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There are more things in heaven and earth, Horatio. The informal dimension of university-SMEs interaction for innovation

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Aim of the paper

- Much literature is devoted to explore the impact of University-Industry collaborations (UICs) on the innovation performance of *large* companies, where the positive effects are evident
  - Less is known on the role UICs for **SMEs**
- This work investigates the impact of UICs on the innovation performance of SMEs
  - Formal and informal ties
  - The interplay between formal and informal ties
- It also shed light on the importance of formal R&D structures for benefiting from UICs
  - Presence or absence of a R&D department

UICs and SMEs

- Vast literature on the role of UIC in (regional/national) innovation systems, especially relevant for firms interested in capturing opportunities laying at the frontier
- Empirical focus on large corporations
- SMEs found to be engaging quite less with universities
  - Universities less likely to engage and offer SMES-friendly projects (Caloghirou et al, 2001; Bodas Freitas et al, 2013)
  - SMEs lack the needed absorptive capacity (Spithoven et al, 2010).
- Impact of UICs on SMEs innovation performance still underinvestigated
  - Benefits on new product development activities in the Japanese context (Motohashi, 2005) and in the probability to become innovative, in the EU context (Lasagni, 2012)

(In)formal collaborations and absorptive capacity

- The literature on UICs often focused on measuring ***formal collaborations*** in terms of co-patenting and co-publishing activities.
  - Formal are not the only collaborations taking place between firms and university, especially in the context of SMEs
  - The ***informal side*** of the UICs is underestimated, and it is important to investigate upon it, as recommended by Perkmann et al. (2013) and Ankrah and Al-Tabbaa (2015), who ask for further research on this topic.
- No study so far has investigated the potential influence of ***absorptive capacity and innovation competencies*** on the relationship between UIC and product innovation performance (Kobarg et al. 2017)

Hypotheses

- Hyp. 1: Formal collaborations with universities positively impact the innovation performance of SMEs.
- Hyp. 2: Informal collaborations with universities positively impact the innovation performance of SMEs.
- Hyp. 3: Informal collaborations positively moderate the impact of formal collaborations on the innovation performance of SMEs.
- Hyp. 4: Firm's absorptive capacity positively moderates the impact of the collaborations with universities on the innovation performance of SMEs.
- Hyp. 5: The moderating effect of R&D is higher for formal collaborations.

The empirical setting

- Analysis of SMEs located in the Veneto region, being characterised by
  - the presence of a moltitude of SMEs, often operating within industrial districts or clusters, and specialised in low-tech manufacturing and, more recently, KIBS.
  - an innovative capacity based on learning by doing activities and diffuse innovation practices, where informal collaborations for innovation are in place
  - a model not linked to an R&D driven structure
- Mixed-method approach (Narula, 2004)
  - face-to-face and phone interviews with SMEs' entrepreneurs
  - original survey

Quantitative analysis: Data collection

- Starting from the universe of manufacturing SMEs (10-250 employees) operating in the Veneto region and included in the AIDA Bureau Van Dijk database (5.166 firms) we identified a stratified sample and collected 181 responses.

- Survey through CATI method in the period December 2015 – January 2016, investigating SMEs' innovation activities over the period 2012-2014

  - questionnaire composed of 40 items inquiring firm characteristics; innovation outputs; firm's activities and resources for innovation, external to the firm resources for innovation and public support for innovation.

- Key structural characteristics of the sample:
  - 27% belong to high/ med-high tech industries
  - 48% has 10-19 employees, 36% has 20-49 employees , 17% has more (50-249 employees)

Methods

- Negative binomial regression models for estimating
  - The impact of different types of UIC and innovation performance
  - The moderating effect of the presence of R&D labs on the capacity of firms to gain from UICs

Variables

- Dependent variable (innovation performance)
  - Sum of the declared innovation intensity (0-7) of the four types of innovation (product, process, marketing, organizational); (0-28)
- Independent variables
  - Dummy capturing if firms engaged in cooperation with University (UI_uni)
    - Engaged in formal UICs (form_coll) informal UICs (inform_coll) or both (both_coll)
  - Dummy capturing presence of R&D department (R&D)
  - Dummies capturing the co-presence of UIC and R&D, also considering for type of collaboration
    - engaged in UICs and had a R&D department(YesColl_YesR&D);
    - engaged in UICs and had no a R&D department (YesColl_NoR&D);
    - not engaged in UICs and had a R&D department; (NoColl_YesR&D);
    - not engaged in UICs and had not a R&D department (NoColl_NoR&D)
- Controls
  - Size, industry, age, export intensity, access to public funds

Model estimation

	Model II		Model III		Model IV	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Formal coll	0.0713	(0.151)				
Informal coll	0.372***	(0.136)				
Both_coll	0.548***	(0.203)				
NoColl_YesR&D			0.587***	(0.125)	0.574***	(0.125)
YesColl_NoR&D			0.203	(0.139)		
YesColl_YesR&D			0.773***	(0.124)		
YesForm_NoR&D					-0.0684	(0.151)
YesForm_YesR&D					0.728***	(0.123)
YesInform_NoR&D					0.256	(0.175)
YesInform_YesR&D					0.737***	(0.171)
YesBoth_NoR&D					0.645***	(0.133)
YesBoth_YesR&D					0.853***	(0.248)
Controls	included					
Constant	1.349***	(0.340)	0.797**	(0.363)	0.812**	(0.370)
Observations	179		179		179	
Pseudo R-squared	0.0238		0.0378		0.0394	

Negative Binomial Regression Model. Robust Standard Errors

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- Informal collaborations is related to a higher innovation performance
- UICs are effective only if coupled with an internal R&D effort
- Such a combinatory effect is valid for all types of collaborations
- Hybrid forms of collaborations (formal and informal) could work also in absence of internal R&D structures

Some conclusive remarks

- Research on UICs of SMEs is timely and important, yet requires specific empirical and theoretical lenses
  - *implications for how research on innovation is conducted when SMEs are considered*
- Informal UICs play an important role for increasing the innovation capacity of SMEs and is complementary to formal relationships
  - *implications for measuring the real impact of universities on local systems and on the evaluation of professors' performance*
- A minimum absorptive capacity is required for SMEs in order to profit from UICs
  - *implications for how to build policies effectives for SMEs*