IESA Instituto de Estudios Sociales Avanzados

CSIC CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

University of Western Sydney

ARCNSISS / ANZRSAI Conference
Adelaide, 1st November 2008

Knowledge Intensive Service Activities that Matter fo
Industry Innovation: evidences from a peripheral regio

Manuel Fernández-Esquinas, CSIC – mfernandez@iesa.csic.
Cristina Martinez-Fernandez, UWS - c.martinez@uws.edu.
Irene Ramos-Vielba, CSIC – iramos@iesa.csic.

Overview

1. The project
2. The region
3. The ‘elusive’ university-industry research collaboration
4. The ‘ubiquitious’ KISA
5. Research methods
6. Preliminary results
7. Preliminary Conclusions
8. Policy lessons for innovation and regional development

The Project: Conditions for enhancing the capacities of a regional innovation system

Region: Andalusia (Spain) (Southernmost reg. of Europe)

Main goals of the project:

- mapping interactions of key actors
- study of expectations, strategies and experiences
- detecting impacts of universities and public research organizations (PRO) on innovation

Main components of the project:

- policy analysis
- survey to firms (n=737)
- survey to research teams in universities (n=786)
- case studies on cooperative research (n=25)

The Region: location and basic facts

Maria is doing a map with some basic feautures for you to explain a little about Andalucia – this map should be ready by Thursday

The Region: main features

- Importance of traditional industry and service sectors
- Small and medium size firms
  - → some innovative clusters and industrial districts
  - → shortage of innovative firms
- R&D capabilities concentrated in universities and public research centres (9 public univ. 3 PRO networks)
- Policy change: toward a more interactive model of innovation polices

[Cristina to talk on this slide]

The 'elusive' university-industry research collaboration

A typology of research partnerships

- **'Research support'** – financial equipment contributions made to researchers and universities by industries.

- '**Cooperative research'** – includes contract research, consulting by researchers, and certain group arrangements that can specifically addresss immediate industry problems (NSF, 1982a cited in Belkhodja and Landry, 2005), or government agency problems.

- '**Knowledge transfer'** – can take place through the recruitment of recent cooperative education programs (Phillips, 1991), through co-authoring of research papers, especially by researchers and industrial form members (NSB, 2000; NSF, 1982b cited in Belkhodja and Landry, 2005).

- **'Technology transfer'** – focusing on addressing industry issues by leveraging university-driven research with industry expertise and translating these contributions into technologies needed by the market place (NSB, 2000; Teece, 1987 cited by Belkhodja and Landry, 2005).

Perkmann and Walsh (2007)

Table 2: A typology of university-industry links

Extent of relational involvement		
High: relationships	Medium: mobility	Low: transfer
Research partnerships Research services	Academic entrepreneurship Human resource transfer	Commercialisation of intellectual property (e.g. licensing)
Use of scientific publications, conferences & networking		

[Cristina to talk on this slide]

The 'ubiquitious' KISA

- *Informal relationships and informal linkages gaining importance in establishing long-term partnerships*
- *Co-production of knowledge largely being produced by Knowledge Intensive Service Activities (KISA)*
- *KISA occurs in both high-tech, KIBS and low-tech, traditional industries*
- *KISA – research/consultancy activities to provide new or improved solutions / new or improved information that leads to new ideas and/or co-production of knowledge. Involves HR both from universities and industry. Activities that provide a pathway for innovation to occur.*
- *Contractual or Informal*
- *KISA-innovation (product development /service imrpovement) / KISA-skills (training/skills upgrade)*

[Cristina to talk on this slide]

Our operative definition of KISA

KIBS: Services usually provided by other specialized firms.

-Some of then can be labeled as 'high level outsourcing' because they require specialized knowledge.

-Ex: legal assistance, accounting, marketing research and IT related consultancy, among others.

KISA Innovation: activities related to R&D, or innovation closed to R&D.

-In-house R&D, implementation of processes and design related to innovation, adquisition of specialized equipment

-Several kind of services provided by universities and PRO

KISA Skills: activities related to human resources training and specialization, both in formal and informal fashion.

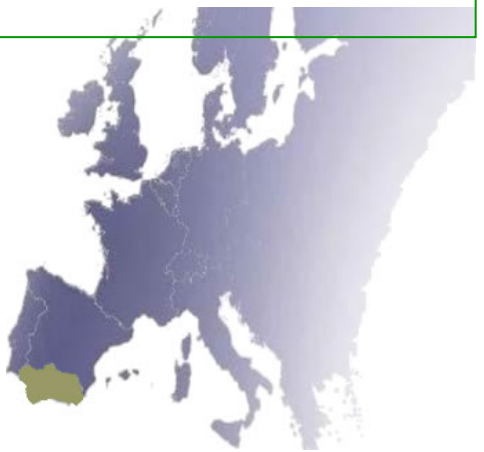
-Specialized external courses (such as ad-hoc courses, corporative masters, etc.)

-Training provided by Universities and PRO on demand from the firm, and temporary exchange of personnel.

Research Methods: Field work

Data source: **registry of business located in Andalusia (regional government)**

It comprises 1844 firms which have received some type of public aid for innovation from 1999 to 2005.



An "operative population":

- **Firms with differing innovative capabilities**
- **A wide range of activity areas and a diversity of sizes**
- **Urban & rural**

Sample: 737 firms (randomly selected)

- **Proportional distribution between strata**
- **Strata: sector by activity and province where the firm is located**
- **Face to face interviews at the firms' offices: two waves of field work: 72-75% response rate for each wave.**
- **Respondents: owner of the firm, executive director, R&D or innovation department manager**

Research methods: Firms in the sample

		Frequency	Percent
Belongs to a corporate group	Yes	168	22.8
	No	567	76.9
	No answer	2	0.3
Number of workers	From 1 to 5	225	30.5
	From 6 to 10	162	22.0
	From 11 to 25	174	23.6
	From 26 to 50	73	9.9
	More than 50	101	13.7
	No answer	2	0.3
	Minimum	**1**	
	Maximum	**3580**	
	Mean	**56**	
	Std. Deviation	**239**	
Firm age	Fewer than 7 years	133	18.0
	More than 7 years	599	81.3
	Do not know / No answer	5	0.7
	Minimum	**1**	
	Maximum	**338**	
	Mean	**18**	
	Std. Deviation	**21**	
Activity sector (PITEC)	Agriculture, livestock farming, forestry and fishing	46	6.2
	Oil industry	3	0.4
	Manufacture industry	196	26.6
	Energy and water	26	3.5
	Building industry	47	6.4
	Services	419	56.9
Geographic environment	Science or tecnology park	61	8.3
	Industrial park	209	28.4
	Urban area	398	54.0
	Rural area	60	8.1
	Others	6	0.8
	Do not know / No answer	3	0.4
R&D department	Yes, in this location	157	21.3
	Yes, in a different location	28	3.8
	No	551	74.8
	No Answer	1	0.1
Num. of workers at the R&D department	Fewer than 5 workers	102	55.1
	From 5 to 9 workers	34	18.4
	10 or more workers	38	20.5
	Do not know / No answer	11	5.9
	Non applicable	552	
TOTAL		**737**	

- **Few corporate groups (22% of firms in a corporate group)**
- **Small firms (40% with less than 10 workers)**
- **Importance of service sector (more than 50%)**
- **Diversified locations (54% in urban areas, only 8% in Tech. Parks)**
- **Small R&D departments (25% with R&D departments, more than 50% of depart. with less than 5 workers)**

Research Methods: Analysis

Variables

→3 sets of activities: KIBS - KISA innovation - KISA skills

→% of firms involved en each actitivy

Step 1: Descriptive results

→ Basic profile of the fims

Step 2: Identifying the innovative firms

→ Product innovation and process innovation

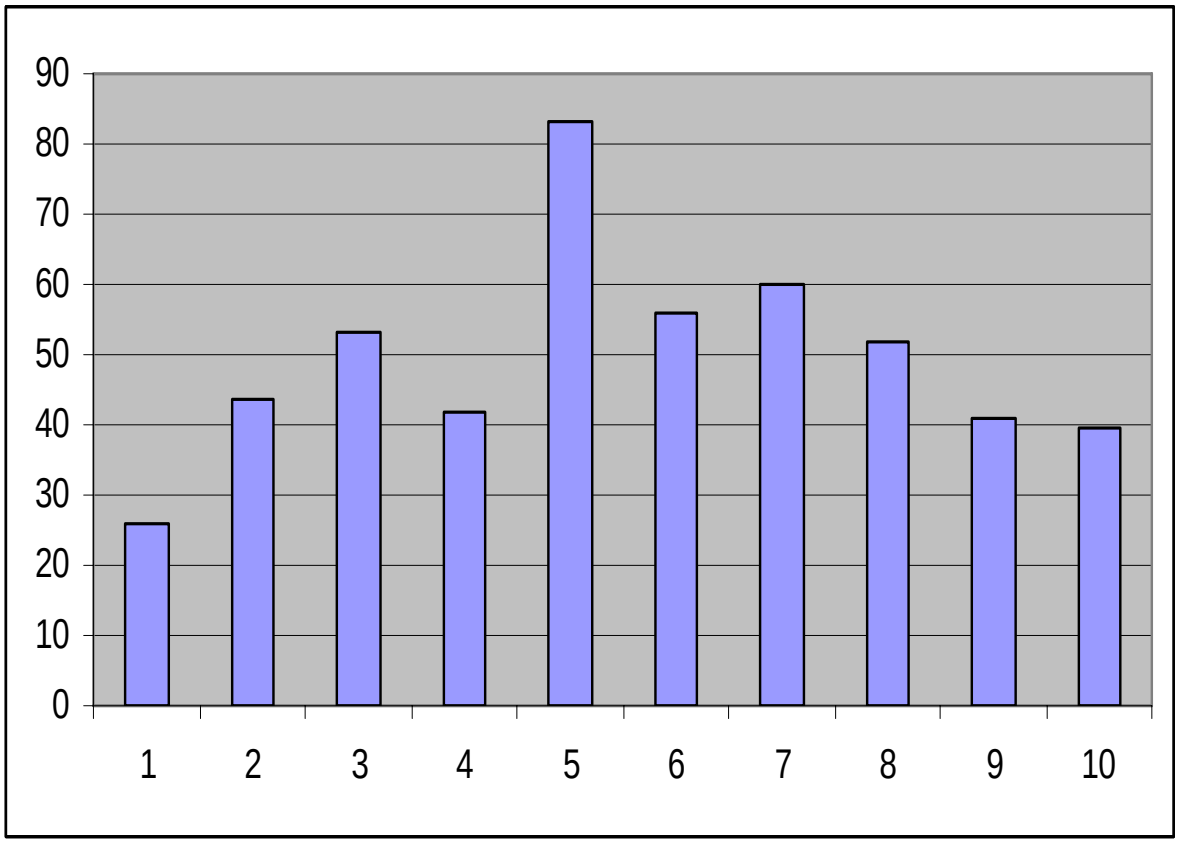
Step 3: Multivariate analysis: logistic regression

→ Ind. variables: KIBs – KISA Innov – KISA Skills + control variables

→ Dep. variables: firms with both product and process innovation

Descriptive Results: KIBS

Graph 1: KIBS: % of firms involved in each activity



1. Business development advise
2. Planning advise
3. Marketing & promotion advise
4. Marketing & product research
5. Accounting & financial advise
6. IT services
7. Recruitment
8. Accreditation
9. Legal services
10. E-commerce

A basic profile of firms involved in KIBS

SIZE: firms with > 20 workers → 8 activities (of 10)

development and planning advise: only > 250 workers

SECTOR: manufacture, energy, R&D, some services → 5 activities

LOCATION: Tech. Parks → 4 activities

Marketing and product, IT advise, acreditation, legal serv.

PRODUCT CYCLE: Growth phase → 2 activities

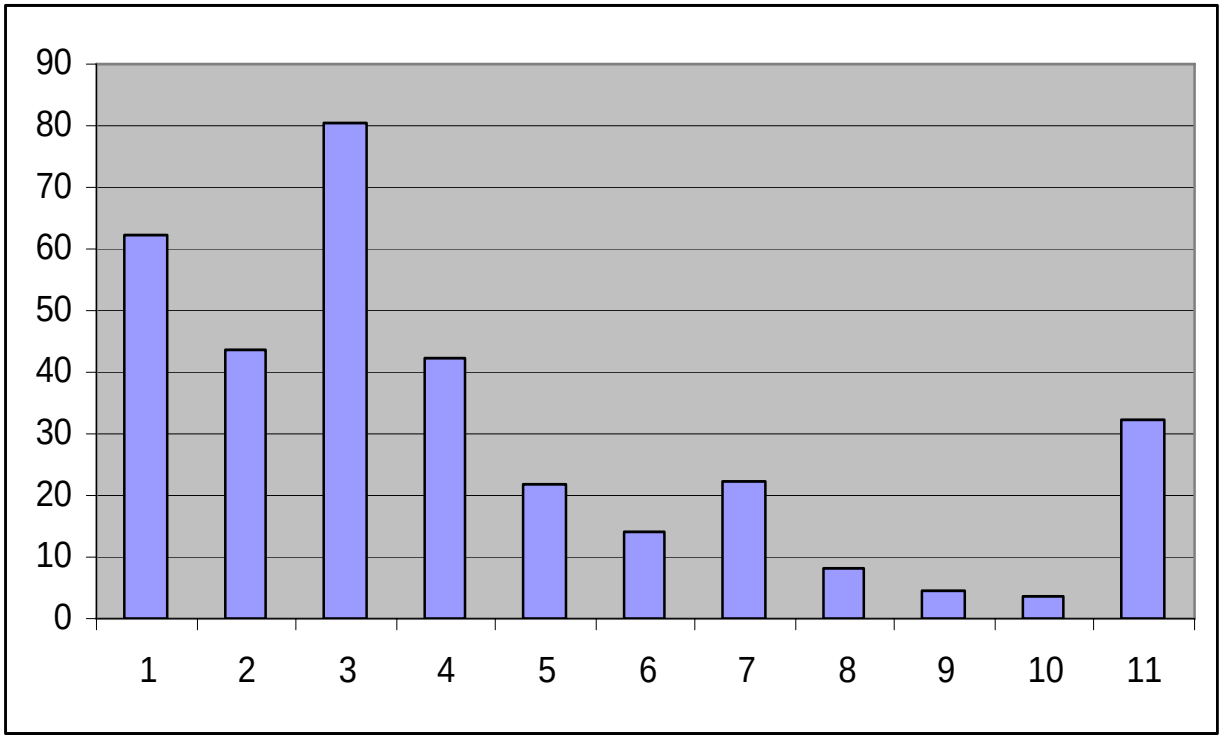
Planning advise, Marketing and product research

EDUCATION: > 25% of wokers with HE → 7 activities

R&D DEPARTMENT: in-house department → 7 activities

Descriptive results: KISA Innovation

Graph 2: KISA-Innovation: % of firms involved in each activity



1. In-house R&D
2. Outsourced R&D
3. Acquisition of specialized equipment
4. Implementation of /design for innovation
5. Consultancy from university
6. Contract project from university
7. Joint project with university
8. Use of university facilities
9. University patent exploitation
10. Participation in a joint centre
11. Informal relations with university personnel

A basic profile of firms involved in KISA innovation

SIZE: > 20 workers → 11 activities (of 11)

Implementation of inn.: only > 250 workers

Univ. patents exploitation: only 50-250 workers

LOCATION: Tech. Parks → 10 activities

PRODUCT CYCLE:

Growth phase → 4 activities: in-house R&D, implem. of innov, use of univ. facilities, relationships with univ.

Birth phase → 2 activities: in house R&D, implem. of inn.

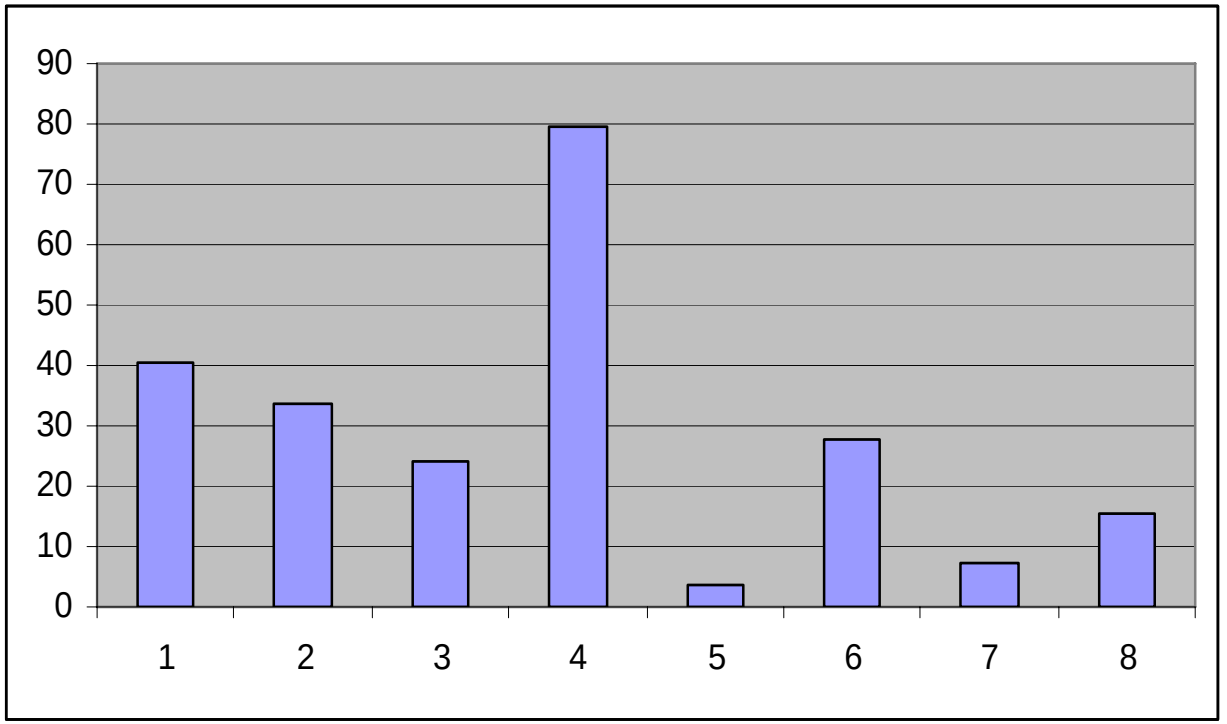
EDUCATION: > 25% of wokers with HE → 9 activities

Relationships with univ: only > 50% of workers with HE

R&D DEPARTMENT: in-house department → 11 activities

Descriptive results: KISA Skills

Graph 2: KISA-Skills: % of firms involved in each activity



1. Courses on Management
2. Courses related to productive process of the firm
3. Temporary stay of workers in other firms
4. Congress or professional meeting
5. Other training
6. Internships of university postgraduates
7. Temporary exchange of workers with university
8. Specific training provided by university

A basic profile of firms involved in KISA Skills

SIZE: firms with > 20 workers → 6 activities (of 8)

Courses on productive processes: only firms > 250 workers

LOCATION: Tech. Parks → 5 activities

Most of them with universtities

PRODUCT CYCLE: Growth phase → 2 activities

Attendance to congress, exchanges with universities

EDUCATION: > 25% of wokers with HE → 6 activities

Only > 50 of workers with HE: relationships with universities

R&D DEPARTMENT: in-house department → 8 activities

Innovation performance of the firms

			Process Innovation			Total
			Yes	No	No answer	
Product Innovation	Yes	Count	256	159	2	417
		% of Total	34,7%	21,6%	,3%	56,6%
	No	Count	82	236	2	320
		% of Total	11,1%	32,0%	,3%	43,4%
Total		Count	338	395	4	737
		% of Total	45,9%	53,6%	,5%	100,0%

Building the dependent variable

1. **Firms with product and process innovation (34,7%)**
2. **Firms with only product innovation (21,6%)**
3. **Firms with only process innovation (11,1%)**
4. **Firms with no innovation (32%)**

→ VALUE FOR OBSERVATION: 1

INDEPENDENT VARIABLES:

-KIBS, KISA Innovation, KISA Skills

PRELIMINARY RESULTS

Firms with more probabilities of PxP innovation are:

KIBS: Marketing and product research

Accounting and financial advise

Acreditation, bussiness develop. advise

K- Inn: Design for innovation

Informal relationships with univ.

Aquisition of equipment

Use of univ. facilities

Outsourced and in-house R&D

Contract projects with univ.

K-Sk: In-house training

Congress or meetings

Courses on management

Exchange of workers with univ.

Red: more than 50%

Blue: more than 30%

Conclusions

The more ‘absorptive capacities’ the firm has, the more knowledge intensive activities the firm involve in

Some KISA are related to innovation performance: most of them are related to R&D, but not all of them.

Next step of the analysis: finding the interactions

→ It is possible that some of these activities go togueter: Most innovative firms are the ones who recombine diferente kinds of knowledge

Policy Lessons

Cath up regions have a firm structure with difficulties for withdraw R&D capacities direcly from universities or other companies

Capacities for innovation can be enhanced by:

- Facitilitating broad range of services from universities
  - ‘Not only patent exploitation or R&D projects’
- Facilitating high level consulting and advise
- Facilitating skills upgrade and circulation of workers

Key process: pool of diversified sources→recombination of knowledge


Gracias