AGENDA

• Context
• Research and Development
• R&D and Innovation
• Internal and External R&D
• Public Private Partnerships
• PPPs challenges; advantages
• R&D funding

• Establishing partnerships
• More and more, SMEs «outsource» R&D to University laboratories.

• University professors are more and more open to private R&D funding (depends on university and type).

• However, often culture mismatch.
INTRODUCTION (2)

For the sake of knowledge

UNIVERSITY

- Knowledge Management
- Teaching
- Research
- Service
- Development
- Publications

SMEs

- Knowledge management
- Profits
- Confidentiality
- Limited disclosures

Commercialization of new and useful Technologies

Source: Louis P. Berneman, 1999

Openness

Academic Freedom

For Profit

R&D

Technology Transfer
Research and Development are two different but sometimes related processes:

- **Research:**
  - Curiosity → Knowledge, Ideas (IP)

- **Development:**
  - Knowledge, Ideas → Products & Processes
R&D IS NOT ALWAYS THE SAME

In Academic Institutions:

\[ \text{R&D} \]

Output: Knowledge, Ideas, IP

In Commercial Organizations:

\[ \text{R&D} \]

Output: Products, Processes
R&D as a percentage of GDP, selected nations

Source: OECD

Military dominated
# TOP TEN R&D COMPANIES 2009

<table>
<thead>
<tr>
<th>POSITION</th>
<th>COMPANY</th>
<th>SPENDING USD B.</th>
<th>INNOVATION RANK*</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>SAMSUNG CORP.</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>GLAXO SMITHKLINE</td>
<td>6.2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>SANOFI AVENTIS</td>
<td>6.3</td>
<td></td>
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<tr>
<td>7</td>
<td>JOHNSON &amp; JOHNSON</td>
<td>7.0</td>
<td></td>
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<tr>
<td>...</td>
<td>...</td>
<td></td>
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</tr>
<tr>
<td>3</td>
<td>NOKIA</td>
<td>8.2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>MICROSOFT</td>
<td>9.0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ROCHE HOLDINGS</td>
<td>9.1</td>
<td></td>
</tr>
</tbody>
</table>

* Bloomberg 50 most innovative companies
<table>
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<th>INNOVATION RANK*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ROCHE HOLDINGS</td>
<td>9.1</td>
<td>NOT in top 50</td>
</tr>
<tr>
<td>2</td>
<td>MICROSOFT</td>
<td>9.0</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>NOKIA</td>
<td>8.2</td>
<td>23</td>
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<tr>
<td>...</td>
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<td>NOT in top 50</td>
</tr>
<tr>
<td>10</td>
<td>SAMSUNG CORP.</td>
<td>6.0</td>
<td>11</td>
</tr>
</tbody>
</table>

* Bloomberg 50 most innovative companies
INTERNALIZE OR
EXTERNALIZE R&D?

• More and more companies recognize that keeping everything internal and secret slows down innovation «not invented here syndrome».

• Alternative:
  – Collaborate with customers and suppliers.
  – Collaborate with public research institutions.
Appropriate **contracts** and **good relationships decrease risks** (infringement, not respecting Confidentiality, collaborating with competitors…)

Leverage patent/IP system
Public Private Partnerships (PPPs) have intensified since 1980.

Baye Dole Act, 1980, USA

- IP stemming from publicly funded research belongs to Research Institution receiving the funds.
- Strong increase in technology transfer activity and impact, new way to work with companies.
Co-authored scientific publications are an indication of PPPs.

Source: Centre for Science and Technology Studies (CWTS), Leiden University, using Web of Science (WoS) database.
PERCEIVED CHALLENGES OF PPPs

Mismatch between supply and demand: Firms not always willing (e.g. high transaction and search costs, research not relevant or of low quality) or capable of making use of public research results (e.g. lack of own absorptive capacity)

Source: Daniel Kupka/ OECD
www.oecd.org/sti/innovation
OECD: Organization for Economic Co-operation and Development
ADVANTAGES OF PPPs

• Not only IP and results.
• Also continuous source of information on latest scientific breakthroughs.
• Transfer of personnel: academic researcher can be hired by company. Students can be hired by company. Professors can act as scientific consultants, spin-off creation and acquisition.
ADVANTAGES OF PPPs

• Access to latest generation scientific equipment.
• Access to the open world of scientific research.
• IP, legal and commercialization support of Technology Transfer Offices (long term relationships, trust).
• Companies.
• Research Institutions (own funding of collaborative research projects).
• Government:
  – Every country has its own system.
  – Switzerland: CTI R&D project funding.
World Competitiveness rankings 2015 (IMD, CH)

Switzerland:
Encouragement for enterprises to perform in an innovative, profitable and responsible manner

Business efficiency ◀: strength of national currency
Various studies confirm the strong collaborative culture between academia and industry in Switzerland and the appropriate technology transfer practices of Swiss universities and other public research institutions.

Easy access to academic researchers and well defined technology transfer processes are important criteria for companies to relocate their business to Switzerland.

Source: Report 2010, Swiss Technology Transfer Association
CTI focus on innovative companies

1. 25’264 Innovation intensive companies
2. 29’042 Innovation poor companies within innovation intensive sectors
3. 31’815 Innovation poor sectors
4. 235’551 Small companies with less than 5 employees and little innovation

Potential Clients for CTI KTT-Support: ca. 15’000 SME (5%)

A. 8291 Industrial SME, modern services, (ICT, R&D etc)
B. 16’132 Construction and other services
C. 841 Large companies
SOURCES OF RESEARCH FUNDING (2)

• Direct government funding to SMEs.
  – Grants with no counterparty.
  – Investments (equity/loan).

• Government funding to research institutions.
  – Grants with no counterparty.
  – Grants subject to reimbursement:
    • Linked/conditional to success.
    • Not linked/not conditional to success.
**CTI in Switzerland’s innovation environment**

- Partners in the innovation process
- From Science to Market

**SNSF**
transforms money into knowledge

**CTI**
transforms knowledge into money
CTI* R&D support, Switzerland

SMEs can get R&D funding from the government.

- Submit a project together with a public research institution.
- Fund 50% of the total project budget (existing resources/personnel count)
- Funds from the government paid to public research institution.

* Commission for Technology and Innovation (CTI)
To submit an application, follow these steps:

› Step 1: Put together a project team
› Step 2: Find out more about your research topic
› Step 3: Put together a project plan
› Step 4: Submit the application
› Step 5: Application processed
› Step 6: Decision
› Step 7: Statutory requirements
› Step 8: Signing contracts

* Commission for Technology and Innovation (CTI)
Further Information

**Project application**

- Application process CTI (PDF, 32 kB, 16.12.2014)
- CTI funding application (DOC, 226 kB, 02.06.2015)
- Model contract CTI project (PDF, 47 kB, 16.01.2015)
- Research facilities allowed for contributions (PDF, 26 kB, 02.02.2015)
- Commercial Goals (PDF, 69 kB, 16.12.2014)
- List of experts F&E 2014 (German) (PDF, 112 kB, 16.12.2014)
- Form animal testing (german) (DOC, 72 kB, 15.12.2014)
- Saläransätze für Projektmitarbeitende.pdf (PDF, 103 kB, 16.12.2014)

* Commission for Technology and Innovation (CTI)
Your ongoing project

Once you have received a positive decision from the CTI you can get going on your innovation project. Once a project is up and running, you should nonetheless take note of the following.

› Step 1: Report & Meeting
› Step 2: Request changes
› Step 3: Final reports
› Step 4: Implementation audit

* Commission for Technology and Innovation (CTI)
CTI R&D support, Switzerland

**USD 126 M** (2014) R&D support funding for SMEs.
CTI R&D support, Switzerland

Type of research institution benefiting most:

- Federal Institutes of Technology
- Universities
- Field specific public research centers
- University of Applied Science

Sources of Research Funding (6)

<table>
<thead>
<tr>
<th>Source</th>
<th>CHF, M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>274</td>
</tr>
<tr>
<td>2014</td>
<td>117.1</td>
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<tr>
<td>2015</td>
<td>5.6</td>
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<tr>
<td>Field specific public research centers</td>
<td>8.5</td>
</tr>
<tr>
<td>Universities</td>
<td>15.4</td>
</tr>
</tbody>
</table>

11/06/2015
CTI R&D support, Switzerland
Other funding activities

- Support to Swiss Competence Centers for Energy Research
- Federal Institutes of Technology
- Knowledge Transfer Support
  - Innovation Mentors for SMEs/ 8 National Thematic Networks
  - Field specific networking events
- Startup and Entrepreneurship

R&D Funding (see prev. slides)

Total 2014: CHF 150.8 million

Knowledge Transfer Support:
- 118.5 million CHF
- 9.8 million CHF
- 3.7 million CHF
CTI in numbers:

Annual report:
file:///C:/Users/kuhn/Downloads/Taetigkeitsbericht_2014_A4_en_150428_lowres.pdf
## STATISTICS 2013, SWITZERLAND

<table>
<thead>
<tr>
<th>ITEM</th>
<th>2013</th>
<th>2012</th>
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<tbody>
<tr>
<td>Research Contracts</td>
<td>3’934</td>
<td>3’323</td>
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<tr>
<td>Invention Disclosures</td>
<td>575</td>
<td>519</td>
</tr>
<tr>
<td>Active Patent Cases (end of year)</td>
<td>1’951</td>
<td>1’818</td>
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<tr>
<td>Priority Patents Filed</td>
<td>297</td>
<td>270</td>
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<tr>
<td>License Agreements</td>
<td>201</td>
<td>174</td>
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<tr>
<td>License Revenues (Kchf)</td>
<td>14’776</td>
<td>13’303</td>
</tr>
<tr>
<td>New Spin-offs*</td>
<td>29</td>
<td>45</td>
</tr>
<tr>
<td>FTE (Academic Technology Transfer)</td>
<td>86</td>
<td>81</td>
</tr>
</tbody>
</table>

*Source: Report 2014, Swiss Technology Transfer Association; * with formal license.*
TT Benchmarking, USA (AUTM), Europe (ASTP), Western Switzerland (Alliance)

![Bar chart showing comparisons between countries in terms of invention disclosures, patent applications, executed licenses, and start-ups.](chart)

Figures are per R&D budget (mio $): 30% = 0.3 unit for each mio $ spent on R&D budget.

### SOURCES OF RESEARCH FUNDING (4)

#### Funding scheme, France

<table>
<thead>
<tr>
<th>Phase</th>
<th>Salaires fondateurs</th>
<th>Subventions</th>
<th>Avances &amp; Prêts</th>
<th>Prêts participatifs</th>
<th>Reduction des coûts salariaux, R&amp;D et impôts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anté-creation</td>
<td>Pôle Emploi</td>
<td>Aides BPI: &gt;-30 k€</td>
<td>Programme SUB: CCE type PK/R&amp;D: &gt;-250 k€</td>
<td>Prêts d'investissement: &gt;-60 k€</td>
<td>Jeune Entreprise Innovante</td>
</tr>
<tr>
<td>Creation</td>
<td>Versement des indemnités chômage</td>
<td>Programme SUB: CCE type PK/R&amp;D: &gt;-250 k€</td>
<td>Avances et prêts BPI: &gt;-50 k€</td>
<td>BPI, SOFRED, etc: &gt;-75 k€</td>
<td>Crédit Impôt Recherche (CIR)</td>
</tr>
<tr>
<td>Premiers succès (CA&gt;0)</td>
<td>Avances et aides Coface: 50-3500 k€</td>
<td>Concours National d’aide à la Croissance: 45-450 k€</td>
<td>Avances et prêts BPI: &gt;-50 k€</td>
<td>Crédit Impôt Innovation (CII)</td>
<td>Reimbursement &gt;-50% frais R&amp;D</td>
</tr>
<tr>
<td>Croissance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Research Tax Credit for R&D expenses (up to 50%)
COLLABORATING WITH UNIVERSITIES

• Stages:
  – Identify Development needs.
  – Build relationships.
  – Agree on a common project.
  – Agree on funding (seek government support).
  – Apply for funding.
  – Agree on Research Contract
    • Elements important to SME.
    • Elements important to University/ Public Research. Org.
COLLABORATING WITH UNIVERSITIES

• Stages (2):
  – Perform research.
  – License (?). Exploit results (SME).
  – Publish & continue generic research (University).
## RESEARCH CONTRACT

<table>
<thead>
<tr>
<th>IMPORTANT FOR UNIVERSITY</th>
<th>IMPORTANT FOR SME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right to Publish</td>
<td>Right to use the Results</td>
</tr>
<tr>
<td>Right to own the IP</td>
<td>Right to own the IP</td>
</tr>
<tr>
<td>Results for research and education</td>
<td></td>
</tr>
<tr>
<td>Warranties</td>
<td>Warranties</td>
</tr>
<tr>
<td>Indemnification</td>
<td>Confidentiality</td>
</tr>
<tr>
<td></td>
<td>Non competition</td>
</tr>
<tr>
<td>Applicable Law and Jurisdiction</td>
<td></td>
</tr>
<tr>
<td>Financial return in case of success (if exclusivity granted on the use of IP)</td>
<td></td>
</tr>
</tbody>
</table>
Firms should be open to external ideas and use them. **Sharing risks and sharing rewards.** More permeability between the inside and the outside of companies. **Diversity.**

- Idea competitions.
- Collaborative product design.
- **Customer involvement** in product development.
- **Supplier involvement** in product development.
- Innovation networks (private or public).
- R&D partnerships.
What is the first two stages before entering into a public private partnership?
THANK YOU
FOR YOUR ATTENTION