Using Open Innovation as an Innovative Means for Technology Transfer

Franco-German Round Table on Intangibles

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Outline

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Using Open Innovation as an Innovative Means for Technology Transfer

- About Us
- FVA Project
- NanoCom

About Us

RWTH TIM-Group

Chair: Professor Dr. Frank T. Piller

RWTH TIM-Group

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- **RWTH**
  - **Rheinisch-Westfälische Technische Hochschule** (Institute of Technology of North-Rhine Westphalia, i.e. a State of Germany) **established in 1870**
  - Today, RWTH Aachen University is one of Europe's leading institutions for science and research (**Annual budget of €650 million; 31,400 students**)
- **TIM-Group**
  - **Established in 1990** (one of the first dedicated chairs in technology & innovation management in Europe)
  - **Dedicated to research, but excellent in participant-centered learning** on graduate student and executive education level
  - **Ranked in top3** in school's ranking w/r to both **publications** and **external funding**
  - **Interdisciplinary team of about 15 full time positions** for researchers (plus student researchers)
  - 70% of annual research budget funded by **competitive**, **peer-reviewed research contracts and grants** from DFG, EU, BMBF, BMWI, AIF
  - **Strong industry partnerships, yet focus on scholarly research, not consulting**
  - "**RWTH TIM Expertenkreis**": **Sponsorship circle of 12 companies**, including 3M, Cognis, Ford, Henkel, Lindt, Telekom, Melitta, Johnson Controls, and others

RWTH-TIM Group: Selections of Recent Research Clusters

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- **Open Innovation**: Increasing the productivity of technical problem solving by external search
- **Customer Co-Creation**: Integration of customers and users in the innovation process in form of a firm-initiated strategy. Focus on toolkits for customer innovation, user innovation contests, and innovation communities
- **Technology transfer**: Absorptive capacity, managing ambidexterity, and preventing "NIH" (not invented here)
- **Customer Co-Design in Mass Customization Environments**: Strategies to profit from heterogeneities in the customer domain
- **Modeling the contingencies of the innovation process**: Database of 300 methods for the innovation process and matching tool to corporate challenges of managing innovation
- **Managing the R&D-production interface (ramp-up)**: Connecting the new product development process with scaling up the manufacturing system

FVA Project

Open Innovation in the German Mechanical Engineering Industry

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Using Open Innovation for Technology Transfer

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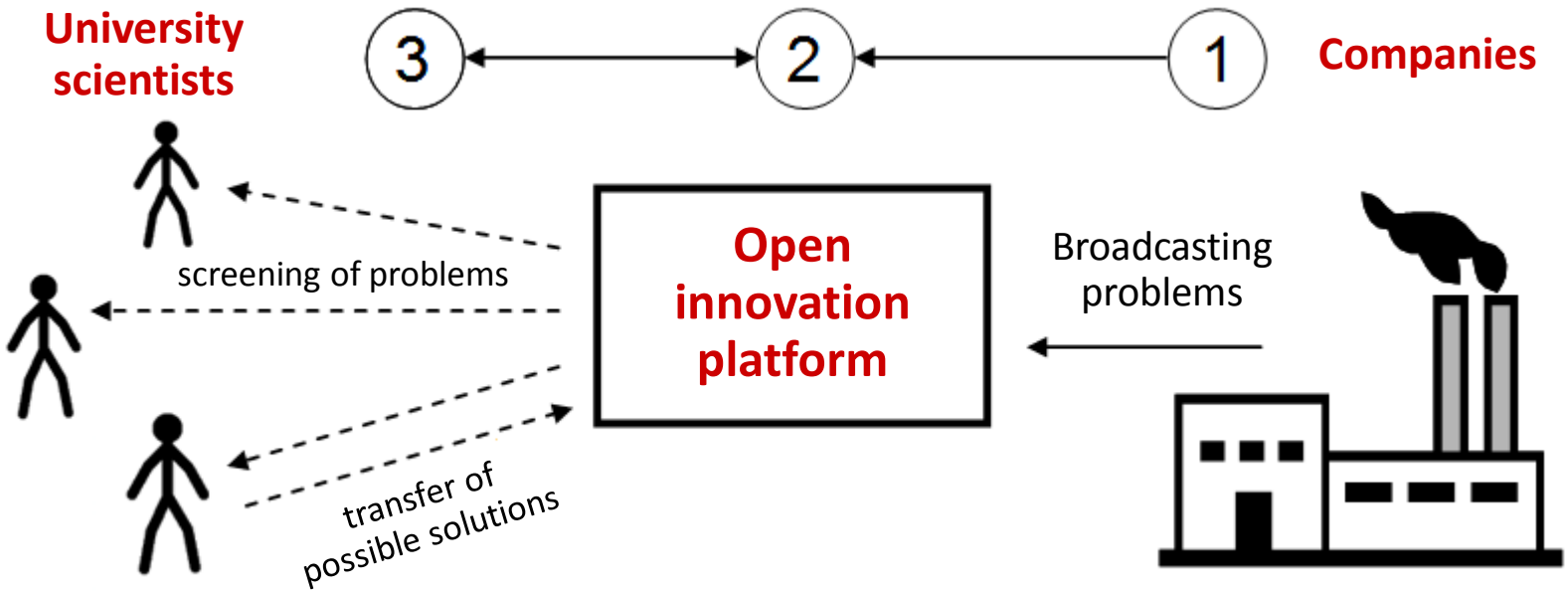

Activities on research side:

- Screening of problems
- Reaction only when problems seems to be known and cost to answer affordable
- Transfer of solution idea
- Transfer of suggestion for contract research

Activities on company side:

- Transfer of problems
- Screening and evaluation of problems
- Transfer of "best" solution
- Contracting of further directed research

VDMA-FVA Project to Pilot Open Innovation in the German Driving Systems Industry

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1. Evaluation and modification of OI methods for industry domain

2. Identification of open innovation platform

3. Piloting of platform and evaluation of efficiency and effectiveness of approach as compared to conventional means of organizing R&D

4. Development of business model for future operation of platform on the FVA level

FVA Forschungsvereinigung Antriebstechnik e.V.

RFP Review

REQUEST # 66198

Durable, Non-Lubricated Gear Materials

Request For Proposal Description

NineSigma, representing **a Central European Academic/Industrial Development Consortium** invites proposals for **strong, durable gear materials that don't require lubrication.**

The successful material will:

- Be compatible with one or more methods of contemporary gear manufacturing
- Convert into gearboxes that can run without lubrication
- Create gearboxes that meet the following specifications
  - Ambient temperature range from 0 to 40 °C
  - Hertzian stress (at gear contact points) up to 1600 N/mm²
  - Nominal drive torque >100 Nm
  - Typical operating input speed>2000 RPM (up to approx. 8000 RPM); output ratio 1/3 – 1/10
  - Support tooth design permitting Efficiency at full load of >90%
  - Operating life >10000 hour
  - Gear thickness about comparable to same performance metal gears

Possible Approaches

Possible approaches might include, but are not limited to:

- Stronger plastic materials
- Composite Materials
- Durable one-time surface treatments for metal gears
- New Alloys for metal gears
- Ceramic materials
- Porous, oil-soaked gears and pre-lubricated gears
  - oil losses must be safely inhibited
  - bulk oil cannot leave gearbox under any circumstances
  - No additional lubrication for the operating life of the gearbox

Opportunity

Licensing, product acquisition, contract research, proof of concept leading to scale-up to manufacturing, joint development, supplier agreement

Timeline

Phase 1 – Material Feasibility and Proof of Principle
Phase 2 – Manufacturing and Commercial Development

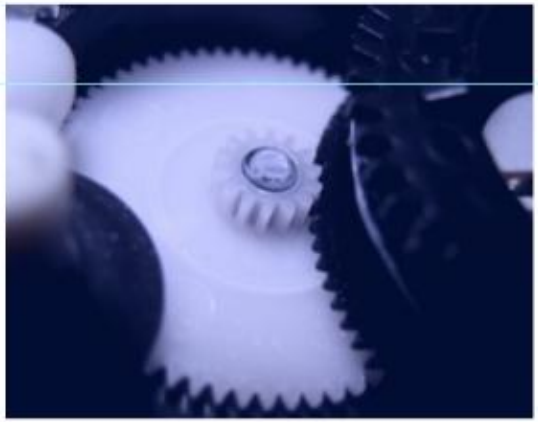
Financials

Phase 1 funding to demonstrate proof of principle is supported by the Academic/Industrial consortium up to the amount needed to contract one year of research in an academic environment. Alternative pathways and options for development will be funded by one or more industrial partners at levels appropriate to the opportunity.

Approaches Not of Interest

The following approaches are not of interest:

- Materials that cannot be fabricated into gears by existing manufacturing methods
- Alternative power trains as substitutes for gears



Classical internal search is often more broad and, thus, less focused and efficient

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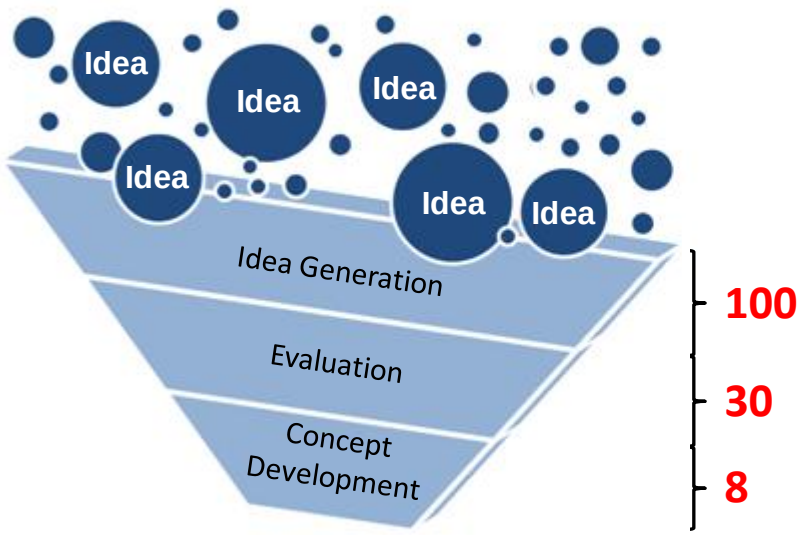
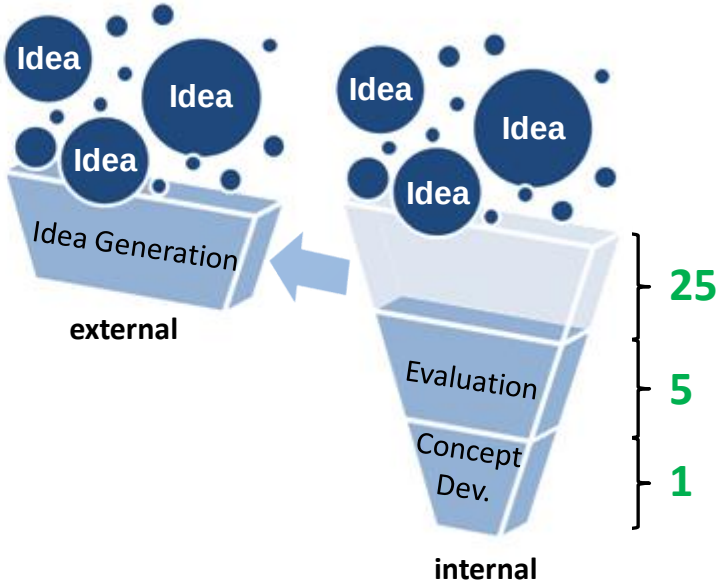
Classic Concept Development *



Broadcast Search



*=Values typically mentioned in the literature

Focused Search via Open Innovation can improve the quality and effectiveness of the idea generation process

The solutions in general were both from sources new to the companies and did contain a new technological solution

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Evaluation of solution proposals by project steering committees

RFP	Institution		Solution Technology		
	new	known	new	known	not sure
66198	23	3	16	6	4
66204	10	0	3	7	0
66207	7	0	6	0	1
66201	33	2	*evaluation ongoing*		

NanoCom

Best Practices to Lower the Barriers for Commercialization of Nanotechnology Research

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Open Innovation Model for Rapid Commercialization of Nanotechnology

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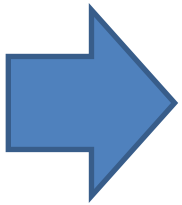
- Cooperation in R&D well established, but organized absorption and dissemination of external knowledge is a rather new phenomenon (Chesbrough, 2006)
- Nanotechnology has great potential given that research results are used more efficiently



- How can open innovation help to improve R&D efficiency?
- What prevents nanotechnology firms from using open innovation as part of their research strategy?
- What are the key success factors / risks of this strategy?

How can Open Innovation help Nanotechnology in Commercializing R&D?

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- Nanotechnology is a platform purpose industry
  - Research is not directed at solving a particular problem
  - Interesting solutions exist without a respective application

Two ways of improving use of nanotechnology research

1. Problem driven research

- Use broadcast search mechanism for
  - Research directed at (industry) problems
  - (Re-)use of existing knowledge

2. Better matching of supply and demand of R&D

- Facilitate technology transfer (IP issues, fair treatment, transaction costs)
- Facilitate use of matching portals (Integration)

Literature Review

Stakeholder Analysis: Barriers to Open Innovation

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Barriers to Open Innovation

Finding the right collaboration partner

- Use of intermediaries, technology transfer offices
- Activities in cluster networks

Misalignment of interests (publication vs. secrecy)

- Patents (or more generally IP-protection) as a natural combination of publication and exclusivity

Unfair treatment of small partners

- Standard and easy-to-use contracts
- Intermediaries as a trusted third party

Loss of independency

- Important to view external collaborations as a complement, not as a substitute for internal idea generation

Interviews with researchers, investors, companies

Publicly Funded Projects

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- Participation drivers:
  - Opportunity for collaboration with other nanotechnology scientists and engineers was the key aspect of the project that attracted their teams
  - Access to markets in a conservative field
  - Project funding is not a key attractant for entrepreneurs / researchers (but still a necessary condition, esp. for small firms)
- IP Issues
  - Preventative measures around IP ownership are viewed as tedious, but necessary
  - Here, as always, a trustworthy partnership is key to success
- Commercialization
  - Entrepreneurs require more flexible, patient funding over a longer period of time to bridge the gap between “research” and “development”
  - Investors are ambivalent about value-add from publicly-funded projects (more important: clear vision, time to market, strong management team)

Interviews with researchers, investors, companies

Questionnaire Analysis

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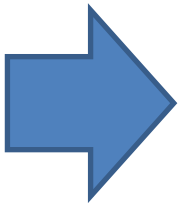
- Open Innovation more important for large firms (in particular: absorption of external knowledge)
- No significant differences across countries and branches
- Technology readiness and manufacturing capability significantly positively correlated with importance of OI
- Positive (but not significant) relation between OI and organizational and investment readiness



- Firms that want to use OI have to be at a certain readiness level to absorb and disseminate knowledge efficiently.
- Collaborations cannot be setup ad-hoc, they should be part of the firm's overall strategy.

Quantitative survey analysis

Conclusion

Open Innovation (and in particular Broadcast Search) is applicable in a wide range of industries and can help overcoming innovation barriers.