Research Leading to Innovation and Spin-off

Prof. Dr. Hans Schnitzer
Graz University of Technology, Austria
Institute for Process and Particle Engineering
Goals of UNCHAIN

• Establishing University Chairs on Innovation in the MEDA Region
• Developing Technology Transfer Policy and Training of the Chair Operators
• Initiating a Re-skilling Program on Innovation
• EU MEDA Twinning MSc Thesis Program
• Developing an EU-MEDA Virtual Environment and Strategy for University-Industry Cooperation in Innovation
Graz University of Technology
www.TUGraz.at

Institute for Process and Particle Engineering
### Facts and Figures

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Academic Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,958</td>
<td>Beginners</td>
<td>09/10</td>
</tr>
<tr>
<td>11,264</td>
<td>Students Total</td>
<td>09/10</td>
</tr>
<tr>
<td></td>
<td><strong>Graduates</strong></td>
<td>08/09</td>
</tr>
<tr>
<td>432</td>
<td>- Diploma Programmes</td>
<td></td>
</tr>
<tr>
<td>450</td>
<td>- Bachelor Programmes</td>
<td></td>
</tr>
<tr>
<td>177</td>
<td>- Master Programmes</td>
<td></td>
</tr>
<tr>
<td>155</td>
<td>- Doctoral Programmes</td>
<td></td>
</tr>
<tr>
<td>198,140 m²</td>
<td><strong>Floor Space</strong></td>
<td></td>
</tr>
<tr>
<td>103.9 Mio. €</td>
<td><strong>Federal Budget 2009</strong></td>
<td></td>
</tr>
<tr>
<td>47 Mio. €</td>
<td><strong>Third-party Funds 2008</strong></td>
<td></td>
</tr>
<tr>
<td>2,222</td>
<td><strong>Staff Total</strong></td>
<td>(as of December 2009)</td>
</tr>
<tr>
<td>1,376</td>
<td>Academic Staff</td>
<td></td>
</tr>
<tr>
<td>846</td>
<td>Non-Academic Staff</td>
<td></td>
</tr>
<tr>
<td>TU GRAZ:</td>
<td>Beginners (WS)</td>
<td>Staff (Persons of 31/12/2009)</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>7 Faculties, 104 Institutes</td>
<td>▪ Total: 1,958</td>
<td>▪ Total: 2,222</td>
</tr>
<tr>
<td>5 Fields of Expertise</td>
<td>▪ Percentage of women: 27.2%</td>
<td>▪ Academic staff: 1,376</td>
</tr>
<tr>
<td>Federal budget 2009 (in Mio €): 103.9</td>
<td>▪ Percentage of foreigners: 19.9%</td>
<td>▪ of which project staff: 752</td>
</tr>
<tr>
<td>Refund of tuition fee 2009 (in Mio €): 7</td>
<td>▪ Percentage of exchange students: 11.6%</td>
<td>▪ Non-academic staff: 846</td>
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<tr>
<td>Income from contractual work 2009 (in Mio €): 50,5</td>
<td></td>
<td>(incl. 39 apprentices)</td>
</tr>
<tr>
<td>Students (WS)</td>
<td>▪ Total: 11,268</td>
<td>▪ of which project staff: 155</td>
</tr>
<tr>
<td>▪ Percentage of women: 21.3%</td>
<td>▪ Diploma programmes: 432</td>
<td></td>
</tr>
<tr>
<td>▪ Percentage of foreigners: 14.7%</td>
<td>▪ Bachelor programmes: 450</td>
<td></td>
</tr>
<tr>
<td>▪ Percentage of exchange students: 2.0%</td>
<td>▪ Master programmes: 177</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Doctoral programmes: 155</td>
<td></td>
</tr>
</tbody>
</table>

Graz University of Technology, Academic Year 2009/10, as of 31/12/2009

33%
TU Graz Funders of Contractual Research Projects 2009


- Ent 29%
- FFG 16%
- FWF 15%
- FPL 8%
- OTH 20%
- EU 12%

EU European Union
FPL Federal, provincial or local authorities
FWF Austrian Science Fund
FFG Austrian Research Promotion Agency
ENT Enterprises
OTH Others
TU Graz - a medium sized university with strong industry links

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Students</td>
<td>11,264</td>
</tr>
<tr>
<td>Graduates</td>
<td>1,214</td>
</tr>
<tr>
<td>Floor space</td>
<td>198,140 m²</td>
</tr>
<tr>
<td>Federal Budget p.a.</td>
<td>103,9 Mill.€</td>
</tr>
<tr>
<td>Income from Contractual Work p.a.</td>
<td>47,0 Mill.€</td>
</tr>
<tr>
<td>Staff</td>
<td>2,222</td>
</tr>
<tr>
<td>- Permanent Staff</td>
<td>1,315</td>
</tr>
<tr>
<td>- Staff for Contractual Work</td>
<td>907</td>
</tr>
</tbody>
</table>

41%
UNCHAIN – UNiversity CHAir on INnovation

RESEARCH

MONEY

IDEAS

INNOVATION

Hans Schnitzer
Université Saint-Josef – Journées de la recherche à l’USJ
Innovation and spin-off
UNCHAIN – UNiversity CHAir on INnovation

SOLUTIONS

Professors
Students

IDEAS

Business
Industry

PROBLEMS

Hans Schnitzer
Université Saint-Josef – Journées de la recherche à l'USJ
Innovation and spin-off
Cornerstone Issues

The present system of production is not sustainable and has not begun to address in a substantive way how competitiveness can be achieved within the framework of sustainability and the same time maintain an acceptable quality of life.

Current trends in the modernisation of production have the potential to improve competitiveness and to reduce environmental impacts but are unlikely to bring production, and the use of products, within the framework of sustainability.

Present policies and actions for RD&I might improve environmental performance but will not foster the transformation in production that are required to achieve competitiveness within the framework of sustainability.

Source: European Commission. Sustainable Production - challenges & objectives, DG Research
Sustainability requires innovation

- doing things better

Factors:
- Factor 4
- Eco-Efficiency

Environmental Impact

Innovation

Quality of life

Economic growth
Basic Questions

• How can economic growth and environmental impact be de-coupled?
• How can production and consumption be de-linked from resource throughput?
• How can changes lead to competitive advantages for the innovative entrepreneurs
There is a need for actions

“An important challenge facing industry is the transition from a traditional to a sustainable system of industrial production.

Regarding this, research and innovation strategies that combine competitiveness with the objective of sustainability should be supported.”

(Statement of the commission “Innovation in the Economy“, 2000)
Change is indeed needed – but its not easy

- Innovation is not a natural process in our culture — imitation and adaptation are
- Risk-taking and change-making are not praised values in our societies – stability is
- Open competition and entrepreneurship are not (yet) assets in our economies – protectionism and well-establishment (still) are
What are the driving forces for innovation?

• consumers, market
• legislation
• costs, prices, economy
• public image,
• supply chain
• end of life problems
• sheer curiosity
But…. What is innovation

The term “innovation” is defined as follows:
(by the Brockhaus Dictionary)

- the planned and goal-oriented modernization of existing (social) systems through the use of new ideas and technologies;

- the creation and introduction of new products, product technologies and forms of organization in the economy
Innovation / Definition

Planned modernization with the goal, either …

to: latin “novare” “modernize”, “change”
(Brockhaus – The Encyclopedia; in 24 Volumes)

Josef A. Schumpeter:
“\textit{Innovation is the process of finding economic applications for inventions}“

“Invention” = The invention itself
“Innovation” = The process which includes all phases of modernization – from the idea to the realization
Innovation in Companies

- **innovative products**
- **innovative processes**
- **innovative organizational structure**

**CREATIVITY**
How to solve this problem?

- Take a ladder
- Invent a telescope watering can
- Put the plant to another place
- Engage a taller secretary
- Ignore problem?

innovate products
innovate processes
innovate organizational structure
Innovation and Market Share

- With innovation
- With improvement
- Without improvement

Market share vs. time
Questions for Companies

- What (innovation) strategy does my company pursue?
- Which market does my company wish to supply?
- What are the “problems” and “chances” of current products?
- How can current products / processes be improved?
- How can I think of “good” ideas for new products or for the optimization of existing products?
- How can I evaluate present ideas?
- How can ideas be effectively converted into a concept and a sellable product / process?
The barriers

- lack of awareness
- lack of information
- lack of skilled people
- lack of money
- lack of suited technologies
Welcome at Graz University of Technology

Research and Technology Office

Information, counselling and support in the field of research funding programs, scientific international relations and mobility as well as research documentation in TUGonline. Assistance to the Vice Rector of Research and Technology in all relevant questions.
» details

Technology Transfer

Central contact point of the Graz University of Technology for corporations, offering initial counselling in questions of company innovations, acting as an agent between companies and the staff of the Graz University of Technology, delivery of career and recruiting services and maintenance of a comprehensive company data base.
» details

Technology Exploitation

A service point and a competence centre for the commercialization of know-how and intellectual property.
» details
TUGraz: science-industry projects: "trust"

- first there was trust then IPR came into play ;-
- trust is not consensus between the two legal departments
- trust and good reputation of universities, institutes and professors has been built on good R&D project results, good infrastructure and most of all on good graduates, over the last years

Quote (UNCHAIN): “Knowledge Transfer Offices should and could play a crucial role as a bridge between research and industry”:

Their role in building trust in science-industry-projects:
(a) help define the rules (cost, contract templates, IPR) and assess compliance:
   eg TU Graz TEO established guidelines for handling of IPR in contract research and collaborative projects which are based on meetings with industry representatives
(b) act in a subsidiary role: a majority of project income is acquired because of institutes’ good reputation (“social capital”), so do not interfere too much
science-industry projects - what industry researchers want:
• an immediate project start, strict compliance to timeline
• to get to know high-qualified young graduates
• to tap specific expertise of senior researchers
• to use specific infrastructure (which is otherwise too expensive to buy)
• no fuss about IPR, if possible 100% exploitation rights

science-industry projects - what academics want:
• to draw a paper
• to draw any figure from the project that they are assessed by (eg citations, third party income)
• to gain some profit for the institute (reserve / lab investment) and if possible for themselves
• NO FUSS about IPR, no „legal tricks“ from industry side
Protect or publish?

Phase 1: Detection
Detection, declaration of research results having a valorization potential

Phase 2: Protection
Research results protected by IPRs protection such as patent, trademark, copyrights...

Phase 3: Publication
Scientific publication of the research results

Phase 4: Exploitation
Transfer agreement of IPRs, licensing, creation of start-up,...

Source: http://wwwde.uni.lu/research/valorisation_of_research_results
### Knowledge & Technology Transfer support portfolio

<table>
<thead>
<tr>
<th>Way of KTT</th>
<th>Central Organisations (service departments eg TTO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>by sc. publications</td>
<td>database, webpage (collection, display)</td>
</tr>
<tr>
<td>by training</td>
<td>quality standards, standard fees, sales</td>
</tr>
<tr>
<td>“by head”</td>
<td>recruiting support services, alumni services</td>
</tr>
<tr>
<td>by employees inventions</td>
<td>rules; selection; incentives; legal support; proactive commercialization incl. negotiation</td>
</tr>
</tbody>
</table>
| by start-ups / spin-offs    | * entrepreneurial spirit awareness, start-up support  
* spin-off rules and compliance                                                                                                                                                                                                                                                                                        |
| by contract research projects| * additional costumers (lead management)  
* contract templates (esp. IPR), compliance                                                                                                                                                                                                                                                                                                                                     |
| by collaborative projects / ventures | support in building consortia; contract templates so that there are only few exceptions (esp. IPR), negotiations                                                                                                                                                                                                                                                                 |

**Hans Schnitzer**  
**Université Saint-Josef – Journées de la recherche à l'USJ Innovation and spin-off**
### Way of KTT

<table>
<thead>
<tr>
<th>Way of KTT</th>
<th>Income (order of magnitude / year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>scientific publication</td>
<td>mostly non-monetary</td>
</tr>
<tr>
<td>education / transfer “by heads”; training courses</td>
<td>100 kEUR</td>
</tr>
<tr>
<td>patenting / licenses</td>
<td>&gt; 100 kEUR</td>
</tr>
<tr>
<td>entrepreneurship:</td>
<td></td>
</tr>
<tr>
<td>spin-offs</td>
<td>&lt; 100 kEUR</td>
</tr>
<tr>
<td>start-ups</td>
<td>non-monetary (“outreach”)</td>
</tr>
<tr>
<td>industrial joint ventures (eg Competence Centres)</td>
<td>&gt;&gt; 1 MEUR</td>
</tr>
<tr>
<td>contract research, collaborative research (projects)</td>
<td>&gt;&gt; 10 MEUR</td>
</tr>
</tbody>
</table>

Largest share of income is still from contract or collaborative research and industrial joint ventures (eg Competence Centres with large consortia)
Practical experience at TU Graz: start-ups/spin-offs

- „Science Park Graz“ (www.sciencepark.at):
- **Academic incubator** for all Graz universities (with a total of 40,000 students and 3,000 employees); TU Graz is majority shareholder
- Evaluted „best academic incubator“ in Austria
- 10-15 incubation projects p.a., but many of them by alumni with some professional experience → only minority of projects is eligible for university shareholdership (spin-off) → since 2005 just 1 TU Graz spin-off in this strict sense
- founders and start-up funding agencies are often reluctant to accept university shareholdership
- better chances for „strict-sense“ spin-offs in lab-intensive sectors (biotech, life science …)
- **entrepreneurship support: mostly „outreach“ function** ie non-monetary; main goal is enhancing regional competitiveness
When a spin off company

Spin-off company could be a perfect valorisation tool when:

• there is a potential new market
• the licensing activity was not effective
• Someone in the research team wants to become an entrepreneur
Map of Spin-Offs and Start Ups from Graz University of Technology

http://portal.tugraz.at/portal/page/portal/FTH/Technologietransfer/Start-up_Landkarte
Thank you!

Hans Schnitzer
Prof. Dr.
Vice Chair

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