Knowledge Transfer: 
A framework and metric set for maturity evaluation

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University Mission

Knowledge Transmission
- teaching, skills

Knowledge Transfer
- application of knowledge

Knowledge Creation
- research
Research Exploitation (how to avail of technology at value)

Research Collaboration (how to leverage state and EU research collaboration supports)

Consultancy Services (how to use 3rd level institutes to generate data, reports, knowledge for your business)

Facilities / Services (how to avail of the wide range of equipment and facilities at 3rd level institutes)

Student Supported Projects (how to avail of postgraduate student expertise for your projects)

Incubation Space (how to access facilities to grow your start-up company)
• Standards – AUTM, ASTP

• Metrics *normalised to research expenditure*
  – LOA
  – Spin-out
  – Company links
  – IDF
  – Patents
  – LOA Income
Observations

• Comparing ourselves to Oxford or Stanford is (perhaps) crazy
• We are likely neglecting important information in the standard metrics

Questions

• Can we develop a self-evaluation framework?
• Can we pull additional useful information from the metrics?
Technology Readiness Levels

- **TRL 1.** Basic principles observed and reported
- **TRL 2.** Technology concept or application formulated
- **TRL 3.** Proof of concept of key analytical characteristic
- **TRL 4.** Laboratory validation of component or breadboard
- **TRL 5.** Field validation of component or breadboard
- **TRL 6.** Field demo of subsystem model/prototype
- **TRL 7.** System prototype demo in operational environment
- **TRL 8.** Actual system completed and qualified in test and demo
- **TRL 9.** Actual system proven in successful end-use operations
Capability Maturity Frameworks

1 - Initial
Process is unpredictable, poorly controlled and reactive

2 - Repeatable
Processes are characterized for specific organization; organization is often reactive

3 - Defined
Projects tailor their processes from the organization's development methodology

4 - Managed
Processes are measured and controlled

5 - Optimizing
Focus on process improvement

Capability Maturity Model – Integrated

<table>
<thead>
<tr>
<th>Level</th>
<th>Focus</th>
<th>Process Areas</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Optimizing</td>
<td>Continuous process improvement</td>
<td>Productivity &amp; Quality</td>
</tr>
<tr>
<td>4</td>
<td>Quantitatively Managed</td>
<td>Quantitative management</td>
<td>Organizational Process Performance</td>
</tr>
<tr>
<td>3</td>
<td>Defined</td>
<td>Process standardization</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Managed</td>
<td>Basic project management</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Initial</td>
<td>Competent people and heroics</td>
<td></td>
</tr>
<tr>
<td>KT MATURITY FRAMEWORK</td>
<td>Level 1</td>
<td>Level 2</td>
<td>Level 3</td>
</tr>
<tr>
<td>-----------------------</td>
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</tr>
<tr>
<td>TT Staff Experience</td>
<td>TT activity new to RPO, no dedicated TT/KT staff.</td>
<td>TT/KT staff at early experience level.</td>
<td>TT/KT staff with developing expertise and skills.</td>
</tr>
<tr>
<td>Spin-outs / LOA Activity</td>
<td>Very low, sporadic and unplanned activity.</td>
<td>Developing TT output, first LOA deals, some spin-out possibilities.</td>
<td>LOAs regular and planned, emerging pipeline of spin-outs.</td>
</tr>
<tr>
<td>Industry Engagement</td>
<td>Emerging industry engagement.</td>
<td>Pockets of industry engagement.</td>
<td>Good industry engagement across several research groups.</td>
</tr>
<tr>
<td>Consultancy Activity</td>
<td>No institutional consultancy strategy, private capacity only.</td>
<td>Pockets of RPO administered and planned consultancy.</td>
<td>RPO wide policy and mechanism for consultancy.</td>
</tr>
<tr>
<td>TT / KT Culture</td>
<td>TT/KT culture not well established.</td>
<td>TT/KT culture accepted at management and researcher level.</td>
<td>TT/KT activity considered in staff promotion evaluation.</td>
</tr>
<tr>
<td>IP Management Processes</td>
<td>RPO IP management policies not in place.</td>
<td>First version policies relating to LOAs and spin-outs in place.</td>
<td>Developed IP and campus company policies.</td>
</tr>
<tr>
<td>Transaction Speed and Quality</td>
<td>Institutional inexperience in TT/KT activity.</td>
<td>TT/KT contract negotiation laborious and time consuming.</td>
<td>TT/KT contract negotiation slow due to multiple review / sign-off.</td>
</tr>
</tbody>
</table>
Metrics *normalised to research expenditure*

LOA
Spin-out
IDFs
Patents
Company links
LOA Income
1. Observations
   a) LOA volume (possibly) measures **TTO quality**
   b) LOA income (possibly) measures **research quality**

   →) Smaller institute bias ??
   →) No culture measurement ??

Metrics *normalised to research expenditure*

- LOA
- Spin-out
- Company links
- IDF
- Patents
- LOA Income
2. Ratios (that ought to be) invariant

a) Pat/IDF (~30%)
b) SO/LOA (~20%)

Metrics *normalised to research expenditure*

LOA
Spin-out
Company links
IDFs
Patents
LOA Income
3. New ratios (evaluation)
   a) LoA / IDF – **TTO effectiveness**

Metrics *normalised to research expenditure*

LOA
Spin-out
Company links
IDFs
Patents
LOA Income
3. New ratios (evaluation)
   b) IDF / Res Spend - **Culture**

Metrics *normalised to research expenditure*

- LOA
- Spin-out
- Company links
- IDFs
- Patents
- LOA Income
3. New ratios (evaluation)
   c) LOA / Industry Contracts – Industry engagement
   d) Industry Contracts / Res Spend – Industry engagement
<table>
<thead>
<tr>
<th>KT Maturity Framework</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>TT Staff Experience</td>
<td>TT activity new to RPO, no dedicated TT/KT staff.</td>
<td>TT/KT staff at early experience level.</td>
<td>TT/KT staff with developing expertise and skills.</td>
<td>Staff at RTTP or equivalent.</td>
<td>Highly experienced and skilled TT/KT staff mix.</td>
</tr>
<tr>
<td>Spin-outs / LOA Activity</td>
<td>Very low, sporadic and unplanned activity.</td>
<td>Developing TT output, first LOA deals, some spin-out possibilities.</td>
<td>LOAs regular and planned, emerging pipeline of spin-outs.</td>
<td>Several years' experience in LOA and HPSU type spin-out creation.</td>
<td>Large portfolio of deal experience. Well-developed activity pipeline.</td>
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<tr>
<td>Industry Engagement</td>
<td>Emerging industry engagement</td>
<td>Pockets of industry engagement.</td>
<td>Good industry engagement across several research groups.</td>
<td>RPO wide targeted industry engagement.</td>
<td>Large portfolio of RPO wide industry contracts.</td>
</tr>
<tr>
<td>Consultancy Activity</td>
<td>No institutional consultancy strategy, private capacity only.</td>
<td>Pockets of RPO administered and planned consultancy.</td>
<td>RPO wide policy and mechanism for consultancy.</td>
<td>Managed and marketed consultancy offering by RPO.</td>
<td>Significant and mature consultancy activity across RPO.</td>
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<td>TT / KT Culture</td>
<td>TT/KT culture not well established.</td>
<td>TT/KT culture accepted at management and researcher level</td>
<td>TT/KT activity considered in staff promotion evaluation.</td>
<td>RPO wide recognition that TT/KT activity is an important activity.</td>
<td>TT/KT embedded as core RPO activity along with teaching and research.</td>
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<td>IP Management Processes</td>
<td>RPO IP management policies not in place.</td>
<td>First version policies relating to LOAs and spin-outs in place.</td>
<td>Developed IP and campus company policies.</td>
<td>RPO wide processes for IP Management as per IP Protocol.</td>
<td>RPO broad IP management developed and monitored.</td>
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<td>Transaction Speed and Quality</td>
<td>Institutional experience in TT/KT activity.</td>
<td>TT/KT contract negotiation laborious and time consuming.</td>
<td>TT/KT contract negotiation slow due to multiple review / sign-off.</td>
<td>TTO has remit to negotiate and sign off on all TT/KT deals.</td>
<td>Very efficient and effective TT/KT transactions.</td>
</tr>
</tbody>
</table>
Thank You For Listening