How to evaluate the impact of academic spin-offs on regional development

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Literature background

Data and methodology

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Background of the paper

• After ten years experience of spin-off promotion by universities and local institutions, there is a growing concern about the evaluation of the impact of spin-offs on universities’ technology transfer and local economies.

• Up to now empirical research on Italian spin-offs focused on analyzing the characteristics of spin-offs and their growth patterns. Less attention has been paid on evaluating their impact on technology transfer and on the local context.
Aims of the paper

Develop an analytical framework to evaluate the impact of academic spin-offs on regional development

Apply this framework to the Italian context and specifically to the Marche region
The role of universities in regional innovation systems

The growing importance of the university third mission (technology transfer) emphasises the role of the university at local level.

This is true especially in the case of university-firm relations (importance of face-to-face interactions) and spin-offs (they are located near the parent institution).
Technology transfer activities by universities

• Potential benefits of technology transfer can be measured in terms of:
  – Knowledge transfer
  – Financial benefits
  – Knowledge spill-over

• It is important to consider who benefits from them (university, academicians, firms) and the geographical span (local, regional or national level)
## Impact of knowledge transfer and spill-over

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<td>Local (NUTS3)</td>
<td>Regional (NUTS2)</td>
<td>National / Global</td>
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<td>Patenting and Licensing</td>
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<td>Contract research and consulting</td>
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<td>Spin-offs</td>
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# Financial beneficiaries

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<th>Contract research and consulting</th>
<th>Patenting and licensing</th>
<th>Spin-offs</th>
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<tr>
<td><strong>University</strong></td>
<td>€ (share in external contracts)</td>
<td>€€ (fees)</td>
<td>€ ? (dividends and capital gains)</td>
</tr>
<tr>
<td><strong>Faculty</strong></td>
<td>€€€ (direct remuneration)</td>
<td>€ (fees)</td>
<td>€ (Remunerations; Dividends and capital gains)</td>
</tr>
<tr>
<td><strong>Former students and researchers</strong></td>
<td></td>
<td></td>
<td>€€€ (Salaries)</td>
</tr>
<tr>
<td><strong>Firms</strong></td>
<td></td>
<td></td>
<td>€ ?? (dividends and capital gains)</td>
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Spin-offs

• Spin-off creation is the most complex way of commercializing academic research (in terms of process, people involved, risks, etc.)

• It is expensive and resource consuming (as patenting) for universities but with little of no prospective financial returns

• ... but has (potentially) the highest impact on the local context, in terms of:
  - Knowledge transfer
  - Financial benefits
  - Knowledge spillovers.
The impact of academic spin-offs on local systems

Direct economic impact of university spin-offs

• they are ‘high-tech’ employers, *that pay* good wages and promote entrepreneurship (Etzkowitz & Leydesdorff, 2000)

• they are sources of technological entrepreneurship *with the potential to* transform the wider regional economy (Etzkowitz et al., 2000)

• they retain close links with ‘parent’ institutions through equity holdings, incubators, technological transfer, recruitment and research collaboration (Heydebreck, Klofsten, & Maier, 2000)
The impact of academic spin-offs on local systems

Indirect impact

- they build on global networks to access technological knowledge, finance, and markets (Dahlstrand, 1999),

- they are sources of technological spill-over and can promote and shape the emergence of regional technology clusters (Di Gregorio & Shane, 2003; Lawton Smith 2006)

- they stimulate business support services and infrastructure, benefiting other start-ups (Lockett, Wright, & Franklin, 2003).
Measuring the impact on local systems

<table>
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<tr>
<th>Impact</th>
<th>Indicators</th>
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</thead>
<tbody>
<tr>
<td>High-tech employer</td>
<td><strong>Sector of activity</strong>&lt;br&gt;<strong>Number of employees</strong></td>
</tr>
<tr>
<td>Source of technological entrepreneurship</td>
<td><strong>Sector of activity</strong>&lt;br&gt;<strong>Promoters, owners, managers</strong></td>
</tr>
<tr>
<td>Links with parent institutions</td>
<td>Grants and contracts with parent university</td>
</tr>
<tr>
<td>Global networks for finance, technology and markets</td>
<td><strong>Ownership structure</strong>, international project in R&amp;D, geographical market</td>
</tr>
<tr>
<td>Source of technological spill-over</td>
<td>Collaboration at local level&lt;br&gt;Labour mobility</td>
</tr>
<tr>
<td>Stimulate business support services</td>
<td>Incubators, start-up competitions, entrepreneurship courses</td>
</tr>
</tbody>
</table>
University system in Marche region

Students: 12,500 (27%)
Researchers: 420 (27%)

Students: 6,400 (14%)
Researchers: 280 (18%)

Students: 10,500 (23%)
Researchers: 316 (21%)

Students: 16,400 (36%)
Researchers: 523 (34%)
Transfer of technology

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Spin-offs

23 (74%)

6 (19%)

2 (6%)

0 (0%)

R&D collaborations

9 mln (59%)

4 mln (26%)

2 mln (14%)

0,2 mln (1%)

2001 - 2010, 31 academic spin-offs

In 2009, 15 mln of private funds
Univpm spin-offs by founding year
Univpm spin-off companies by sector

- Aerospace
- Nanotech e new goods
- Industrial Automation
- Cultural services: 3.23%
- Biomedical: 6.45%
- Life Sciences: 12.90%
- Innovation Services: 19.35%
- Electronic: 19.35%
- Energy and Green Economy: 19.35%
- ICT: 19.35%
### Direct impact: total revenues

<table>
<thead>
<tr>
<th>Year</th>
<th>Thousands of Euros</th>
</tr>
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<tbody>
<tr>
<td>2001</td>
<td>65</td>
</tr>
<tr>
<td>2002</td>
<td>261</td>
</tr>
<tr>
<td>2003</td>
<td>523</td>
</tr>
<tr>
<td>2004</td>
<td>641</td>
</tr>
<tr>
<td>2005</td>
<td>804</td>
</tr>
<tr>
<td>2006</td>
<td>1,516</td>
</tr>
<tr>
<td>2007</td>
<td>2,697</td>
</tr>
<tr>
<td>2008</td>
<td>3,803</td>
</tr>
<tr>
<td>2009</td>
<td>4,510</td>
</tr>
<tr>
<td>2010</td>
<td>5,051</td>
</tr>
</tbody>
</table>
Best performers
## Data for Univpm spin-offs

<table>
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<tr>
<th>IMPACT</th>
<th>Short term</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-tech employer (full time equivalent)</td>
<td>34</td>
</tr>
<tr>
<td>Source of technological entrepreneurship</td>
<td>136</td>
</tr>
<tr>
<td>Volume of sales</td>
<td>5mln</td>
</tr>
<tr>
<td>High-tech employer</td>
<td>ICT, Energy, Innovation service, life science</td>
</tr>
</tbody>
</table>
Local impact
Growth and quantitative impact

- The phenomenon is considerable and consolidated
- Positive process of growth during this tough period

**DESPITE THIS.....**

- some companies seem not to be competitive
- very few spin-offs reach a significant size within the incubation period (3 years), or even after 5-7 years
- most firms do not grow but survive by adopting a low investment–low risk strategy and employing only temporary staff
Research agenda

• analysing the **qualitative** impact of spin-offs on local systems:
  – R&D cooperation with other firms
  – Relations with parent universities

• measuring the impact of spin-offs in the **long term**:
  – Companies set up by people involved in spin-offs creation
  – Labour mobility between spin-offs and other companies in the local system

• Differences in regional innovation systems
  – industry specialization
  – role and relevance of the university
  – Policy aims