

# Spinning-out Enterprises from Universities: Opportunities and Challenges

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# The Policy Context

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- Policymakers have seen spin-outs as potential opportunities for future growth
- Universities see spin-outs as important potential opportunities for revenues
- Various initiatives to provide financial support and create incubators to coach start-ups
- Growth in spin-out numbers

# University spin-outs internationally

## *Too many or too few opportunities?*

| Country     | Period       | No. Spinouts               |
|-------------|--------------|----------------------------|
| US          | 1980-2003    | 4543                       |
| Canada      | 1962-2003    | 1100                       |
| France      | 1984-2005    | 1230                       |
| Netherlands | 1980-1990s   | 300                        |
| Australia   | 1984-1999    | 97                         |
| UK          | 1981-2003    | 1650                       |
| Belgium     | 1980-2005    | 320                        |
| Sweden      | Up to 1990s  | 3-5000                     |
| Germany     | 1997-9; 2001 | 470-4000 p.a.;<br>900-8000 |

# ...In reality converting opportunities problematical

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- Spin-outs generally do not grow (5-7 employees, on average, after 7 years)
- Face challenges in creating significant third stream of financing
- Few make it to trade sale, even fewer to IPO
- Other alternative opportunities
- Non-commercial environment of universities: problems of human, social, organizational & financial resources & capabilities

# Academic Entrepreneurship – Example of the UK

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|                     | 1997-00 | 2001 | 2002 | 2003 | 2004  | 2005  | 2006  |
|---------------------|---------|------|------|------|-------|-------|-------|
| Spin-outs           | 380     | 248  | 213  | 197  | 161   | 148   | 187   |
| Patents             | n.a.    | 250  | 198  | 377  | 463   | 711   | 576   |
| Licensing agreement | n.a.    | 728  | 615  | 758  | 2,256 | 2,099 | 2,699 |
| IPOs of Spin-outs   | n.a     | n.a  | 1    | 1    | 10    | 10    | 4     |
| IPO Value (£m)      | n.a.    | n.a  | n.a. | 214  | 604   | 204   | 246   |

# 10 Challenges & How to Meet Them....

## Insights from Research

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- Based on our studies across Europe:
  - Supporting heterogeneity of Spin-outs
  - Establishing suitable incubator arrangements
  - Progressing spin-outs through development phases
  - Developing spin-out legitimacy in market
  - Forming teams of entrepreneurs
  - Developing university strategies
  - Developing incubators and TTOs
  - Remuneration and incentives
  - Funding availability
  - Developing innovation policy instruments

# Challenge 1: Supporting Heterogeneity of Spinouts (1)

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- Spin-outs not homogeneous
  - 10% clear *exit* strategy
  - 20% *profit* strategy
  - 70% *prospectors*, looking for a business model
- Spin-outs which pursue an exit strategy should:
  - Have Unique Technology Platform
  - Spin-off from a Leading Research Department with sufficient critical mass
  - Be able to attract Venture Capital within 18 months after start-up
  - Be able to attract a high level manager from industry
  - Outcome
    - 60% fail (technological reasons, mismanagement)
    - 34% successful (multiple of different investment rounds > 2); tradesale (usually 9-11 years after start-up);
    - 6% become sustainable growth companies.

# Challenge 1: Supporting Heterogeneity of Spinouts (2)

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- Spin-outs which pursue a profit strategy:
  - Start without external capital
  - Have a bootstrapping strategy in terms of expenses
  - Target a specific niche opportunity with a clear market need
  - Might change to exit strategy after having become a sustainable business
- Spin-outs which are prospectors:
  - Need public funding rather than VC money during preseed period
  - Face need to choose an application and related business plan asap
  - At risk of being ‘living dead’: Need mechanism to terminate

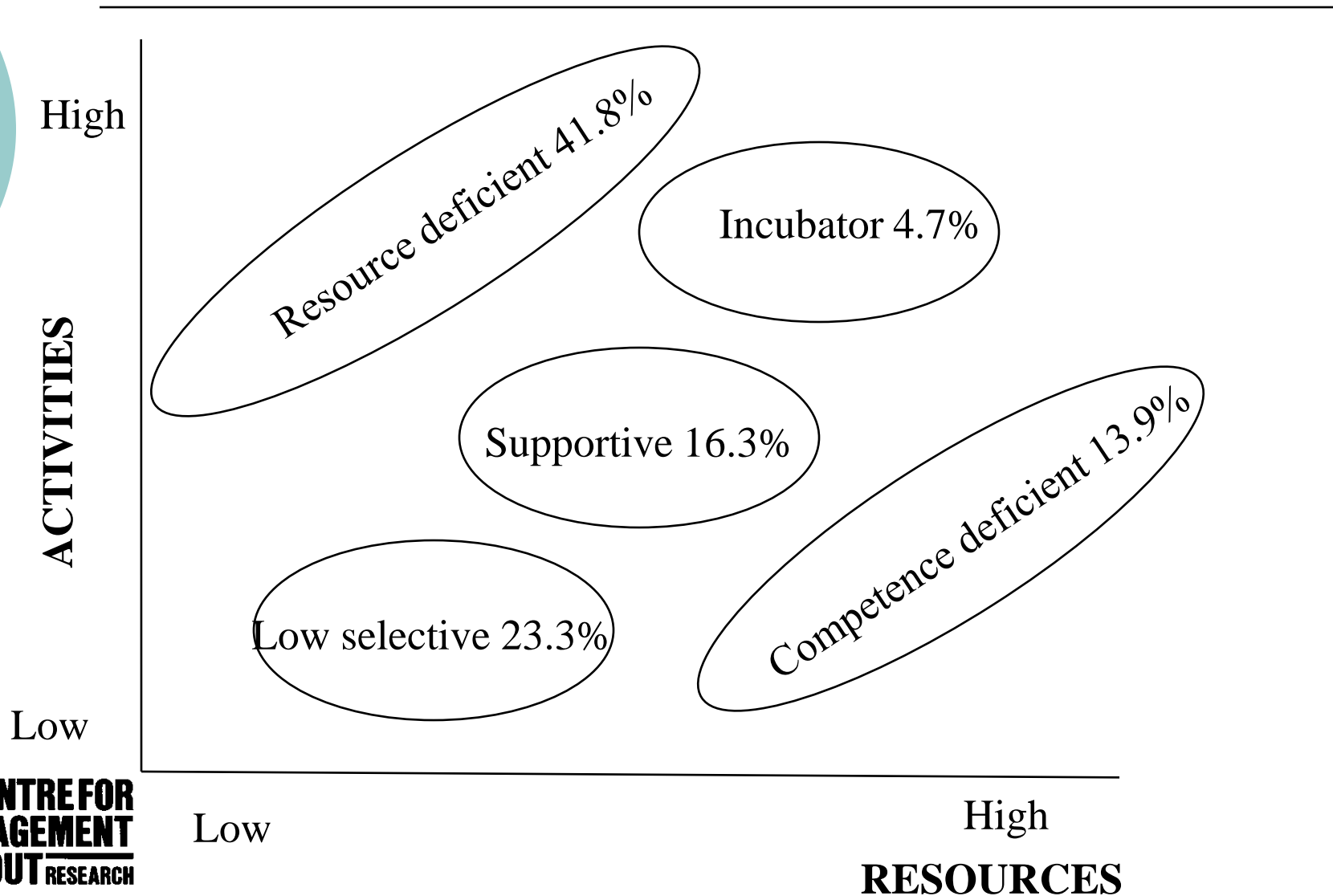
# Challenge 2: Establishing Suitable Incubator Arrangements

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- **Incubator organisation has direct impact on kind of spin-outs created.**
- Three models of support:
  - **1. Low selective Model (e.g. U. Twente)**
    - Stimulation of Entrepreneurial Initiatives among Researchers and Students
    - Based on Autonomy and Low cost incubation facilities
    - No direct IP transfer
    - Returns to University = contract research and PR
  - **2. Incubation Model (e.g. IMEC)**
    - Focus only on spin-outs with an exit strategy
    - Returns through equity participation including formal IP transfer
    - Highly selective model including long incubation before spin-off decision is made
    - Spin-offs as alternative to licensing and contract research
  - **3. Supportive Model (e.g. KULeuven)**
    - Prospector type Spin-outs (no clear business model)
    - Incubation in the market place through spin-off with university related seed funds
    - Focus on business plan support and pre-start up assistance
    - IP transfer and formal contracts = key

# Various Support Models for Spin-Outs

*Based on Interviews in 50 Universities in 7 European Countries*



# Resource Deficient

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- High ambition in terms of activities, but lack resources to realize ambitions:
  - Lack of clarity of objectives in relation to university environment
  - Lack of finance and right mix of experienced people
  - not supported by entrepreneurial university management; absence of regional network
  - Below critical mass of researchers

# Competence Deficient

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- Sufficient resources but not used to perform necessary activities:
  - aim to be Supportive or Incubator but located in environments with low potential
  - associated with research institutes with potential that is too small
  - passive use of resources
  - Lack specialist capabilities that can only be developed over time; may acquire competencies but difficulties in integrating them

# Resources, Capabilities and the USO process

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- Resource inputs
  - Stock of technology
  - Expenditure on external advice on the protection of intellectual property
  - Technology transfer office staff dedicated to the function of spinning-out companies
- Capabilities
  - Incentives and rewards
    - For university staff and outside surrogates
  - Business development capabilities
    - IPR, spinning-out and marketing processes
  - Access to (external) finance
    - VC, BA and industrial partners

# Nature of university processes influences No. of Spin-offs & No. with External Funding

*Based on 48 universities in UK*

| Influence                                      | No. Spin-offs                  | External Backed Spin-offs           | Equity |
|--|--------------------------------|-------------------------------------|--------|
| Total research expenditure                     | Significantly increases        | No significant effect               |        |
| Expenditure on IP protection                   | Significantly increases        | Significantly increases             |        |
| Total TTO STAFF                                | No significant effect          | No significant effect               |        |
| No. years involved in TT                       | No significant effect          | Significantly increases             |        |
| Business development capabilities of TT staff  | <i>Significantly increases</i> | <i>Very significantly increases</i> |        |
| Incentives & reward system                     | No significant effect          | No significant effect               |        |
| Has established links with external financiers | No significant effect          | No significant effect               |        |
| Presence of a Medical School                   | No significant effect          | No significant effect               |        |
| Presence of a Science park                     | No significant effect          | No significant effect               |        |
| R&D intensity of businesses in local region    | No significant effect          | No significant effect               |        |

# Nature of university processes influences No. of Spin-offs & No. with External Funding

*Role of Resources, Experience & Expertise*

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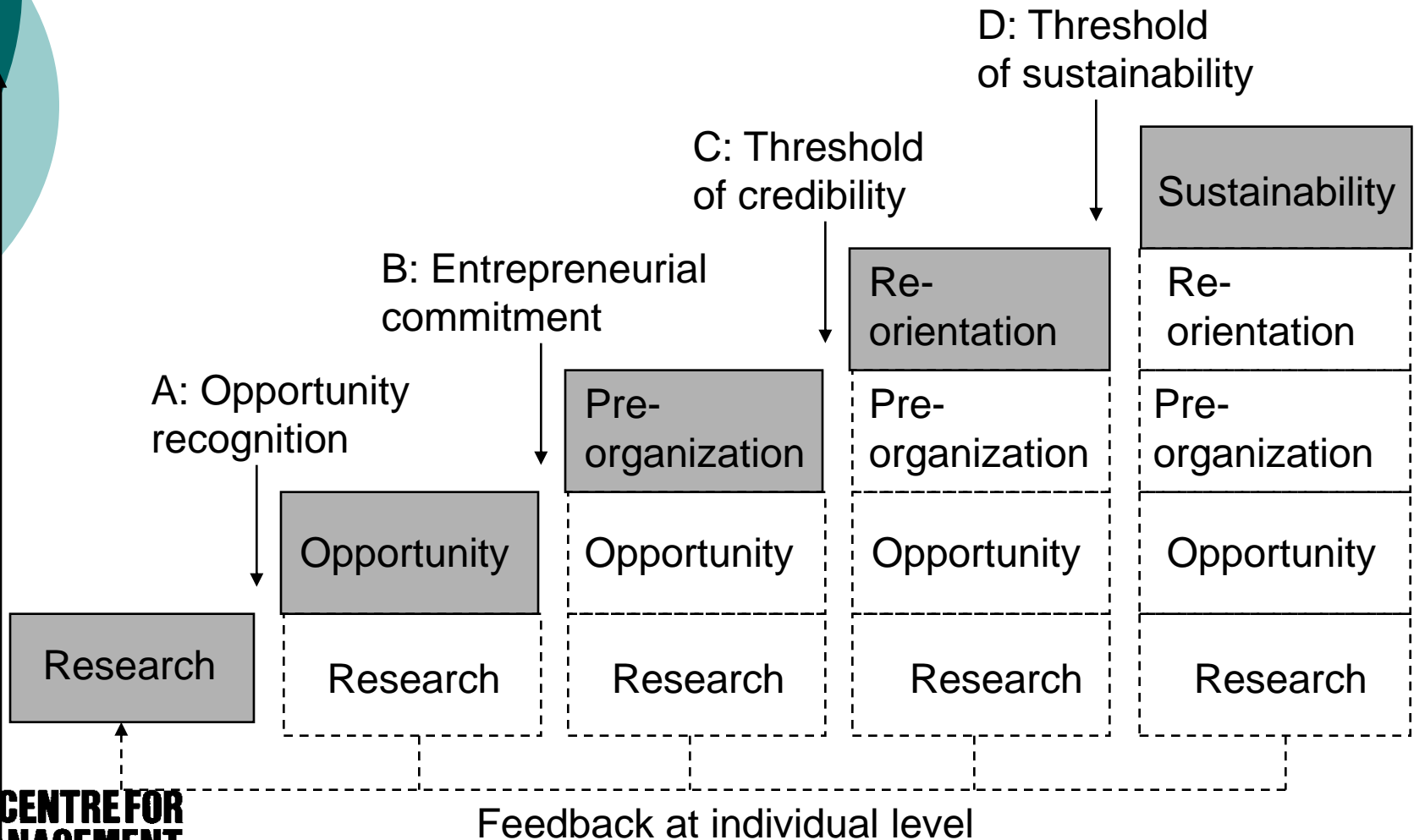
- Importance of business development capabilities but not size of TTO
  - => suggests importance of skills of TTOs recruited & development of routines by universities
- Importance of age of TTO in number of spin-offs with external equity but not number of spin-offs
  - => suggest development of network linkages with finance providers

# Challenge 3: Progressing Spin-outs through Development Phases

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- Process of spin-out development is iterative over phases of venture's growth.
- Support should take into account the different **critical junctures** which spin-outs have to overcome to become sustainable companies
- Four different phases, delineated by clear thresholds which the spin-out should overcome

# Spinout Development Process



# Addressing Critical Junctures

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- Opportunity recognition
  - How can discovery be best applied to satisfy market need?
  - Involve links with industry, venture capitalists and surrogate entrepreneurs to help recognise opportunities
- Entrepreneurial commitment
  - Need for a 'champion'
  - Role of surrogates versus academic
  - Develop networks to identify surrogates

# Addressing Critical Junctures

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- Credibility
  - Create commercial credibility to attract customers and financiers
  - Locate off-campus; present IP as a portfolio of products; demonstrate proof of concept and route to market; identify surrogate entrepreneurs
- Sustainability
  - Access finance
  - Develop networks to access opportunities and resources
  - Develop entrepreneurial team rather individual

# JVSOs v VC backed USOs

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- VCs heterogeneous and not all can provide support USOs need
- Given prior industry knowledge and superior market intelligence of industrial partner, JVSOs better able to develop opportunities from scientific discoveries, which better serve unmet customer needs.
- Industrial partner & university better able to assemble balanced team to commercially exploit technology.
- Credibility from both parent organisations enables JVSOs to access resources more readily & gain momentum to access markets.
- JVSOs may lead to more rapid professionalization and capability building that better equips them to enter dynamic markets and emerge as resilient firms able to compete effectively
- But potential problems....different objectives & timescales to universities and academic entrepreneurs

# Challenge 4: Developing Spin-out Legitimacy in Market (1)

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- How do spin-outs develop legitimacy in the market?
- New firms suffer from liability of newness/ “uncertainty”
- New firms need to adopt strategies that send signals to increase legitimacy and reduce uncertainty, i.e. to create market acceptance
- “One-size-fits-all” strategy inappropriate

# Challenge 4: Developing Spin-out Legitimacy in Market (2)

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- Market and Technology uncertainty requires different strategies -> different legitimacy building
  - Product strategy: no active legitimacy building
    - ⇒ Avoid detection and reaction from incumbents
  - Technology strategy: focus on technology legitimacy building
    - ⇒ Reduce technological uncertainty & convince scientific community
  - Co-optive [both] strategy: focus on scientific & commercial community

Reduce both market & technological uncertainty & convince scientific & commercial communities

# Challenge 5: Forming Teams of Entrepreneurs

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- Spin-out teams lack commercial experience
- Commercial Team Experience is best Indicator of Growth within 7 years after start-up
- Challenge: how do academics meet business-oriented people?
  - Successful teams consist of members with strong instrumental and non-instrumental ties
  - Result : successful teams are formed by people who have joint experience *before* the business opportunity is spotted
- Some are habitual academic entrepreneurs with own networks, others are nascent and need different support

# Challenge 6: Developing University Strategies

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- University strategies
  - Need to adopt a strategic approach to knowledge transfer. Choices concerning:
    - institutional goals and priorities,
    - resource allocation,
    - technological emphasis,
    - patent strategies
    - modes of technology transfer
    - identify why and which type of spin-outs to support
- IP and patent strategies
  - TTOs need to ensure that IP is clean, well-defined and protected before trying to raise commercial interests. = Costs of recruiting sufficient expertise or paying for external advice.
- IP and patent strategy should consider which is licensed on exclusive base?
  - Should adopt a mixture of licensing, start-ups, sponsored research & other technology transfer mechanisms.
  - But choices require different resources and capabilities

# Challenge 7: Developing Incubators and TTOs

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## Incubators and TTOs

- Heterogeneity of spin-outs requires differentiated approach to creation and development
  - > develop a fit between resources at TTO level & espoused strategy
- Focus on gaining better insights into potential business models
- Bringing successful founding teams together
  - Is a sine qua non
  - Should start long before a spin-off opportunity is detected

# Challenge 8: Remuneration and Incentives

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- **Remunerating and attracting TTOs**

Need to enhance skills of TTOs.

Problem: to attract and remunerate personnel to support the creation and business development of spin-outs and to attract venture capital

- **Incentivizing Academics**

- Need to adapt promotion and remuneration systems so that commercialization activities are valued
- Formalized periods of leave to enable academics to focus on development of a spin-out with the possibility of a return

# Challenge 9: Funding Availability

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- University Challenge Funds in the UK, or the *Fonds d'amorçage publics* in France help address initial funding gaps
  - A 2<sup>nd</sup> funding gap beyond start-up stage is evident for exit-oriented business models
  - VCs typically prefer to invest in spin-outs *after* the seed stage, once proof of concept achieved
  - To be successful, TTOs need to:
    - Understand their requirements
    - Present proposals that are investor ready
    - Have a clear decision-making process

# Venture capitalists Attitudes and Perception of Risks Associated with Investment in USOs

| Rank | Compared to High Tech Companies, USOs are more likely to:- | Mean |
|------|--|------|
| 1    | require building a management team                         | 4.4  |
| 2    | require a longer investment time horizon                   | 4.3  |
| 3    | require close monitoring                                   | 4.2  |
| 4    | require several rounds of funding                          | 4.2  |
| 5    | have higher variability of return                          | 3.6  |
| 6    | Fail   | 3.6  |
| 7    | involve protracted pre-deal negotiations                   | 3.5  |
| 8    | be small niche market companies                            | 3.3  |
| 9    | pose valuation difficulties                                | 3.2  |
| 10   | have financial structuring problems                        | 3.1  |

# VCs' Views on Why Investment Proposals Rejected

*Market, venture, university decision making & processes*

| <b>Factors of Significant Differences Between Spin-out Investors and Non-spin-out Investors</b> | <b>Combine score</b> | <b>Non-spin-out investors</b> | <b>Spin-out investors</b> |
|---|----------------------|-------------------------------|---------------------------|
| Size of potential market for applications of the technology                                     | 4.2***               | 4.6                           | 3.9                       |
| Stage of development of the product / service   | 4.1**                | 4.7                           | 3.6                       |
| Availability of a prototype / test data to demonstrate proof of concept                         | 3.5**                | 4.6                           | 2.8                       |
| Difficulty in identifying key decision makers   | 3.4#                 | 4.1                           | 3.0                       |
| Lack of formalized university technology transfer procedures                                    | 3.3*                 | 3.9                           | 2.8                       |
| Requirement for service development to support customers who will use the product / service     | 3.0*                 | 3.7                           | 2.4                       |
| Concerns over co-investing with public sector funds   | 2.9*                 | 3.7                           | 2.4                       |
| Concerns over co-investing with universities  | 2.8*                 | 3.4                           | 2.3                       |
| Joint ownership of the IPR with universities  | 2.6**                | 4.0                           | 1.9                       |

# *Over-valuation at first round affects ability to raise further VC funds*

*[Clarysse et al, ICC 2007]*

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- Asymmetric information between TTOs & initial [public sector] investors particularly acute for new innovations
- TTOs incentive to value formal technology highly to reflect own performance
- If TTO artificially increases amount raised at start-up, will not lead to spin-off being more successful at subsequent rounds:
  - First round investors seek higher valuation as reward for risk taking but may not have skills to have added value
  - As asymmetric information falls as spin-off develops, & private VCs experienced at due diligence, valuation increase required may not materialise

# Challenge 10: Developing Innovation Policy Instruments (1)

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- Heterogeneity of Objectives and Opportunities
  - contribution to national competitiveness,
  - create jobs locally,
  - ensure a financial return for the university,
  - transfer public research results to industry...
- Various initiatives
  - Changes in IP ownership
  - Changes of researcher status,
  - Professionalisation of TTOs,
  - Financial support initiatives,
  - Business plan competitions, entrepreneurship training...
- Effectiveness not demonstrated & confusing signals: need for further evaluation

# Challenge 10: Developing Innovation Policy Instruments (2)

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- Develop local policies to enable the development and recruitment of individuals to act as **boundary-spanners** [e.g. Medici Scheme in UK]
- Need **to be present for longer periods** to enable development of links and networks both inside and outside the university,
- Need to enhance entrepreneurial **behavior** skills

# Concluding Comments

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- Spinning-out enterprises from universities represents many opportunities but also major challenges
- These challenges arise at different levels of analysis and are interdependent
- Spinning-out enterprises needs to be seen within the broader context of different modes of commercializing technology and knowledge from universities
- Spin-outs may not always be the appropriate choice
- To create spin-outs that create value is a long term process, requiring longer term financial support structures and strategies

# Thank You!....Questions?

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Detailed analysis available in:

Mike Wright, et al. (2008). Academic Entrepreneurship in Europe. Cheltenham: Edward Elgar [paperback]