Is it possible to shape a university's research portfolio and to develop synergies between top down and bottom up approaches?

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Universities/Institutes of Technology/Polytechnics

- **Universities have changed, but not beyond recognition**
- **(Bologna, Paris, Oxford . .)**
- **But no longer:**

„Dedicated to the pursuit of knowledge for its own sake, the high protecting power of all knowledge and science, of fact and principle, of inquiry and discovery, of experiment and speculation"

(Cardinal Newman)

Universities/Institutes of Technology

- Response to 19th century **industrialization**
- Triumph of **natural science**
- Demand for **mass education**
- Produce **useful knowledge**
- Decreasing **public funding** (for expensive infrastructure!)
- more **„efficiency**“ requested
- increasing **competition**
- more **autonomy**

Objectives

- Employability of **graduates**
- Meet the demand for **research**
  - *innovation tends to drive basic science*
- Build a **reputation**
- research driven scientific **education**

Organization

- basis: faculty members (**professors**)
- internal **structure**: research group, department, faculty, universitiy
- top/bottom: **flexible**

Faculty

- Hiring top **researchers** (not teachers)
- What are their **expectations**?
  - *Favourable working conditions (job security, salary)*
  - *Academic freedom, intellectual excitement*
  - *Good governance*
  - *Adequate faclities and funding*

The Research Portfolio

- No advance booking for **progress in research** is possible
- Optimize **basic conditions**
- Make available: competence, knowledge base, possibility for cooperation
- Let in the **Trojan horse** of contract research in
- Develop adequate, transparent tools for **competition**
- Strengthen the **strengths**

Management vs. Experts

- Experts are selfish. They don‘t care about the organization
- Set up transparent, universal rules
- Explain consequences of parasitism
- **But do everything to support them**

Facts & Figures

Budget

- 160 M€ government (recurrent, 3 year contract)
- 40 M€ research grants and contracts

Staff

- 160 professors,
- 660 associate and assistant professors,
- 600 project financed
- 1.000 technical and administration

Students

- 17.000 (23% female, 21% foreign)
- 1.350 graduates
- 200 Ph.D's

Research at TU Wien

- Portfolio for fundamental research clearly focused
  - 8 research areas
    wide enough for interdisciplinarity
- Applications-oriented research reveals potentials of fundamental research.

8 Faculties

- Architecture & Planning
- Civil Engineering
- Informatics
- Electrical Engineering & Information Technology
- Mathemathics & Geoinformation
- Mechanical & Industrial Engineering
- Physics
- Technical Chemistry

8 Faculties

Architecture and Planning	Civil Engineering	Electrical Engineering and Information Technology	Informatics
IT and New Media in Designing **Sustainable Concepts for Urban Buildings** **Project Development and Management**	**Modelling and Simulation** **Materials Science** **Infrastructural Planning and Management of Ressources**	**Automation / Computer Technology** **Telecommunications** **Microelectronics / Photonics**	**Computational Intelligence** **Distributed Systems** **Business Informatics** **Media Informatics, Visualisation and Computer Vision** **Computer Engineering**
Mathematics and Geoinformation	**Mechanical and Industrial Engineering**	**Physics**	**Technical Chemistry**
Analysis / Scientific Computing **Discreet Mathematics, Geometry, Algebra** **Mathematics in Economics** **Computational Statistics** **Geoinformation** **Geodesy /Geodynamics** **Environmental Monitoring**	**Computational Engineering and Bio-mechanics** **Product and Plant Development** **Materials Science** **Industrial Management**	**Materials at Extreme Conditions** **Non-linear Dynamics / Complexe Systems** **Analytical Physics**	**Applied Synthetic Chemistry** **Materials Chemistry** **Chemical Technologies and Analytics** **Process- and Bio-engineering**

Main Emphasis – TU Vienna

8 Research Areas

1. Automation Technologies
2. Bio-Engineering
3. Computational Science and Engineering
4. Information and Communication Technologies
5. Materials Science and Industrial Production Technologies
6. Quantum Physical and Optical Technologies
7. Security Technology and Risk Management
8. Environmental Technology and Sustainable Development

CEST – Champions League of research institutions

According to number of publications and impact factor (SCI)
TU Wien in five Qualified Subfields [1] vertreten:

- **Applied Physics, Condensed Matter, Materials Science,**
- **Instrumentation & Measurement,**
- **Materials Science & Engineering,**
- **Computer Science & Engineering,**
- **Physical Chemistry & Chemical Physics.**

(1) min. 50 Publ. in 5-years (1994-1999) and Impact-Factor min.20

EU 5th FP

1998–2000:

149 projects, 25 M€

RWTH 135

Uni Stuttgart 132

TU München 91

Projects in major programs: 42 IST

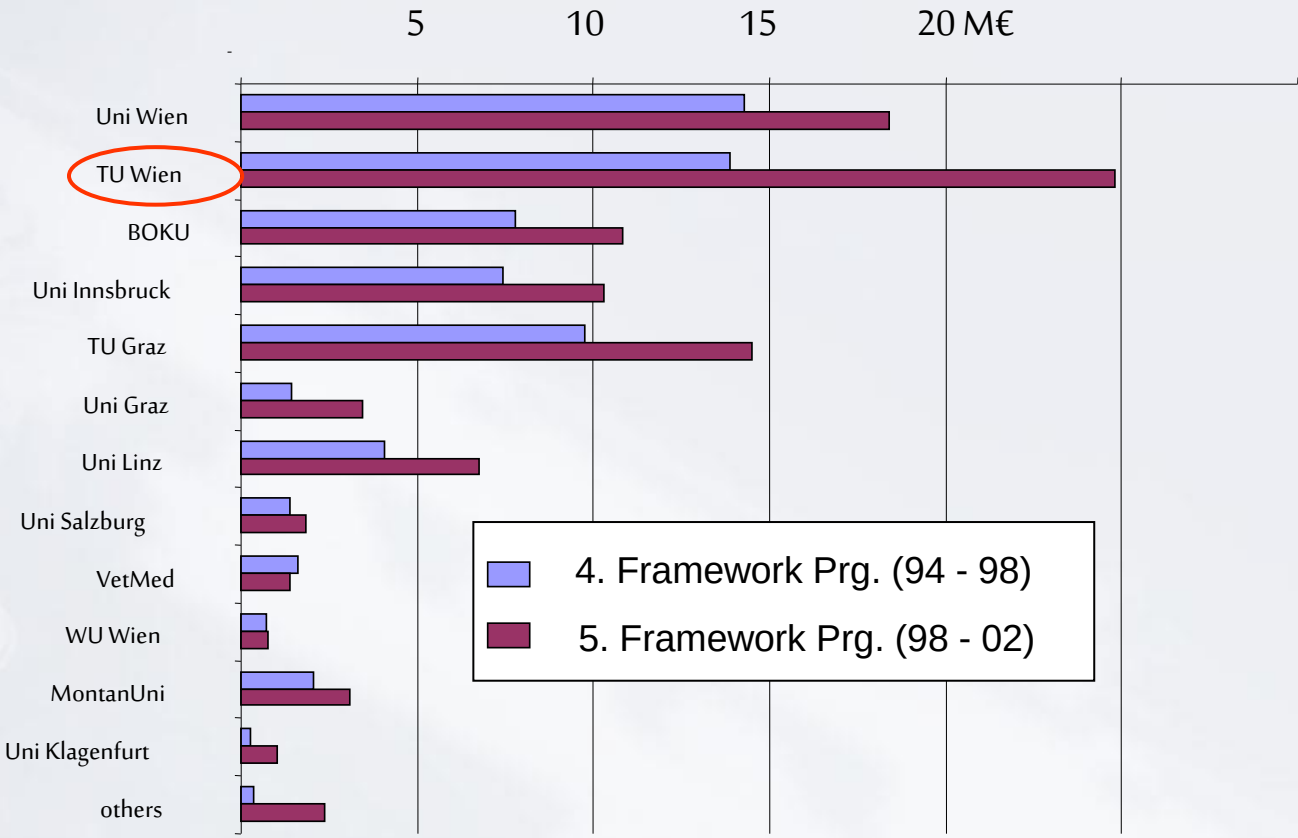
33 GROWTH

28 IHP

16 EESD-UW

15 EESD-EN

7 QoL



Co-operation with the Economic Sector

Motivations

- contribute to **innovation and progress**
- Motivation of scientists: see the **outcome of research** being applied
- **Research guided education**: students involved at early stages
- Development of **curricula**: feedback of requirements
- Access to industrial research infrastructure
- Cash flow: salaries of young researchers, research infrastructure