The Role of Universities in Regional Innovation for Global Challenges

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ACA Conference

The Engaged University. Linking the Global and the Local.

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Overview

1. New approaches to innovation: the need for systemic solutions and game-changers

2. Emerging forms of co-creation: searching social, organisational, infrastructural coherence

3. The Global Dimension of Regional Innovation: why universities are ideally suited to go glocal
1. New Approaches to Innovation:
   Driving Forces

1. **Radical transformations** - digitalisation, globalisation, climate-change -
global societal challenges ➔ need for systemic multi-actor solutions

2. Increasingly “hybrid” research & innovation: disruptive innovation and
   scientific breakthroughs most often occur at interfaces between disciplines
   and different actors’ perspectives ➔ open innovation networks

3. Emphasis on knowledge economy in post-crisis Europe - value creation
   highest in knowledge intensive sectors with dense connectivity between
   university & industry, facilitated by national, regional, city governments

4. Financial incentives for collaborative research funding

5. Accelerated pace of innovation ➔ demands on agility of businesses and
   adaptability of universities in building research networks, nurturing talents

6. Regional strategic awareness and analysis and/or common vision /
   agenda to help to align regional actors (Smart Specialisation Strategies)

7. **Generational change of culture**: search for impact and social presence
   in an increasingly disorienting and disembodied world
1. New Approaches to Innovation

- From linear to reiterative innovation
- From closed to open innovation
- From technological to systemic and challenge-driven
- From individual to collaborative interdisciplinary innovation
- From spontaneous to systematic
- From knowledge exchange between independent partners to co-creation in innovation spaces of interdependent ones
- From projects to innovation cultures
- From incremental change to disruptive transformation driven by game-changers
Educating Game-changers:

- Aalto Design Factory
- TU/e Challenge Projects
- Manchester Univ. Stellify
- TUMentrepreneurship education/ StarTUM

WHAT IS DF

Aalto Design Factory (ADF) is an interdisciplinary product design and learning hub uniting students, teachers, researchers, and industry. We aim to build a new kind of passion-based learning culture for Aalto University. You are welcome to join us!

DESIGN FACTORY

STELLIFY

Tu/e innovation Space

Tu/e innovation Space is a community and facility that supports interdisciplinary hands-on education, engineering design and entrepreneurship.

Welcome!

Tu/e Innovation Space is a community and facility that supports multidisciplinary hands-on education, engineering design and entrepreneurship.

It's a space where students learn to deal with complex societal and industrial challenges, create prototypes and develop innovations in collaboration with researchers, businesses and each other.

Furthermore, it provides a space and support for lecturers that develop and offer hands-on courses and want to contribute to innovation in education.
Innovation Competences as Motor and Reflection of Teaching and Learning Reforms

Table 2 Learning and teaching: needs, responses and framework conditions

<table>
<thead>
<tr>
<th>New needs and concerns related to universities' role in innovation</th>
<th>Institutional responses of universities</th>
<th>Necessary framework conditions</th>
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</thead>
<tbody>
<tr>
<td>Qualitative aims:</td>
<td>Teaching reforms:</td>
<td>Regulatory:</td>
</tr>
<tr>
<td>• Prepare for disruptive innovation</td>
<td>• Extend interdisciplinary, project-based learning</td>
<td>• Sufficient academic autonomy of universities for introducing new study programmes and design their content</td>
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<tr>
<td>• Promote systemic understanding and competences</td>
<td>• Support student self-organisation</td>
<td>• Sufficient academic autonomy of universities for the selection of students to study programmes</td>
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<tr>
<td>• Create game-changers</td>
<td>• Improve teaching innovation services</td>
<td>Financial:</td>
</tr>
<tr>
<td>• Extend students research-related competences</td>
<td>• Extend mentoring, including by external stakeholders</td>
<td>• Sustainable funding for low student/staff-ratios to allow for project-based learning, orientation in diverse learning paths, and mentoring</td>
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<td>• Promote digital skills</td>
<td>• Provide entrepreneurial modules, as extra offer or integrated into curriculum.</td>
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<tr>
<td>• Foster entrepreneurial mind-set and skills</td>
<td>• Develop digital skills modules</td>
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<td></td>
<td>• Encourage and support start-ups</td>
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</table>
2. Necessity of New Approaches: Combining Multiple Perspectives in “Triple-Helix” Co-creation

- Open innovation networks
- Interest in start-ups
- Strategic access to university talents, research, infrastructures

- Thematic clusters
- Expanded services (incubators, start-up support)
- Collaborative infrastructures

- Emphasis on facilitating role in innovation (funding, regulations, infrastructure support, services)

- Central & strategic role in innovation as transformative institutional process
- Knowledge exchange integrated into core missions
## Triple Helix Co-Creation Structures

<table>
<thead>
<tr>
<th>Connective Structures &amp; Infrastructures</th>
<th>University role / contribution</th>
<th>Business role/ contribution</th>
<th>Government contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Research Centers with Impact Mission</td>
<td>University research with international visibility attracts national and international funds and talent to the region. Provide researchers and facilities for applied research and prototype development</td>
<td>Companies and public external stakeholders adopt research in their development and cooperate to meet challenges together Funding and expertise for IP and commercialisation</td>
<td>Competitive funding to meet societal/economic challenges Adapting regulations to meet challenges Co-Funding for Centers</td>
</tr>
<tr>
<td>Joint Labs or Industry Labs on Campus</td>
<td>Research expertise Global research partners Researchers (master students, PhD, postdocs) Tech transfer services</td>
<td>Funding for PhDs Funding for research infrastructures IP and prototyping services Venture capital for start-ups/inventions</td>
<td>Infrastructure Building permit PPP regulations Special framework contract for PPP accounting</td>
</tr>
<tr>
<td>Joint Campuses, Science Parks</td>
<td>Openness to external partners, PPP, in research and education to create dynamic campus environments</td>
<td>Infrastructural Investments PPPs with long term perspective</td>
<td>Urban planning and zoning laws allowing mixed use Infrastructural investments Orchestrating use of EU structural funds Lobbying for European and national funds</td>
</tr>
</tbody>
</table>
Triple/ Quadruple Helix Co-Creation Network: Challenge-driven Innovation

City as Living Lab, Service Facilitator, Funding Agency and Political Lobbyist

University as Research Hub, Technology Foresight, Network Facilitator, Provider, State-of-the-Art Research Infrastructure, TechTransfer

The Cooperative Automotive Research Network, initiated by SEAT, Volkswagen Group Research and the Universitat Politècnica de Catalunya (UPC), is an open hub for industrial and academic partners from the areas of automotive and mobility research & innovation. CARNET is located in Barcelona, and works through project-based collaboration. It focuses on innovation and solutions that close the gap between academic research and industrial innovation in urban mobility.
3. Global challenges need local solutions and benefit from regional proximity -

- Universities as global pipelines: access to new technology and research frontiers: International research = condition for long-term partnerships with corporations and other external stakeholders interested in addressing global developments and challenges –
- Universities as thematic moderators of research areas to address global challenges: innovation networks and clusters to develop and pool complementary expertise in joint grants, institutes, shared access to large research / tech infrastructures
- Universities as interdisciplinary incubators for systemic approaches
- Universities as talent pipeline: Demand for talent / internationally competent HE graduates with subject knowledge and transferable skills with university attracting talents from outside the region/abroad and educating students to face a global world (student mobility: Internships, international challenge projects, start-up ventures)
Quadruple Helix Cooperation in Regional Innovation Systems creates three-dimensional coherence and builds a common innovation culture.

Organisational Coherence

Connective Leadership
- Building trust through
- Common norms, values, narratives, social glue
- Collaborative disposition

Connective Cultural Norms
- Lasting connectivity through joint institutional structures, common agenda, joint decision-making and resource allocation

Connective Organisational Forms
- Provide collaborative co-creation spaces with flexible central urban architecture,
- Maximising chance encounters, relevant events, services, technical facilities

Social Coherence

Spatial Coherence

Connective Collaborative Spaces

university’s new centrality = orchestrating multi-actor innovation networks
Geography matters in a globally networked world: Regional density of university knowledge exchange
# Strategic Business-University Collaboration

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<td>Produce relevant knowledge:</td>
<td>• Support curiosity-driven research with long-term perspectives</td>
<td>Regulatory:</td>
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<tr>
<td>• Short-term: concrete solutions to current innovation problems</td>
<td>• Adapt hiring policy to combine research excellence and impact criteria</td>
<td>• Sufficient organisational and academic autonomy of universities to allow for flexible, strong interdisciplinary units</td>
</tr>
<tr>
<td>• Long term: scanning horizon of scientific, technological and user developments</td>
<td>• Strategic partnerships with few companies, organisations, including foresight function</td>
<td>Financial:</td>
</tr>
<tr>
<td>• Co-creating knowledge by connecting different actors to address common innovation challenge in knowledge-intensive areas</td>
<td>• Contracted research for specific solutions</td>
<td>• Support curiosity-driven research with sufficient core funding</td>
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<td></td>
<td>• Research support and business facilitation service as contact point for businesses</td>
<td>• Support schemes for university-business collaboration</td>
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<td></td>
<td>• Promote interdisciplinary networks</td>
<td>• Provide medium-term competitive grants for thematic cluster development</td>
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<tr>
<td></td>
<td>• Create and moderate thematic clusters bringing together diverse disciplines and institutions</td>
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| Access to research infrastructures:                          | • Strategic investment in large research infrastructures, also as public-private partnerships | Financial: |
| • Sharing expensive large state-of-the-art infrastructures   | • Provide long-term technical staff for infrastructures | • Provide sufficient institutional core funding for infrastructural investment, maintenance, technical staff |
| • Access to technical facilities and equipment with technical support staff | • Establish co-creation spaces and access to research facilities for externals | • Provide special competitive funds for large-scale research infrastructures |
Universities are ideally suited as hinge between the global and the local – but only if...

- Differentiated financial support, incl. for multi-actor collaboration
- Flexible multi-functional organisational forms
- State-of-the-Art research infrastructures collaborative spaces
- Facilitating government regulations and framework conditions: autonomy
- Visionary leadership, steering capacity, enabling governance
- Multi-level strategic development process
- International research quality - cooperative, interdisciplinary
- Attention to educational innovation, project-based learning, flexible curricula
- Innovation Culture
  values, norms, enabling narratives
Thank you for your attention!
Questions are welcome...

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EUA Study on Regional Innovation Eco-Systems: Focus and Methodology

Focus:

- Interaction between universities and their partners in regional innovation systems, across institutional, sectoral and disciplinary boundaries
- Transformation of roles of triple helix actors: univ., government agencies, businesses, new emphasis on quadruple helix incl. users, citizens, students
- Multi-dimensional connectivity: leadership and key actors, cultural identities & narratives, strategy development process, funding frameworks, organisational forms and infrastructures – innovation cultures

Methodology:

- Qualitative Study: 9 Case Studies in diverse EU regions with high or rising innovation indicators according to Eur. Reg. Comp. Index:
  - Barcelona, Manchester, Munich, Helsinki/Espoo, Paris, Warsaw, Brno (South Moravia), Braga (Northern Portugal), Eindhoven
- More than 160 interviews (university leaders, researchers, students, big and small companies, govern. & intermediary agencies)
Regional Innovation “Ecosystems”

- Density of knowledge production – opportunities connected to geographic proximity, but such proximity is being used systematically
- Interdependence of actors (and awareness thereof), actively looking for synergies, mutual reinforcement – “local buzz”
- Interlinked aligned set of leaders, alignment through cultural norms, history, common narratives, strategies, structures, infrastructures
- Quest for coherence or systematic approach to regional development (in smaller regions, or different sectors of larger regions)
- All dimensions of development addressed, with search for synergies
- Making use of each others’ facilities, networks and “global pipelines”, mutual access, through targeted events and collaboration
- “Eco” = life, nutrition (external inflow of ideas, people, resources), adaptation to changing conditions, organic growth, open eco-systems: exchange of energy and matter with outside