STRATEGIC RESEARCH PARTNERSHIPS IN AUSTRALIA AND GERMANY - THE IMPORTANCE OF REGIONAL COOPERATION AND INTERNATIONAL NETWORKING

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INTRODUCTION AND OBJECTIVE

- **Research-oriented public-private partnerships (PPP):** Organisation of long-term oriented strategic research between universities and industry.
- **PPP:** public service and/or a private economic activity, jointly financed and operated by the public sector and industry on the basis of a contract which regulates financing and operation.

**Objectives of the presentation**

- Analysis of significant characteristics of the funding initiative of the German Ministry of Education and Research (BMBF) "Research Campus - partnership for innovation" and comparison with the Australian Cooperative Research Centres Programme.
BACKGROUND: OPEN INNOVATION APPROACH

- **Complexity** of technology development and innovation processes increases. Strategy: *collective technological and financial risk minimization*.
- **Opening of the innovation process** is based on two directions
  - Inbound: Use of external knowledge in the enterprise
  - Outbound: Supply of knowledge created in the enterprise
- **Integration** of customers, users, external experts in all phases of the innovation process
- Joint search for a solution; **interactive value creation**
- **Substitution effects** by external research
- Joint **capacity and competence building**

Source: Chesbrough et al. 2006
MOTIVES FOR STRATEGIC RESEARCH PARTNERSHIPS

- Increasing international competition and technological complexity → shorter product and technology life cycles → increasing importance of strategic research partnerships.

Motives for strategic research partnerships from perspective of industry:
- Access to new technologies and the know-how of the partner
- Qualification
- Securing competitiveness
- Time benefits
- Cost reduction
- Risk diversification
- Synergy effects
- Contact with potential employees
# Cooperation Models

## One-Off Contracts
- Solve the problem
- Launch the innovation in the business or the marketplace

## Large-Scale Projects with Multiple Partners
- Cooperation between multiple institutes, external partners and companies

## International Cooperation
- Involvement of international partners in different forms of collaboration

## Strategic (PPP) Partnerships
- Long-term partnerships that evolve from non-contract, pre-competitive research

## Clusters
- Regional partners from research, industry and universities

## Spin-offs
- Out-licensing and other forms of economic valorization

Source: Fraunhofer Society, adapted
### INTERNATIONAL PUBLIC PRIVATE PARTNERSHIP PROGRAMMES

<table>
<thead>
<tr>
<th>Country</th>
<th>Name</th>
<th>Duration</th>
<th>Responsibility</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Cooperative Research Centres</td>
<td>Since 1990</td>
<td>Department of Industry</td>
<td>Competence Centre</td>
</tr>
<tr>
<td>Austria</td>
<td>Kplus / Kind, Knet; COMET</td>
<td>1998-2009; since 2006</td>
<td>BMVIT/TiG, FFG</td>
<td>Competence Centre</td>
</tr>
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<td></td>
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<td>BMWA/FFG</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>National Centres of Excellence (NCE)</td>
<td>since 1989</td>
<td>NSERC, CHIR, SSHRC</td>
<td>Network</td>
</tr>
<tr>
<td>Finland</td>
<td>Strategic Centres for Science, Technology and Innovation (SHOK)</td>
<td>since 2006</td>
<td>TEKE</td>
<td>Competence Centre / Cluster</td>
</tr>
<tr>
<td>Germany</td>
<td>Research Campus (Forschungscampus)</td>
<td>Since 2012</td>
<td>BMBF</td>
<td>Competence Centre/PPP</td>
</tr>
<tr>
<td>Norway</td>
<td>Centres for Research-based Innovation Scheme (SFI), Centres of Excellence scheme (SFF)</td>
<td>2006-2014</td>
<td>Research Council of Norway</td>
<td>Competence Centre</td>
</tr>
<tr>
<td>USA</td>
<td>Engineering Research Centres (ERC), Industry/University Cooperative Research Center (IURCR)</td>
<td>since 1985 since 1979</td>
<td>National Science Foundation</td>
<td>Competence Centre</td>
</tr>
</tbody>
</table>

Source: Kaplun (2013) amended
AUSTRALIA: COOPERATIVE RESEARCH CENTRES

- Established in **1990**
- **Objective:** Improve effectiveness of Australia’s research effort
- Partnerships between public and private sector together with end users.
- **Two elements:**
  - Cooperative Research Centre (CRC) grants – supporting medium to long term industry-led collaborations, up to 10 years
  - Cooperative Research Centres Projects (CRC-P) grants – supporting short term, industry-led collaborative research, up to 3 years
- So far over 215 CRCs, in **2016/17: 31 active CRCs**
TOPICS OF CRC

- **Agriculture, Forestry and Fishing (5)**
  - CRC for Sheep Industry Innovation (2014/15), internat. collab.: 3 countries

- **Mining (2)**
  - CRC for Optimising Resource Extraction (2015/16), 9 countries

- **Manufacturing (5)**
  - Innovative Manufacturing CRC (2015/16), 1 country (Fraunhofer)

- **Services (19)**
  - Antarctic Climate and Ecosystems CRC (2014/15), 8 countries
  - Lowitja Institute Aboriginal and Torres Strait Islander Health CRC (2014/15), 3 countries

Source: CRC Directory
GERMANY: RESEARCH CAMPUS

- September 2012: 10 Research Campus projects were selected
- Most RC entered the main phase at the end of 2014. Nine are still operating
- Three distinct characteristics:
  - Proximity – bundling of research activities and competencies on a university or public research campus
  - Medium- to long-term adaptation of a specific research topic
  - Mandatory public-private partnership
# Topics of the Research Campus

<table>
<thead>
<tr>
<th>Research Campus</th>
<th>Topic</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARENA 2036</td>
<td>Development of multifunctional composite materials</td>
<td>Stuttgart</td>
</tr>
<tr>
<td>Digital Photonic Production</td>
<td>3D-printing and construction of composites</td>
<td>Aachen</td>
</tr>
<tr>
<td>Electrical Nets of the Future</td>
<td>Direct current voltage for power transmission</td>
<td>Aachen</td>
</tr>
<tr>
<td>Mobility2Grid</td>
<td>E-mobility and mobility in urban concepts</td>
<td>Berlin</td>
</tr>
<tr>
<td>INFECTOGNOSTICS</td>
<td>Efficient and rapid on site proof of infection agents</td>
<td>Jena</td>
</tr>
<tr>
<td>M2OLIE</td>
<td>Medical intervention environment regarding cancer</td>
<td>Mannheim</td>
</tr>
<tr>
<td>MODAL AG</td>
<td>Mathematical optimization of complex processes</td>
<td>Berlin</td>
</tr>
<tr>
<td>Open Hybrid LabFactory</td>
<td>Hybrid light construction for automobiles</td>
<td>Wolfsburg</td>
</tr>
<tr>
<td>STIMULATE</td>
<td>Screening of minimal-invasive methods in medicine</td>
<td>Magdeburg</td>
</tr>
<tr>
<td>ARENA 2036</td>
<td>Development of multifunctional composite materials</td>
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</tbody>
</table>
INTERNATIONAL ORIENTATION

Australia
- Export share of GDP: 18.9%
- Import share of GDP: 21.1%
- Major export markets: China (31.6%), Japan (13.9%), Korea (6.7%), USA (4.6%), India (4.2%)
- Major products: Iron ore, coal, gold, natural gas, aluminium
- Internat. students: 25.8% of all students

Germany
- Export share of GDP: 46.0%
- Import share of GDP: 38.4%
- Major export markets: USA (8.9%), France (8.3%), UK (7.0%), Netherlands (6.5%), China (6.4%)
- Major products: Automobiles, medicaments, aircrafts, antisera
- Internat. students: 12.3% of all students

Sources: World Bank WITS, Australian Government, Dept. of Education, Universities Australia, Statistisches Bundesamt
One future priority of cooperation will be to promote innovation, for example by bringing together German research clusters and their Australian counterparts.

**Successful Bilateral Cooperation**

University collaborations are an important element of German-Australian cooperation. Currently 521 cooperation agreements exist between German and Australian universities.

**Australia- Germany Joint Research Cooperation Scheme**
RESEARCH CAMPUS: CAMPUS MODEL

- Local/regional networking "under one roof" (i.e. in one building) is mandatory.
- All partner organisations (firms, universities, research institutes) have to transfer personnel to the research campus.
- Companies specifically hire doctoral students and assign them to the research campus.
- Qualification of doctoral candidates for jobs in the management of research projects.
- On-site presence leads to many new contacts and project ideas, but requires regulation and contracts (non-disclosure agreements) and is challenging.
- International cooperation is welcome, it exists, but it is not mandatory.
CRC: NATIONAL FOCUS AND INTERNATIONAL ORIENTATION

- Due to size of country, many CRCs are a **national network**
- Participating **large companies** often come from abroad → many Australian MNEs shifted research capacities to locations outside Australia
- Public funding should be spent in Australia, but can be spent overseas if this will **benefit Australia**
- All active CRCs have **international collaborations** (with one up to 17 countries)
- **Education and qualification** is very important. CRCs are evaluated according to contribution to scientific education and to generation of industry-ready graduates
BMBF: INTERNATIONAL COOPERATION ACTION PLAN

1. **More mobile:** Germany must continue to increase the mobility of trainees, students, and scientists both to and from Germany in order, among other things, to meet the future demand for skilled staff.

2. **More effective:** Cooperation and funding procedures are to be made as easy as possible; obstacles to bilateral and multilateral cooperation must be reduced.

3. **More efficient:** Germany must improve its networking activities and promote networking at all levels as well as between all stakeholders, both national and international.

4. **More focused:** Germany must focus even more consistently on quality and excellence in its global relations to the benefit of all concerned.

5. **More site-aware:** Germany must define its interests more closely and consider international collaborations from the aspect of strengthening the competitiveness of German industry (opening up markets) and science.
RESEARCH CAMPUS: STARTING POINTS FOR INTERNATIONALIZATION

- **More mobile:** Attraction of foreign trainees, students and scientists to work in a Research Campus - this already happens.

- **More efficient:** Improvement of international networking activities is on the agenda (internationalization programme for leading-edge clusters), but not yet for the Research Campus.

- **More focused:** Research Campus = quality and excellence. Research Campus are attractive partners for international bilateral cooperation.

- **More site-aware:** Research Campus should strengthen Germany’s competitiveness. Adding international expertise could support both industrial and scientific competitiveness.

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SIMILARITIES AND DIFFERENCES

- **Research Campus**: *Industry oriented*
- **CRC**: *end-user oriented* → more societal topics are addressed
- **Research Campus**: *Campus model* with focus on local/regional networks
- **CRC**: Sometimes regional, *mostly national* with often strong international linkages
- **Research Campus**: *International collaborations*, but *not mandatory*
- **CRC**: All CRCs have *international cooperation partners*
- **Research Campus and CRC**: *Education and qualification* is *important*, in case of CRCs much more embedded into international linkages
CONCLUSIONS

- Both CRCs and Research Campus are **strategic public-private research partnerships**
- **Local/regional collaboration** generates **advantages** (trust, information flow, exchange of tacit knowledge), but is **difficult to organise** (contracts, new buildings → campus model)
- **International collaboration** is a **necessity** (scientific exchange), but involves in countries like Australia the **overcoming of larger distances** than in Germany (partners close by across the border)
- Regarding education (students) and the networks of the CRCs, Australia reveals a **stronger international orientation** than Germany
THANK YOU FOR YOUR ATTENTION!

Public-private partnerships in research and innovation: Trends and international perspectives

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