

INTERNATIONAL CONFERENCE

1st & 2nd July 2009

Catholic University of Portugal · Porto, Portugal



EMPLOYABILITY
& ENTREPRENEURSHIP:
**TUNING UNIVERSITIES
& ENTERPRISES**

University-Firms relations in Portugal: an empirical study

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Missions of universities:

1. to engage in **research and disseminate knowledge** across both academic and student communities.
2. providing **highly educated and qualified personnel** to the economy in general and the industry in particular.
3. be an **engine of local economic development** by restructuring their research capabilities to be more responsive to local industry (e.g., setting up specialized research units, joint cooperative ventures or interdisciplinary projects that are more receptive to industrial needs).

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Firms:

Should be interested in forging links, perhaps even in collaborating with universities, in order to capture timely new technological opportunities stemming from basic research (Mohnen and Hoareauc, 2003).

Proximity to basic science is reported by Cohen (1995) to be one of the main determinants of innovation.

Governments:

In their quest to maximize the social return of innovation should also be concerned with fostering such links between private firms and universities.

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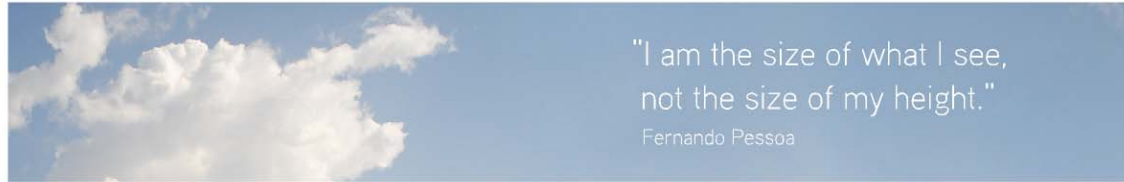


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Motivation for the present study:

Using a large-scale database of (1583) firms located in Portugal, we aim to contribute to a **better understanding of the quality and extent of firm-university links** by examining the firms' propensity to establish (formal) contacts with universities.

Similar studies in terms of the scope of analysis focus on the linkages between firms and universities considering this latter as an aggregate, homogenous entity. The present study overcomes such limitation by econometrically evaluating **the quality and extension of firm-university contacts with all and each of the Portuguese universities.**

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not the size of my height."
Fernando Pessoa



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Structure of the presentation:

1. Importance of Universities for firms learning and innovation
2. Methodology and descriptive results regarding the contacts between firms located in Portugal and Universities.
3. Empirical results on the determinants of the firms' propensity to contact all and each of the Portuguese Universities
4. Conclusions

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1. Importance of Universities for firms learning and innovation

University–industry collaboration **has intensified in recent years** due to four interrelated factors (Bercovitz and Feldmann, 2006):

- the development of new, high-opportunity technology platforms such as computer science, molecular biology and material science;
- the more general growing scientific and technical content of all types of industrial production;
- the need for new sources of funding for academic research brought on by severe budgetary restrictions;
- the prominence of government policies aimed at raising the economic returns of publicly funded research by stimulating university technology-transfer.

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1. Importance of Universities for firms learning and innovation (...)

Universities are complex bureaucracies with their own rules, rewards and incentive structures. In contrast to commercial firms with a relatively simple profit motive, universities have complex objective functions that involve a variety of educational and societal objectives as well as the interests of faculty members and the broader scientific community.

The core elements in university–industry relationships are transactions that occur through the mechanisms of sponsored research support (including participation and sponsorship of research centres), agreements to license university intellectual property, the hiring of research students, and new start-up firms.

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1. Importance of Universities for firms learning and innovation (...)

Community Innovation Survey for the EU:

Only a small fraction of innovative enterprises uses universities and public research laboratories, as an important information source in their innovation process.

From all reporting innovative EU firms (excl. UK) 4.5% rated universities as important sources of information, while **68% indicated universities as not important at all.**

The survey shows that **less than 10% of innovative firms had cooperative agreements with universities.**

United States:

The vast majority of research partnerships registered under the National Cooperative Research and Production Act do not include a university. Although the trend is increasing, only a modest **15% of all research partnerships involved a university.**

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1. Importance of Universities for firms learning and innovation (...)

Previous research has shown, however, that linking with external entities is a **key element in successfully exploring strategies that emphasize the search for, discovery and development of new knowledge.**

Such interactions give the firm access to knowledge that differs from, but can complement, the firm’s existing technology portfolio. **The integration of this new knowledge leads to path-breaking innovation.**

We expect that pursuing university interactions to tap into such expertise is likely to be more **highly valued by firms with innovation strategies** that emphasize exploration rather than exploitation — the refinement, extension, and intelligent use of existing competencies.

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1. Importance of Universities for firms learning and innovation (...)

Very few studies within firm-university linkages have been supported by systematic data analysis.

The vast majority have studied such linkages from a qualitative point of view or by relying on case studies.

Additionally, these studies tend to consider all universities in aggregate without distinguish the different type of universities that exist in a given country, namely those that are more 'entrepreneurial led' from those more 'classical'.

We gathered primary data which permit to evaluate the quality and extension of firm-university contacts with **all** and **each** of the Portuguese universities.

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2. Methodology and descriptive results regarding the contacts between firms located in Portugal and Universities

Direct survey to all (2852) firms located in Portugal listed in 24 Portuguese entrepreneurial associations covering all economic activities.

The questionnaire was implemented through telephone and fax contacts to all firms from the above mentioned list.

The results provided in the present paper are based on **1538** valid questionnaires, reflecting a good response rate (53.9%).

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	Population INE	Respondent sample (n=1538)
Industry		
Mining and quarrying	0.2	0.8
Food products, beverage and tobacco	1.6	7.9
Textiles and leather	3.7	8.6
Wood, pulp and publishing	2.4	3.0
Coke and chemicals	0.2	4.2
Rubber and other non-metallic	1.1	3.9
Basic metals and fabricated metal products	2.6	4.3
Machinery and equipment NEC	0.7	2.7
Electrical and optical equipment	0.3	3.4
Transport equipment	0.1	2.2
Manufacturing NEC and recycling	1.7	4.0
Electricity, gas and water supply, construction	17.0	4.9
Wholesale and retail	52.1	33.8
Transport and storage	4.3	4.1
Post and telecommunications, financial intermediation	2.7	1.8
Computer and related activities	0.5	3.6
Research and development & eng services	8.0	4.7
Social services and non-profit associations	0.9	2.0
Regions (NUTs II)		
North	31.3	37.2
Centre	22.5	19.5
Lisbon and Tagus Valley	28.9	38.1
Alentejo	7.9	2.3
Algarve	5.4	1.6
Islands (Madeira and the Azores)	4.0	1.3

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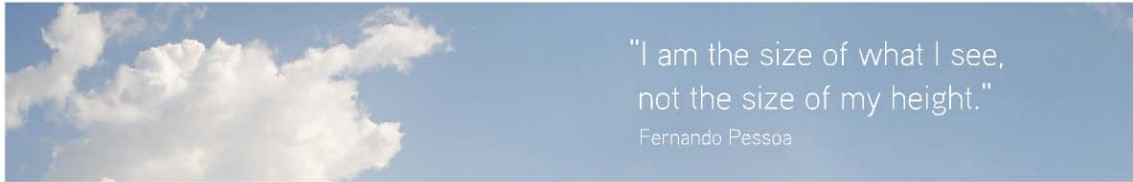
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**Innovation-related information and knowledge sources for firms located in Portugal (n=1538)
according to the degree of importance attributed by firms**

Type	Source	% of firms			
		Not used	Low or very low	Medium	High and very high
Internal	Within the firm	0.1	0.5	10.3	89.1
	Universities	24.6	37.9	16.0	21.5
Institutional	Public R&D institutes	19.4	50.4	21.0	9.2
	Other governmental entities	19.7	59.2	15.2	5.9
	Private R&D institutes	25.4	33.6	24.8	16.1
Business networks	Clients	0.6	15.3	36.3	47.8
	Equipment suppliers	7.5	42.2	25.7	24.6
	Competitors	1.7	17.1	38.9	42.3
	Consultants	14.4	26.2	23.4	36.0
	R&D labs and firms	32.3	23.6	26.6	17.4
Sector information	Sector conferences and meetings	12.2	42.9	28.7	16.2
	Trade associations	6.3	51.0	31.6	11.1
	Technical and sector literature	18.0	26.3	18.5	37.2
	Fairs and events	7.2	17.1	21.6	54.2
Specialized information	Technical standards and norms	12.8	14.3	11.7	61.3
	Health and hygiene legislation	0.8	3.5	11.1	84.6
	Environment norms and legislation	0.7	3.4	9.6	86.3

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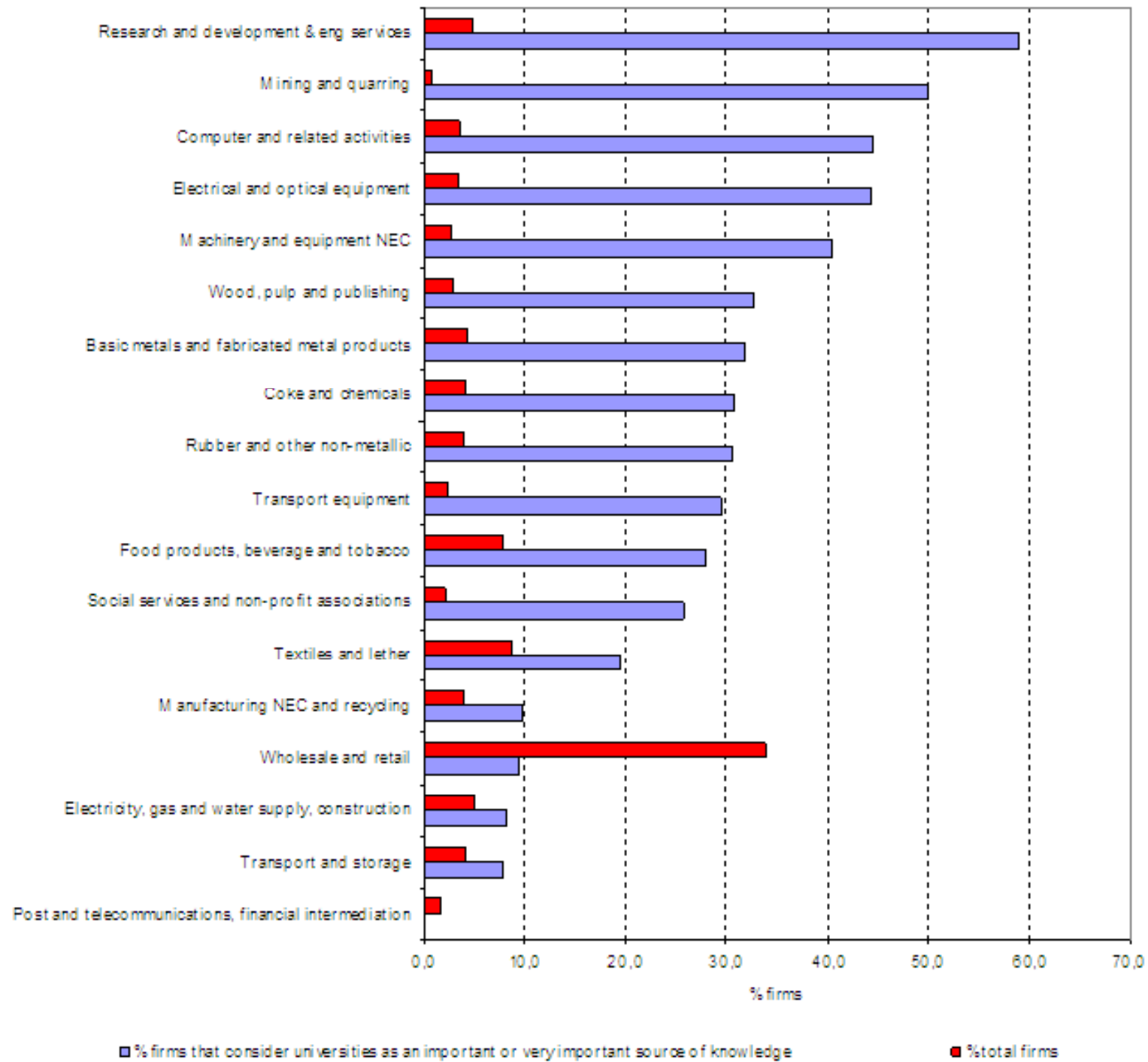


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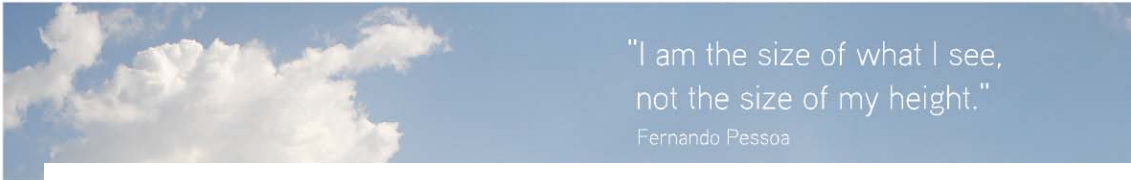


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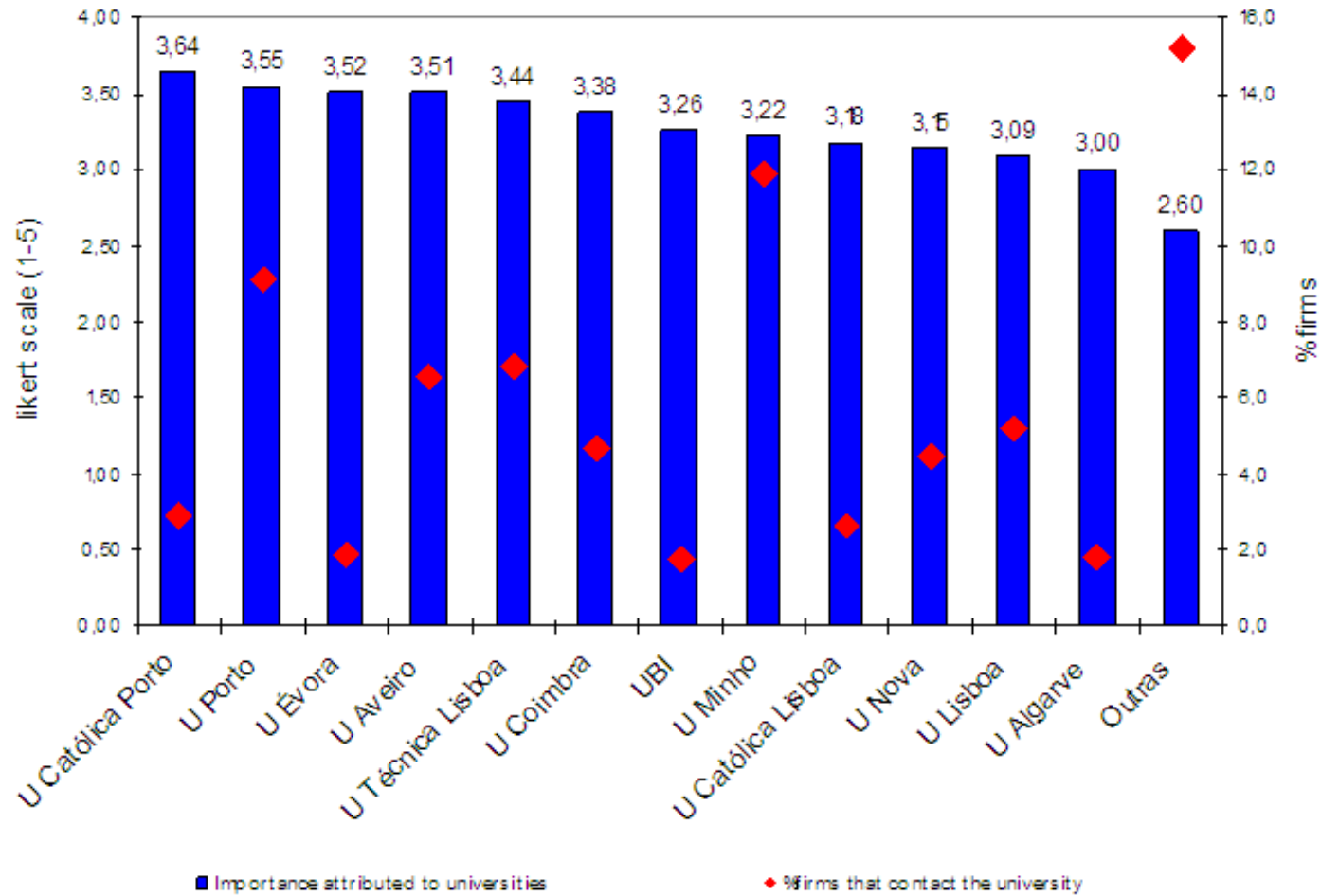


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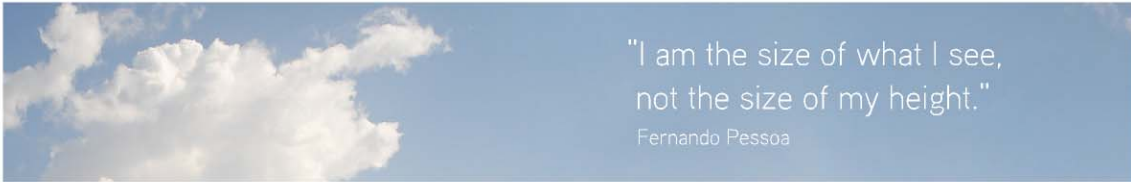


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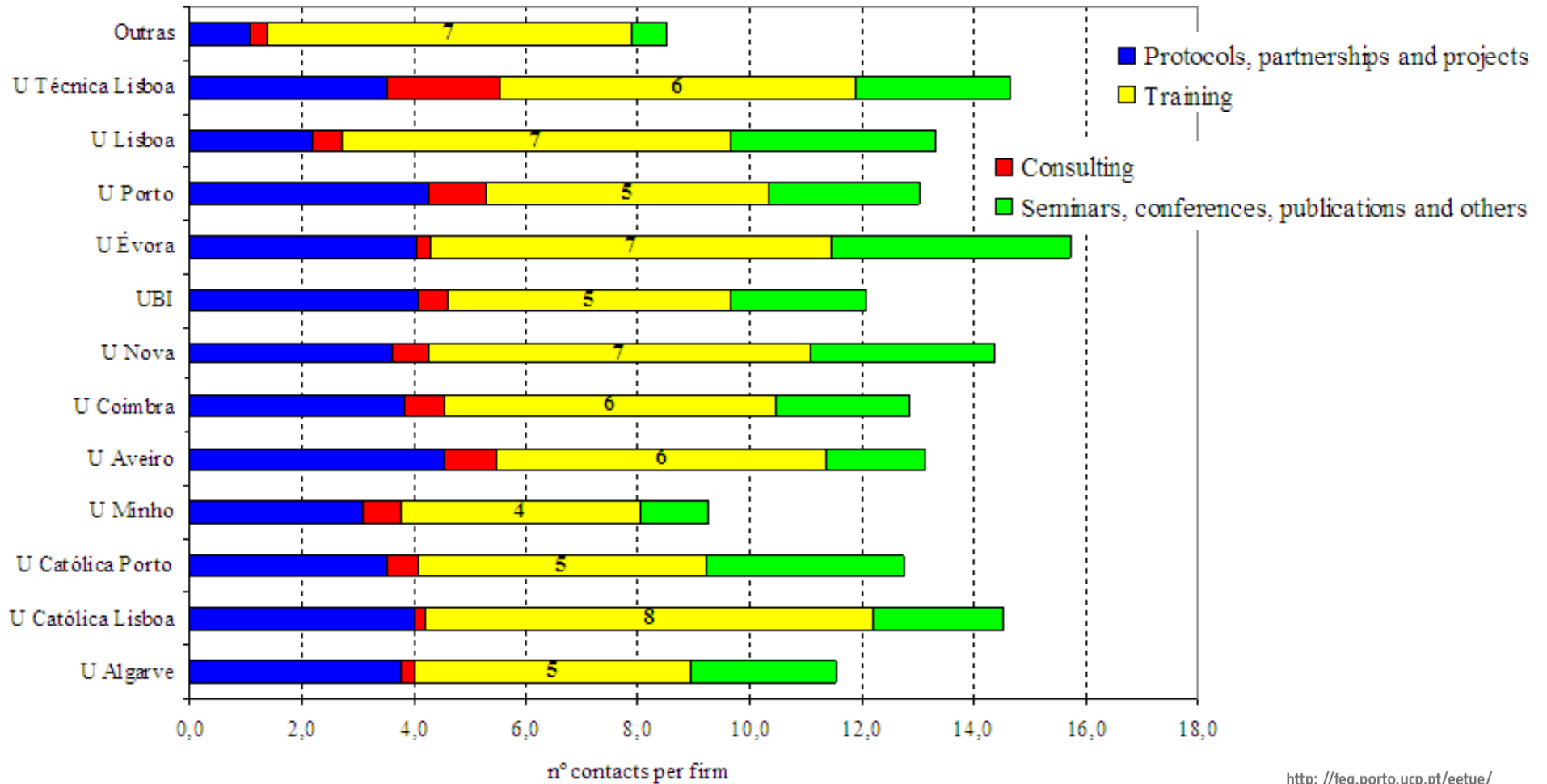


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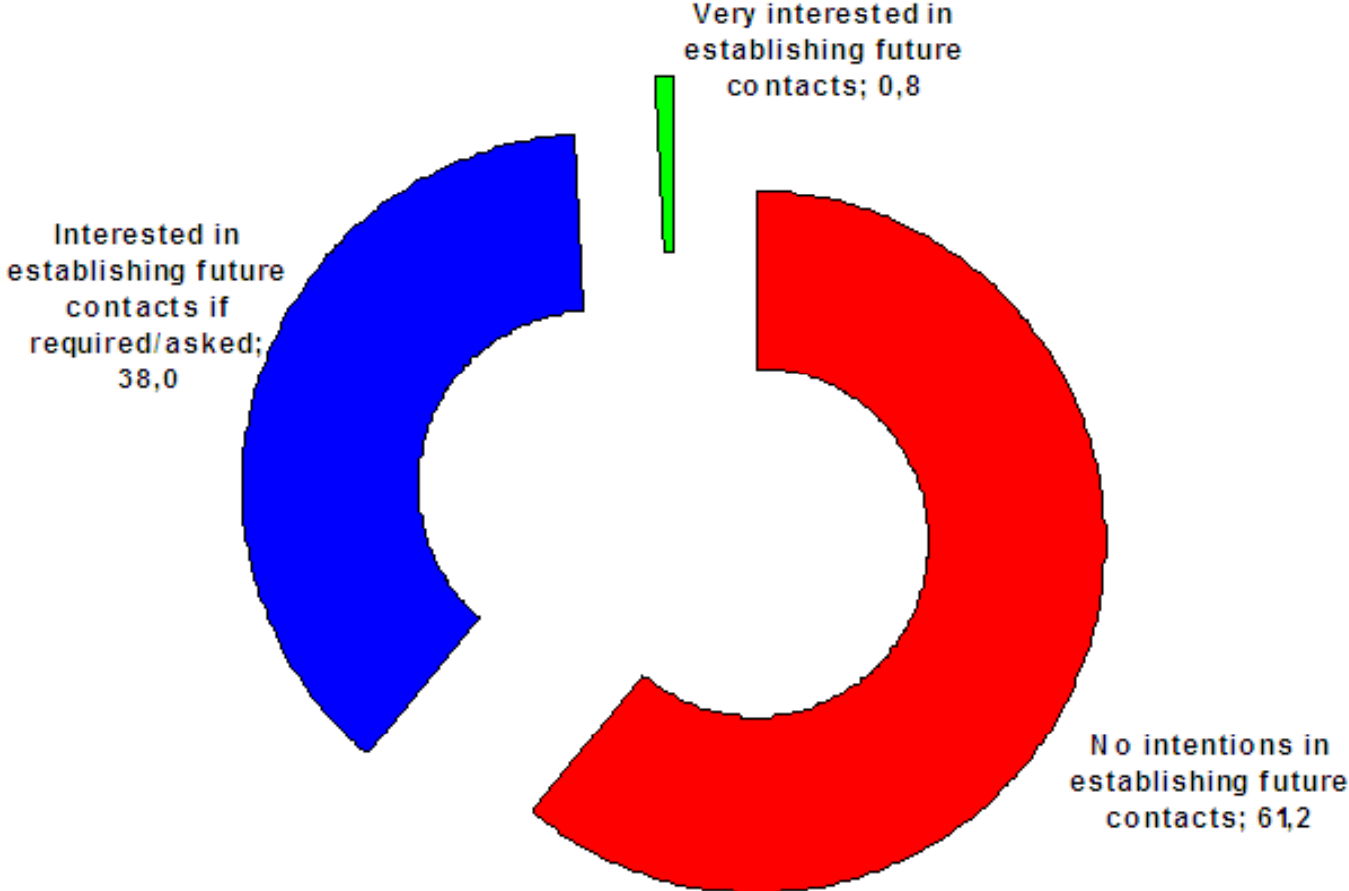




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3. Determinants of the firms' propensity to contact all and each of the Portuguese Universities

$$\log\left(\frac{\text{Pr ob}(\text{ContactUniv})}{\text{Pr ob}(\text{Not ContactUniv})}\right) = \beta_0 + \underbrace{\beta_1 \text{Age} + \beta_2 \text{Size} + \beta_3 \text{ExpInt} + \beta_4 \text{R \& DInt} + \beta_5 \text{FOwnership}}_{\text{Firms' Structural Characteristics}} + \underbrace{\beta_6 \text{SkillInt} + \beta_7 \text{EducInt}}_{\text{Human Capital}} + \beta_8 \text{Openness} + \beta_9 \text{Region} + \beta_{10} \text{Industry} + \varepsilon_i$$

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Universities	Structural traits	Human capital	Region	Industry
Algarve	Larger		Algarve	
Aveiro	Larger R&D intensive	Skill intensive	North Centre	Wood, pulp and publishing Basic and fabricated metal products Machinery and equipment nec R&D & Engineering services
Beira Interior	Larger Foreign owned		Centre	Food, beverage and tobacco Textiles and leather Coke and chemicals R&D & Engineering services
Católica Lisboa	Larger	Education intensive	Lisbon and Tagus Valley	
Católica Porto	Larger Exporters	Skill intensive Education intensive	North	Mining and quarrying Food, beverage and tobacco R&D & Engineering services
Coimbra	Larger R&D intensive Nationally owned	Skill intensive Education intensive	Centre	Coke and chemicals
Évora	Larger R&D intensive	Education intensive	Alentejo	Food, beverage and tobacco Social services and non-profit associations
Lisboa	Larger R&D intensive	Skill intensive Education intensive	Lisbon and Tagus Valley	
Minho	Larger	Skill intensive Education intensive	North Centre	Textiles and leather Coke and chemicals Rubber and other non-metallic Basic and fabricated metal products Machinery and equipment nec Transport equipment
Nova	Larger R&D intensive	Skill intensive Education intensive	Lisbon and Tagus Valley	
Porto	Larger Exporters	Skill intensive Education intensive	North Centre	Coke and chemicals Basic and fabricated metal products Computer and related activities R&D & Engineering services
Técnica Lisboa	Larger	Skill intensive	Lisbon and Tagus Valley	Mining and quarrying Wood, pulp and publishing Coke and chemicals Basic and fabricated metal products Machinery and equipment nec Electrical and optical equipment Computer and related activities R&D & Engineering services
All	Larger Exporters R&D intensive Nationally owned	Skill intensive Education intensive	Centre Algarve	Food, beverage and tobacco Coke and chemicals Rubber and other non-metallic Basic and fabricated metal products Machinery and equipment nec R&D & Engineering services

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4. Conclusions

Our results show that in Portugal, on the overall, the links between firms and the universities are **weak, occasional and lack of sustainability**.

The **universities in general do not seem to have innovation strategies** and the local institutional–organizational representation of innovation support at the universities seems to be inadequate.

The **interactive skills of the firms seems to be extremely weak**, only large (whichever the university), R&D and human capital intensive firms systematically evidence higher propensity for drawing on universities as sources of information and knowledge for their innovation activities.

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4. Conclusions

The results seem to suggest that the **low frequency of contacts** with universities in Portugal may be related to an **industry structure that is focused on non-science based industries**, characterized by a high share of small and medium sized firms, whose portfolio of **R&D strategies is limited**.

The relationships between firms and universities are characterized by a **high degree of heterogeneity**.

Current policies are mainly directed to ‘forcing’ universities into tU-E types of relationships with no acknowledgement that without appropriate ‘demand’ little will be achieved. **Without willing partners satisfaction will not be achieved.**

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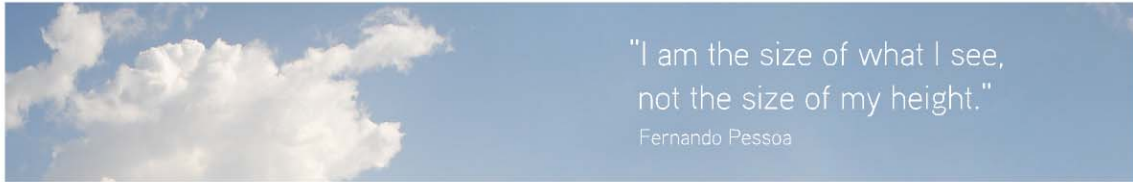


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4. Conclusions

Firms and universities have **different norms, and have different levels of evaluation criteria**. Expectations from each other are also not clear in many cases resulting in linkages not translating into deeper levels.

Firms located in Portugal tend to be **skeptical of the research done in the university**. In general, **collaboration with industry is still only a peripheral concern of the university**. Universities seem to be more comfortable with their role of knowledge generating institution.

Despite recent research underscores the importance of universities in contributing to local economic development, leading edge research, high value jobs and innovation as O’Shea et al. (2005: 1005) recognize in the case of the USA, “ ... unfortunately, for many institutions, **efforts to make universities more entrepreneurial have not had sufficient impact**”. **The present study reveals that this is also the case for Portugal ...**

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