REPORT ON TECHNOLOGY TRANSFER AND WEALTH CREATION (T2WC) SURVEY

Survey Objectives:

- To document technology transfer activities among APRU member universities in the Asia-Pacific region.
- To identify and highlight the key constraints and challenges faced by APRU member universities in technology transfer.
- To propose recommendations for improving national policy environments for university technology transfer and facilitating regional cooperation among APEC economies.

Survey Methodology and Sample Description:

- Structured e-mail questionnaire, administered to the TLO (technology licensing office) Director (or his/her equivalent) in the 29 member universities of APRU who have agreed to participate.
- Use of standard definitions of Association of University Technology Managers (AUTM) survey where possible.
- All statistical analysis presented is based on the sample returns, without weighting.

Distribution of Responses:

- 22 universities
  - 10 North America
  - Asia/Austral-Asia: 9 Asia, 1 each Australia, New Zealand, South America
- 76% response rate (91% for North American universities and 67% for Asia/Austral-Asian universities)
- 86% public universities
- More than 70% have medical schools
- Average of 1,546 tenure track faculty members, 1,003 PhDs, 23,346 students, of which an average of 29% were graduate students
DISTRIBUTION OF RESPONSES

<table>
<thead>
<tr>
<th>Region</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
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<td>45.5</td>
</tr>
<tr>
<td>University of California, Berkeley</td>
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<tr>
<td>University of California, Los Angeles</td>
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<td>University of California, San Diego</td>
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<tr>
<td>University of California, Santa Barbara</td>
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<tr>
<td>University of Washington</td>
<td></td>
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<tr>
<td>University of Southern California</td>
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<tr>
<td>The University of British Columbia</td>
<td></td>
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<tr>
<td>University of Oregon</td>
<td></td>
<td></td>
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<tr>
<td>Stanford University</td>
<td></td>
<td></td>
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<tr>
<td>University of California, Irvine</td>
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</tr>
<tr>
<td>Japan</td>
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<tr>
<td>Kyoto University</td>
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<tr>
<td>Osaka University</td>
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<tr>
<td>The University of Tokyo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waseda University</td>
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<tr>
<td>Asia (excluding Japan)</td>
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<td>Seoul National University</td>
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<td>University of Science and Technology of China</td>
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<tr>
<td>National Taiwan University</td>
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<tr>
<td>University of Auckland</td>
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<td>South America</td>
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<td>University of Chile</td>
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<tr>
<td>Total</td>
<td>22</td>
<td>100.0</td>
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Key Findings and Policy Issues/Recommendations

- The North American Universities in APRU generally have a significantly higher level of technology creation and transfer activities than other APRU member universities. The longer history of involvement in such activities is one contributing factor.

- Technology creation and transfer intensities are increasing among all APRU member universities; they are growing at a faster rate among universities outside of North America.

- Significant differences exist between North American member universities of APRU and member universities from other regions in terms of Objectives of Technology Transfer (TT), policies governing these TT activities, technology areas of emphasis, and organizational approaches. This may reflect the diversities of environmental contexts.

- The majority of APRU member universities have not implemented systematic monitoring of the economic impact of technology transfer on new firm formation, job creation, and other economic measures.
T2WC Conference Participation

20 APRU Institutions from 9 Countries Sent 64 Participants from the following universities:

- Fudan University
- Hong Kong University of Science & Technology
- Kyoto University
- National University of Singapore
- Osaka University
- Seoul National University
- Stanford University
- Tsinghua University
- University of British Columbia
- University of California, Berkeley
- University of California, Los Angeles
- University of California, Santa Barbara
- University of Oregon
- University of Southern California
- University of Sydney
- University of the Philippines
- University of Tokyo
- University of Washington
- Waseda University

- 34 organizations were represented and included: 5 private, 4 government and 22 academic institutions
Research, Invention Disclosure and Patenting

Three year range: 99 to 114 Invention Disclosures

Cumulative Non-Expired Patents Issued
Range from 117 to 188
Mean # as of end of FY2000
Cumulative Non-Expired Patents Issued as of End FY2000
Mean percentage of patents generated by researchers in the following schools/departments
Technology Licensing

New Technology Licensing Agreements
Mean cumulative # of licenses/options executed as of End FY2000
(Data exclude one outlier)

Technology Licensing Agreements According to Recipient Organization
Mean # of licenses to existing companies
Technology Licensing Agreements According to Recipient Organization
Mean cumulative # of licenses as of End FY2000

Licenses to start-up companies
- North America: 36.4
- Other: 9.8
- Total: 46.2

Licenses to existing companies
- North America: 324.8
- Other: 30.5
- Total: 355.3

Licenses Yielding Income
Mean # of licenses/options yielding license income

<table>
<thead>
<tr>
<th>Year</th>
<th>North America</th>
<th>Other</th>
<th>All countries</th>
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<tbody>
<tr>
<td>FY1998</td>
<td>109.2</td>
<td>3.4</td>
<td>71.4</td>
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<td>FY1999</td>
<td>129.9</td>
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<td>FY2000</td>
<td>135.7</td>
<td>8.9</td>
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</table>
Research Funding Generated by Licensing
Did any technology licensing over past 3 years generate new sponsored research grants to university by recipient company?
(Percentage of universities responding ‘yes’)

- North America: 90.0%
- Other: 55.6%
- Total: 73.7%
Technology Transfer or Licensing Office

Range of Responsibilities for TTOs
Percentage of universities whose TTOs have the following responsibilities by region

License Income Received v. Cost of Operation
Would license income received over the past three years cover the cost of the operation of the TTO?
(Percentage of universities responding ‘yes’)

North America 90.0
Other 22.2
Total 57.9
Importance of Technology Transfer Objectives

(Mean score)

Service to researchers
Transfer of technologies for the public good
No. of inventions commercialized
Licensing income generated
Local economic development
Generation of sponsored research grants
Prestige of the university
No. of start-ups created
No. of inventions disclosed
Other

North America
Other
University Policies Affecting Technology Transfer

Invention Policies
Ownership of patent rights to technologies developed by faculty, students and staff
(Percentage of universities)

North America
- University 80.0%
- University and others 10.0%
- Others 10.0%

Other countries
- University 40.0%
- University and inventor 40.0%
- Others 20.0%

Start-Up Company Policies
Can a tenure-track faculty member serve on board of directors of:

Existing companies

Start-up company to commercialize invention

<table>
<thead>
<tr>
<th>Region</th>
<th>Yes</th>
<th>Yes, but need approval</th>
<th>No</th>
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</thead>
<tbody>
<tr>
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<td>50.0</td>
<td>0.0</td>
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<tr>
<td>Other</td>
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<tr>
<td>Total</td>
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<tr>
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<tbody>
<tr>
<td>North America</td>
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<td>50.0</td>
<td>0.0</td>
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<tr>
<td>Other</td>
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<td>Total</td>
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<tr>
<td>North America</td>
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<td>5.0</td>
<td>40.0</td>
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</tbody>
</table>

Legend:
- Yes
- Yes, but need approval
- No
Start-Up Company Policies
Can a tenure-track faculty member:

- Take no-pay leave for involvement in start-up co. to commercialize invention
- Engage in consulting for industry

Assistance Provided to Start-Up Companies
(Percentage of universities providing assistance)

- Uni can take equity in start-up cos.
- Mentoring and business advisory svc.
- Facilitate access to VC
- Entrep center providing entrep-related educ and outreach events
- Advice on govt commercialization grants
- Business plan comp
- Aid in recruiting mgmt team
- Prototyping fund
- Uni-affiliated research/science park
- Uni-based incubator facility/services
- Direct investmt fr uni endowmt fund in start-up cos.

North America
Other
Total

Yes, Yes, but need approval
No
Conflict of Interest Policy
Does university have a written policy statement on conflict of interest for faculty member involvement with business/industry?
(Percentage of universities)

North America
- Yes: 90.0%
- No: 10.0%

Other Countries
- Yes: 55.6%
- No: 44.4%

Equity Management Policy
Does university have an equity management policy for start-up companies receiving technology licensing?
(Percentage of universities)

North America
- Yes: 90.0%
- No: 10.0%

Other Countries
- Yes: 22.2%
- No: 77.8%
Economic Impact and Wealth Creation

Tracking of Start-up Companies
Does university track number of start-up companies by faculty members/alumni?
(Percentage of universities responding yes)

Tracking of Start-up companies by Faculty members
Mean cumulative no. of start-up companies as of end FY2000
(for universities that track start-ups by faculty members only)

With technology licensing

Without technology licensing
Tracking of Economic Impact/Wealth Creation Indicators of Start-Up Companies with Technology Licensing from University
(Percentage of universities which track indicator)

- No. of jobs created
- Sales revenue generated
- External investment received
- Other indicators

Tracking of Economic Impact/Wealth Creation Indicators of Start-Up Companies without Technology Licensing from University
(Percentage of universities which track indicator)

- No. of jobs created
- Sales revenue generated
- External investment received
- Other indicators
Policy Issues and Recommendations

➢ Technology transfer activities have been extensively monitored among North American universities through organizations like the Association of University Technology Managers (AUTM); this the first time that comparable information on universities outside North America is available.

➢ Some APRU member universities from outside North America were not able to participate in this survey because they have not yet set up a Technology Transfer Organization (TTO), or they have not developed capacity to collect such data yet. Some of the participating universities indicated that this is the first time they have compiled such data.

➢ APRU can play a useful role to promote information collection on technology transfer activities and on the economic impacts of technology transfer among its members.

➢ The diversity of APRU members (also) makes the organization an ideal forum for promoting comparative research on best TT practices under different environmental contexts and for facilitating information exchange and knowledge sharing.

➢ APRU might consider replicating the survey in the future (involving more member universities,) and promoting joint research into improving methods for analyzing the economic impact of university technology transfer under diverse environmental conditions.

NOTE:
This report is summarized from a presentation made at the 6th APRU Annual Presidents’ Meeting at University of California, Berkeley on June 21, 2002. The presentation was prepared by:

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Annette Singh         Rosanne Dutton
Finna Wong            Kathleen Allen

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National University of Singapore   University of Southern California