & impacts

# Conceptual framework: sets out multiple vectors of KT from unis / PROs to industry



# Conceptual framework: sets out various factors influencing success of KT

- **Supply factors** include 1) the quality of new knowledge of relevance to industry and 2) a critical mass of new knowledge such that it can support ongoing investment by either government or firms.
- **Demand factors** include 1) research capabilities and human capital, 2) the legal and regulatory framework, 3) access to finance, 4) the absorptive capacity of firms and 5) potential market or demand for innovations.
- **Institutional factors** include the location of the university, the portfolio of disciplines, collaboration, number of KTO staff
- **Policy factors**, including those to limit possible disadvantages of the IP licensing model

# Conceptual framework: sets out the costs and benefits of IP licensing model

	POTENTIAL BENEFITS	POTENTIAL COSTS (OR INVESTMENTS)
UNIVERSITIES AND PROS	<p><b>1) Increased IP ownership facilitating entrepreneurship and vertical specialization</b></p> <ul style="list-style-type: none"> <li>Reinforcing other policies aimed at academic entrepreneurship (e.g., enhancing access to finance)</li> <li>Licensing and other revenues (e.g., consulting) can be invested in research</li> </ul> <p><b>2) Cross-fertilization between faculty and industry</b></p> <ul style="list-style-type: none"> <li>Intangible benefits to university reputation and the quality of research</li> <li>Helping to identify research projects with a dual scientific and commercial purpose</li> </ul> <p><b>3) Increased student intake and ability to place students in firms</b></p>	<p><b>1) Diversion of time away from academic research</b></p> <ul style="list-style-type: none"> <li>Distorting incentives for scientists and potentially also for the nature of public-oriented institutions</li> <li>Reorganizing university processes and culture with a view to commercialization</li> </ul> <p><b>2) IP-related establishment and maintenance costs</b></p> <ul style="list-style-type: none"> <li>Establishing and maintaining a TTO and related IP management, including investment in expertise and human resources</li> <li>Spending time on IP filings and technology transfer (even if contracted out to a TTO)</li> <li>Additional financial and reputational costs associated with defense of IP rights</li> </ul>



# Conceptual framework: sets out the costs and benefits of IP licensing model

<p><b>FIRMS</b></p>	<p><b>1) Facilitates university-business linkages</b></p> <ul style="list-style-type: none"> <li>• Enabling firms to have access to top scientists and to collaborate with the scientific community in developing innovation within a clear contractual setting</li> </ul> <p><b>2) Enables the creation of a market for ideas and contracting with universities</b></p> <ul style="list-style-type: none"> <li>• Framework diminishes transaction costs and increases legal certainty, facilitating investment by private sector</li> <li>• Securing an exclusive license increases incentives for further investment</li> <li>• Ability to specialize is competitive advantage (vertical specialization)</li> <li>• Transparency through published databases on licensing and management practices</li> <li>• Improved content of patent databases</li> </ul> <p><b>3) Commercialization of new products generating profits and growth</b></p>	<p><b>1) Barriers to access of university inventions</b></p> <ul style="list-style-type: none"> <li>• Precludes free access to university inventions - including the more basic research fields and research tools, except where research is the result of a sponsored contract</li> <li>• Lack of access if another firm has secured an exclusive license</li> </ul> <p><b>2) IP-based transaction costs and tensions in industry-university relationships</b></p> <ul style="list-style-type: none"> <li>• University scientists lack an understanding of development costs and market needs (cognitive dissonance) leading to higher probability of bargaining breakdown</li> <li>• IP negotiations can interfere with establishment of joint R&amp;D and university-industry relations, where universities act as revenue maximizer with strong stance on IP</li> </ul>
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# Conceptual framework: sets out the costs and benefits of IP licensing model

	POTENTIAL BENEFITS	POTENTIAL COSTS
BROADER IMPACTS ON SCIENCE	<p>1) Increased impact of more focused research with potential for application</p> <p>2) Improved innovation system linkages</p> <p>3) Increase in the quality of research and education</p>	<p>1) Reorientation of the direction of research</p> <p>2) Negative impacts on open science</p> <ul style="list-style-type: none"> <li>•Crowds out/displaces the use of other knowledge transfer channels to industry</li> <li>•Publication delays, increased secrecy, less sharing, including the withholding of data</li> <li>•Decrease in international scientific exchanges</li> </ul> <p>3) The promise of university income can reduce government commitment to funding</p>
INNOVATION AND GROWTH	<p>1) Commercialization of inventions with</p> <p>2) (Localized) positive impacts on R&amp;D, technology spillovers, entrepreneurship, employment and growth</p> <p>3) Higher competitive position of country in global market</p>	<p>1) Long-run negative effect of diverting attention away from academic knowledge production</p> <p>2) Long-run negative effects of IP on open science and follow-on innovation</p> <ul style="list-style-type: none"> <li>•Patenting of broad upstream inventions, platform technologies and research tools increases the cost of follow-on research and innovation</li> <li>•Reduction in the diversity of research</li> </ul> <p>3) Focus on IP might inhibit rather than promote commercialization of inventions</p>

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#### Institutional / Policy Questionnaire

Country studies assessing approaches / impacts

# Literature Review and policy evaluations

- 1) Role of public research
  - 2) Stock-taking of policies and practices
  - 3) Academic literature review of approaches
- What KT laws and practices have been put in place in high- and middle-income countries? Can they be grouped into distinct approaches?
  - What are the specifics of these approaches ranging from the legal and institutional approaches, the incentive and evaluation structures, and other transfer component?
  - Which overall economic and other impacts have been measured?

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# WIPO country and data template

- The Country Study Template allows flexibility in producing information that reflects national conditions, while at same time producing a common set of metrics.
  - 1) What is currently known about knowledge transfer activities in your country?
  - 2) What may be country-specific methods of transferring knowledge to the private sector?, and
  - 3) What is done to evaluate the economic and other impacts of knowledge transfer (both informal / formal)?

# WIPO policy questionnaire for institutions

## I. Ownership of IPRs Created at the Institution

Questions 12 – 16 only need to be answered if your institution has an IP policy (yes to question 9).

1. Does your institution's IP policy regulate ownership of the following IPRs that are created within the institution? *More than one answer is possible.*

- Patents
- Copyright
- Industrial designs
- Utility models
- Trademarks
- Plant varieties
- Trade secrets/confidential business information
- No, it does not regulate ownership of any IPRs
- Don't know/Not relevant

2. Does your institution's IP policy follow national regulations on the ownership of IPRs?

- Yes, the institution's policies follow the national regulations
- Yes, but the institution's policies include areas not covered by the national regulations
- No, because there are no relevant national regulations
- No, the IP policy alters the national regulations
- Don't know/Not relevant

3. Who owns the IP when research is funded by public or private sources?\*

*More than one answer is possible*

IP Owner	Funded by public sources	Funded by private (business) sources
University/PRO	<input type="checkbox"/>	<input type="checkbox"/>
Funding organization / business	<input type="checkbox"/>	<input type="checkbox"/>
Inventor(s)	<input type="checkbox"/>	<input type="checkbox"/>

## Information on

- the legal environment for university/PRO IP and knowledge transfer
- the economic environment for transfer of technology
- IP held by university/PRO and staff

# Selected comparative country studies to assess approaches and impacts

- uniform research approach, drawing on and implementing the recommendations of the aforementioned statistical research component
- if possible, the production of a common set of metrics and the deployment of a common survey instrument.

**2-3 high-income countries:**

UK, Germany, Republic of Korea

**2-3 middle-income countries:**

Brazil, China, South Africa



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# Timelines

- 2014-2015: Agreement of Minister for Science and Technology, Mr. Wang Gang, China and WIPO Director General Mr. Gurry to develop joint research project
- 2016-2017: Implementation of the project

	<b>Time-frame</b>	<b>Content</b>
<b>Stage 1</b>	February 2016	- Hiring of all international and national experts
<b>Stage 2</b>	Now to mid-March	- Production of draft outline for the metrics paper and draft structure for country studies (Arundel)
<b>Stage 3</b>	Project kick-off call mid-March 2016	- Discussion of draft country study template to align with inputs from country experts - Discussion of draft outline for the metrics paper
<b>Stage 4</b>	End April 2016	- Draft country study template (Arundel) and start of country studies
<b>Stage 5</b>	July 2016	- Draft study on metrics (Arundel) for team discussion and further input to country studies
<b>Stage 6</b>	July 18 or 19, 2016	- Intermediate workshop at MOST on July 18/19 with international expert, WIPO and China team - Final study on metrics - Agreed approach for country studies
<b>Stage 7</b>	by mid-November 2016	- First draft of country studies for team discussion (feedback until end-November 2016) and first draft of overview study covering the elements of above section 2a (Arundel and Wunsch-Vincent).
<b>Stage 8</b>	November 2016 or March 2017	- International workshop, UNU-MERIT/MOST/WIPO, Maastricht <ul style="list-style-type: none"> <li>• Presentation of revised country studies</li> <li>• Presentation of final metrics paper</li> </ul>
<b>Stage 10</b>	July 2017 October 2017	- Finalization of all study inputs, including sections 2a. and 2b., and data analyses - Launch of the full report

# Discussion questions

- How complete and adaptable to countries of different level of development is the conceptual framework?
- How thought through and complementary are the various project inputs and outputs? Which changes are required?
- Any further feedback on project elements?