The Role of EU-Funded Research and Innovation Networks in Advancing Knowledge-Intensive Entrepreneurship

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EU-funded research projects as a networking environment for young firms (1)

Several studies have examined the **structural features** of the research collaborative networks funded by the EU FPs (e.g., Breschi and Cusmano, 2004; Barber et al. 2006; Roediger-Schluga and Barber 2008; Protogerou et al. 2010; Protogerou et al. 2012).

Summary of research findings

- EU-funded research activity has **grown considerably** resulting in substantially large networks
- Networks' connectivity is highly **dependent on a core of influential actors** (mainly universities, research centers, and large-sized firms) strengthening their **positioning** and **strategic role** through time.
- **Newcomers** (such as small firms) get **access** to FPs often **through joining projects** led by larger and more reputed organizations. Thus, although basic networks remain stable, they are also able to attract new partners over time.
- The networks analyzed display 'small-world properties' i.e., they may be considered as relatively **efficient mechanisms of knowledge creation and diffusion**.

EU-funded research projects as a networking environment for young firms (2)

Empirical evidence indicates that, in general, there is a **downward trend** in industrial participation in FPs over time (Protogerou et al., 2012), due to **contract conditions** on intellectual property rights, administrative **complexities**, and **bureaucracy**.

The presence of dynamic SMEs is generally limited and only a limited number of them acquire equally important network positions to their larger, well-established counterparts (Protogerou et al., 2013).

Barriers to participation (Faber et al., 2016) may be related to

- the **cognitive distance** between EU research projects and SME practices,
- the social **distance** between SMEs and potential attractive network partners,
- participation **costs**, and
- **complexity and duration** of EU application procedures.

EU-funded research projects as a networking environment for young firms (3)

In general, empirical evidence on the impact of FPs on industrial partners indicates that their **main contribution** lies in the improvement of firms' **scientific** and **technological capabilities** and not directly in their economic performance.

Thus, there is a need this study indicates the **need to capture the economic value of intangible assets** (e.g., innovative and technological capabilities) produced ***through*** FPs which in turn affect firms' economic performance and entrepreneurial outcomes.

Methodology

Extensive desk research to develop a database including information on Greek firms that have been established from 2010 onwards (i.e., **young firms**) and have also participated in at least **one** FP research project (FP7 and Horizon2020).

The database includes information on:

a) firm characteristics, **founding** teams and **employees** (primarily based on firms' websites and LinkedIn combined with in-person communication when required)

b) the FP projects these firms have participated in (based on CORDIS and Innovation Radar)

Social network analysis to describe the **structural characteristics** and study the **network position** and **role** of newly-established firms in FP7 and H2020) and to **investigate the collaboration patterns** developed among them and other network research actors (*ego networks*).

In this way, we are examining the potential of the specific networking environment to allow newly-established

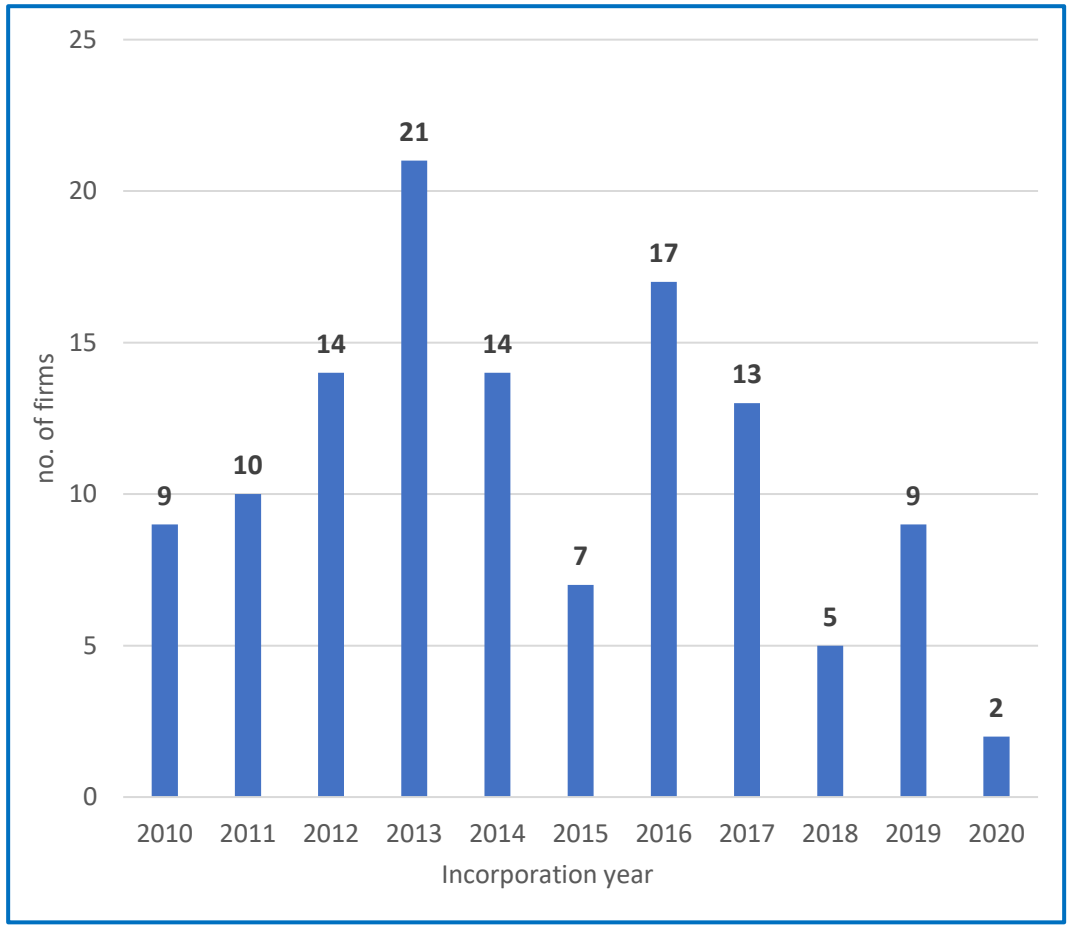
participating firms:

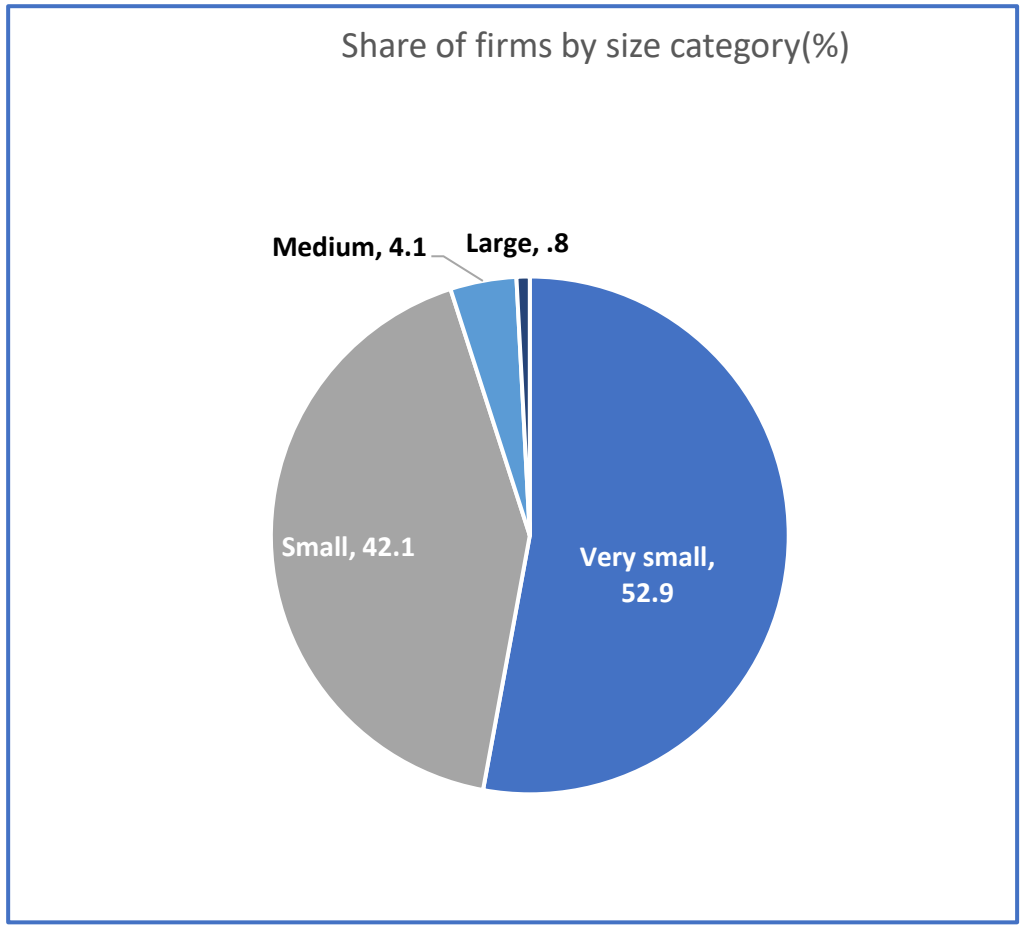
a) to **gain access** to a considerable amount of **resources**

b) to **develop relationships** with actors exhibiting a high degree of diversity

Sample and key findings

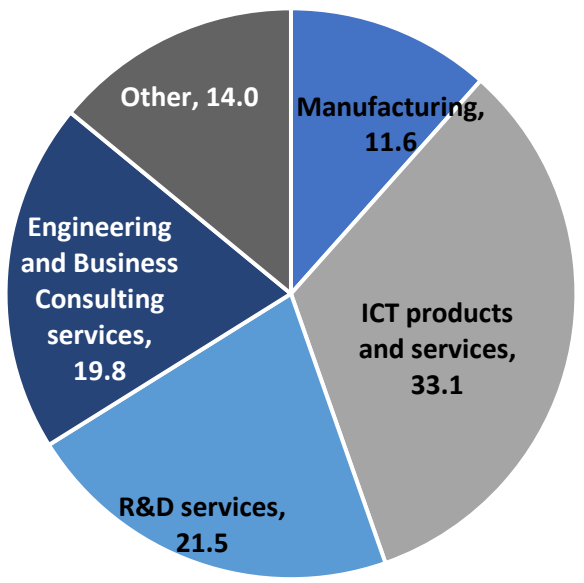
The sample: firms established from 2010 onwards with at least 1 participation in FP7 or H2020→in their majority micro and small firms (N=121)



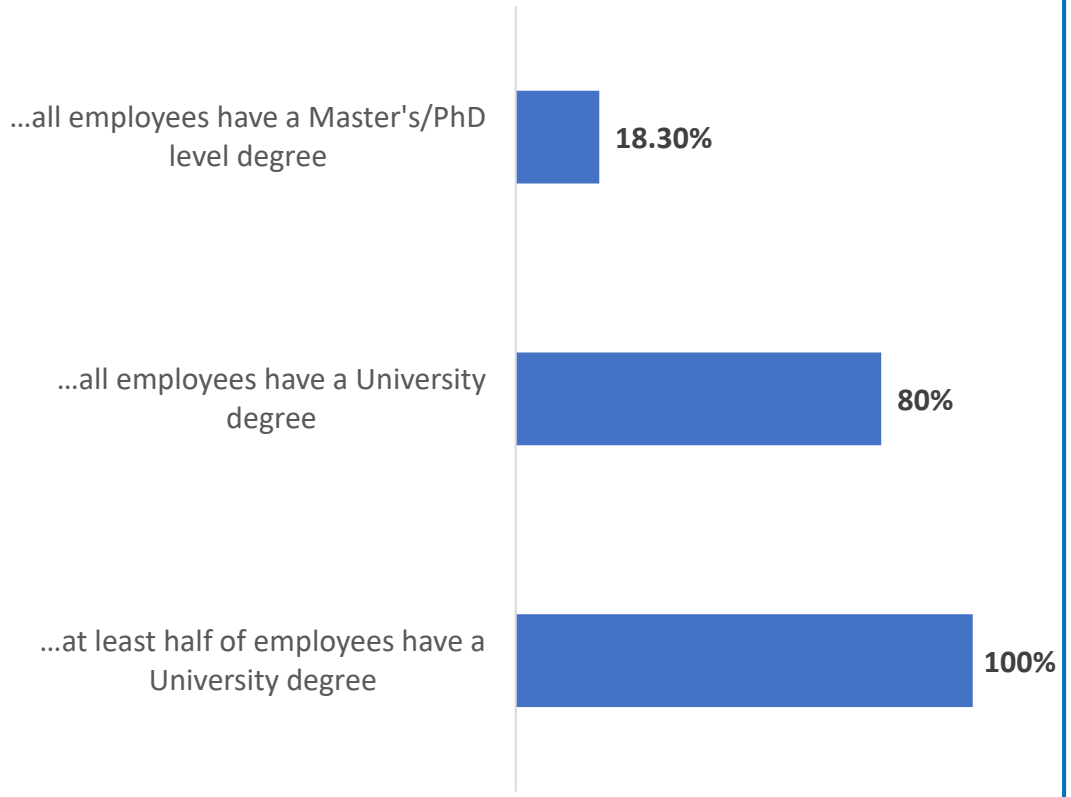


Sample characteristics: primarily knowledge-intensive services (74.4%) with a large share of well-educated employees

N=121 Share of firms by economic activity type (%)



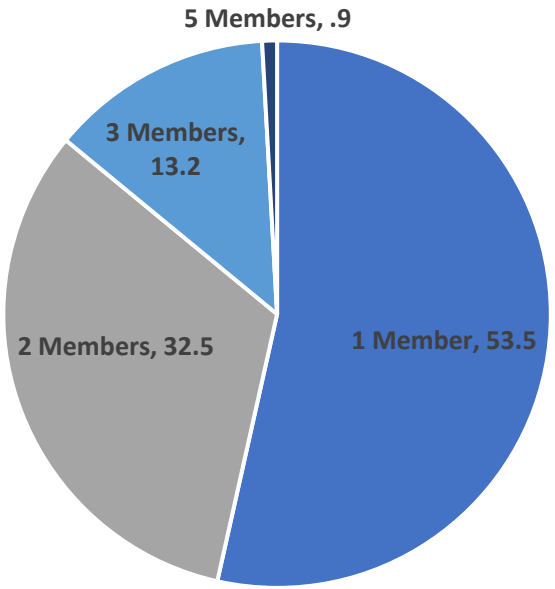
N=120 Share of firms in which...



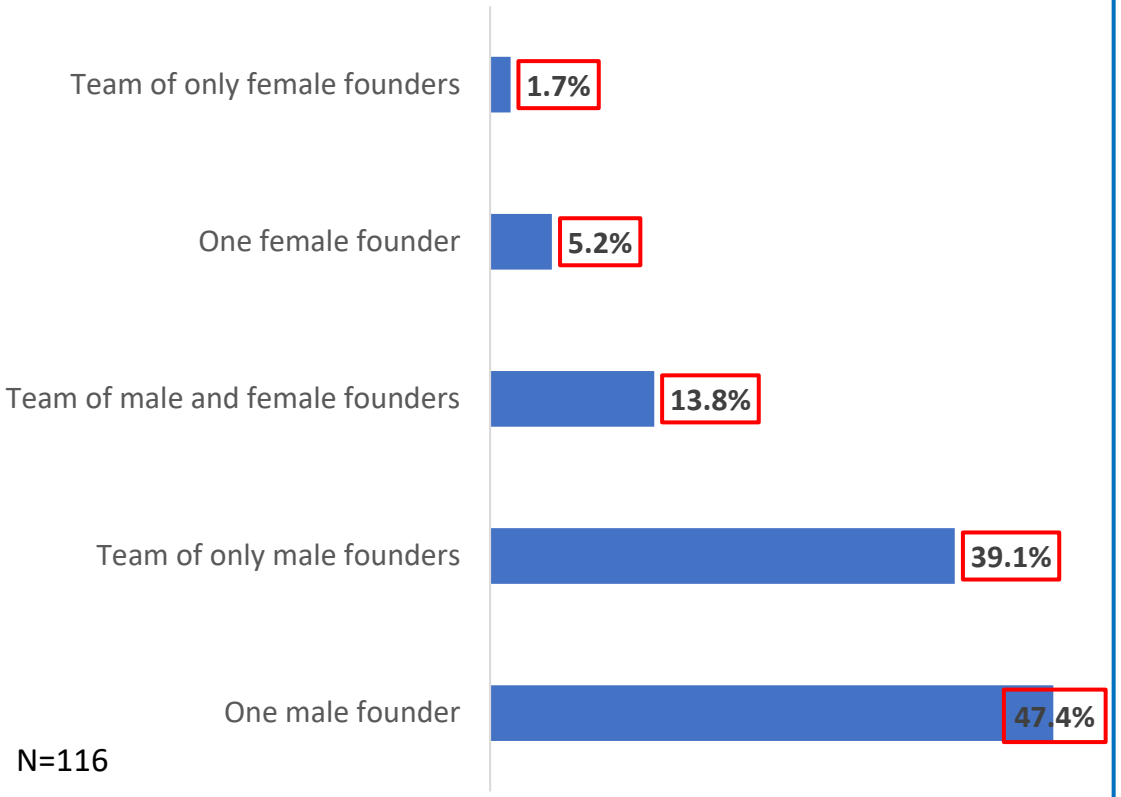
The founding team: small (86% up to 2 members), male-dominated teams

N=121

Share of firms by size of founding team (%)

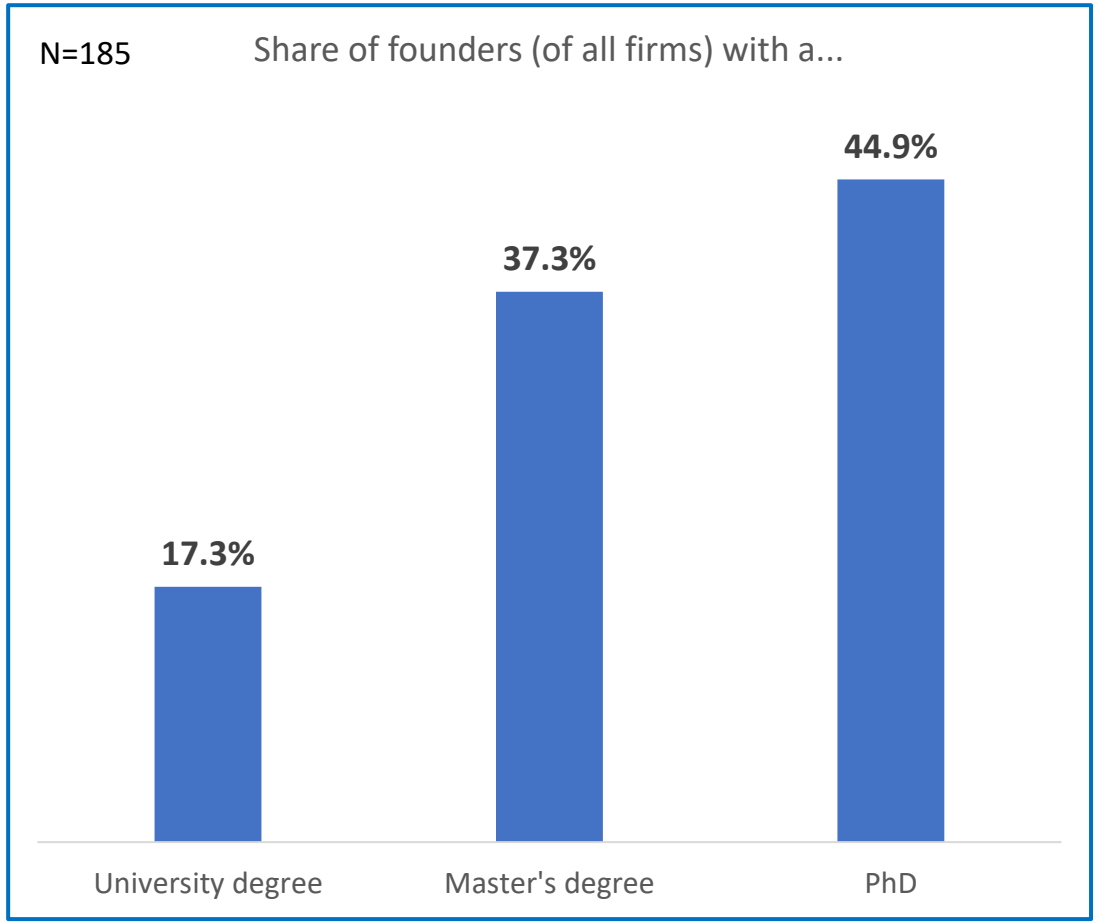


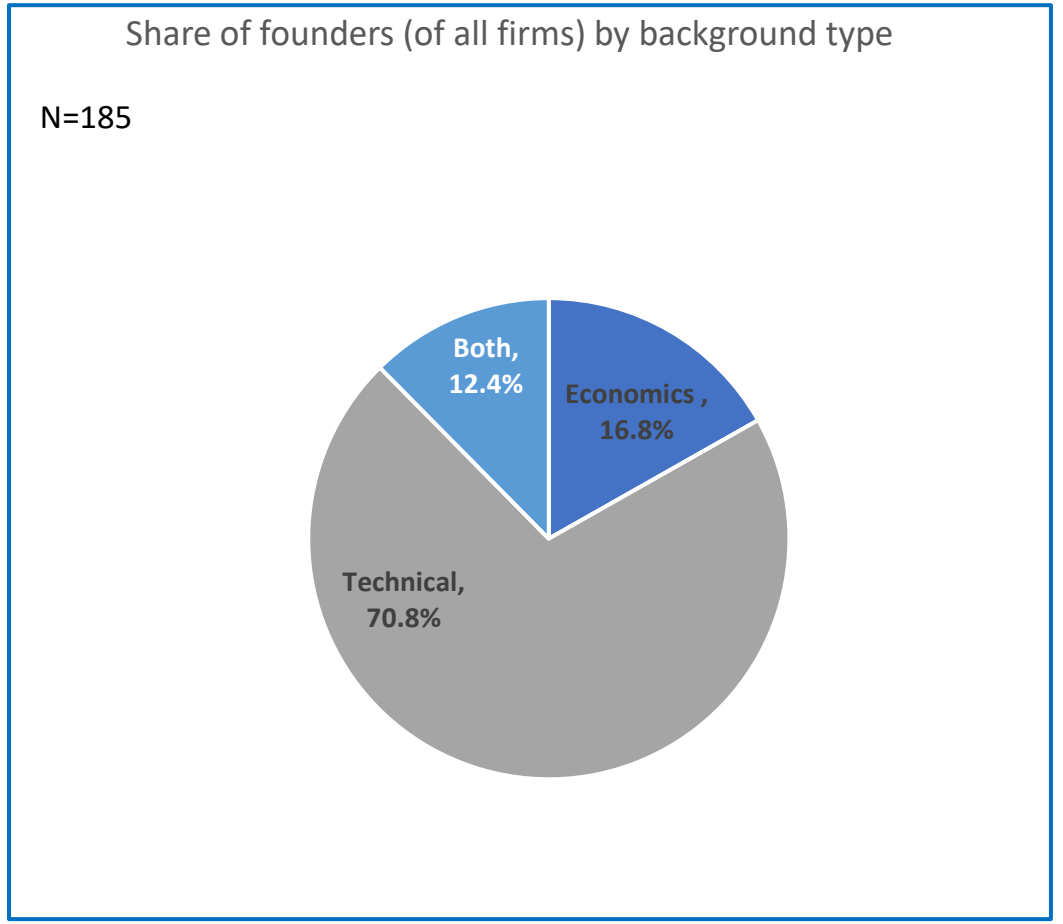
Share of firms by type ans gender of founding team (%)



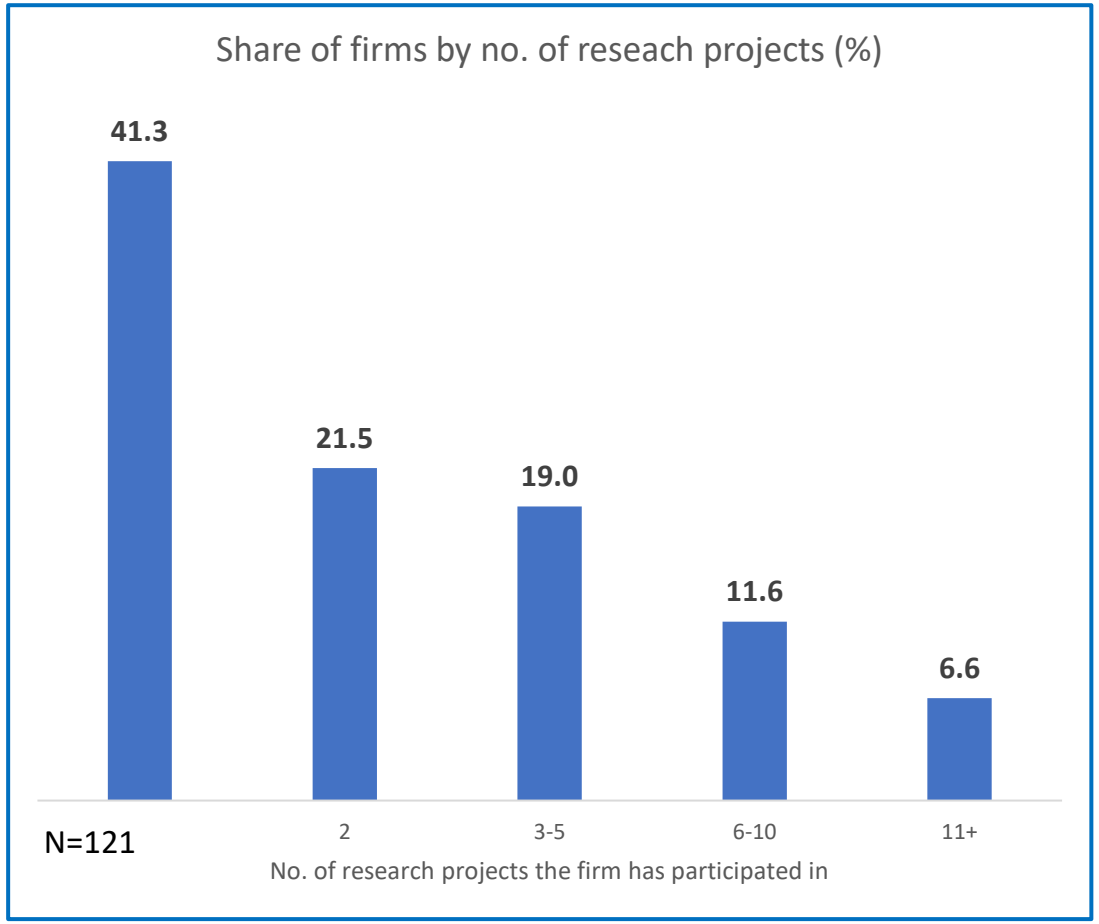
N=116

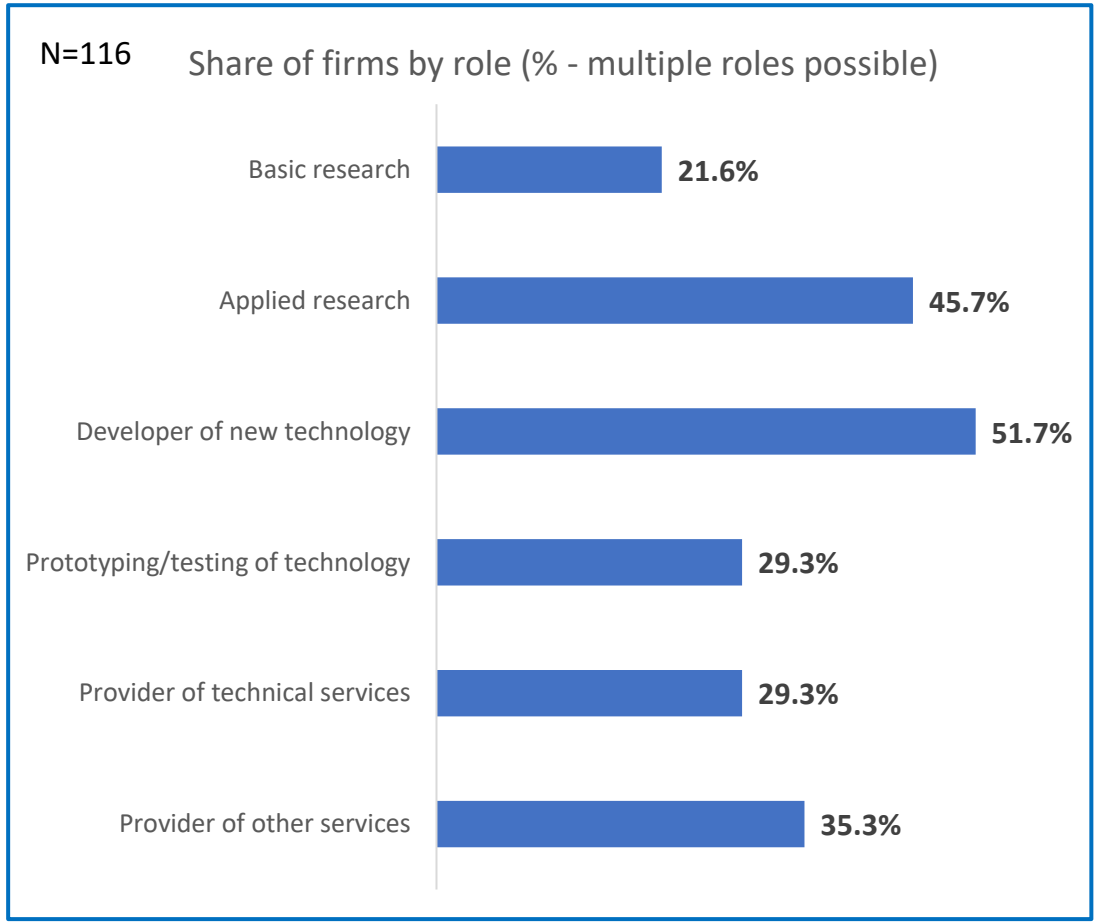
Very well-educated founding teams: all founders have a university degree, and almost 50% are Ph.D. holders, mostly with a technical expertise (71%)





Project participation and role: 63% have participated in just 2 projects, and more than 50% are new technology developers





Determinants of firms' participation in FPs (linear regression models)

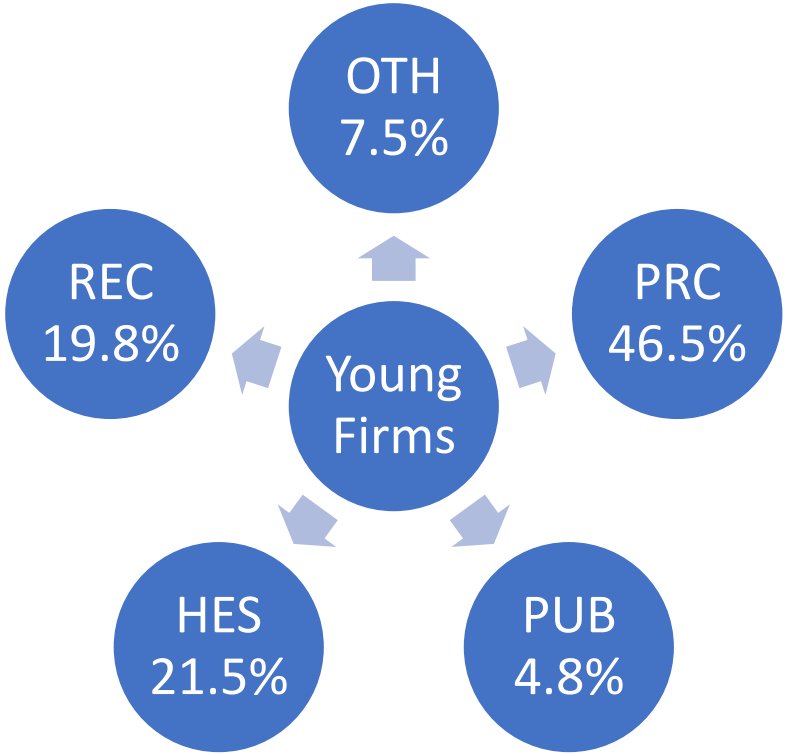
Variable	No of Projects		Ln (Total Funding)	
	Model 1	Model 2	Model 3	Model 4
Control Variables				
Firm's Age	0.133	0.157	0.0522	0.042
No of Employees (ln)	0.401	0.292	0.00449	0.101
Sector_Manufacturing	0.754	0.669	1.018**	0.641
Sector_ICT products & services	0.397	0.367	0.854***	0.601*
Sector_R&D services	-1.232	-1.367	0.761**	0.435
Sector_Engineering & Business Consultant services	-0.063	0.402	0.596*	0.684*
Human Resources				
No of Employees with PhD	**0.480*** **	**0.551*** **	**0.0855** **	**0.0791***
Founding team				
No of Founders	-0.367	-0.372	-0.0706	-0.0697
Combination_Tech&Economy_Background	**1.947** **	**1.797** **	0.294	0.263
Project role				
No of different roles	**1.660*** **		**0.396*** **	
Role_Basic Research		0.606		-0.00542
Role_Applied Research		1.142		**0.579** **
Role_Technology Development		1.308		**0.704*** **
Role_Technology Services Provider		**2.105** **		0.366
Role_Trial Use of Research Results		**2.108** **		0.379
No. of Observations	110	110	104	104
F	11.33	7.07	8.43	7.01
Prob > F	0.000	0.000	0.000	0.000
R^2	0.533	0.510	0.475	0.522
Adjusted R^2	0.486	0.429	0.419	0.449

Network structural characteristics: highly interconnected networks

	FP 7	H2020
Nodes	456	4338
Edges	5467	91941
No. of components[1]	4	3
Size of Giant Component	425	4333
Edges of Giant Component	5342	91937
% of Giant Component	93.2%	99.88%
Density (x100)	5.27	0.977
Global efficiency	0.342	0.387
Clustering coefficient[2]	0.939	0.866
Characteristic path length[2]	2.91	2.71
Diameter[2]	6	5

[1] Excluding components with $size < 2$. [2] Referring to property of the Giant Component

Diversity of young Greek firm's collaborators (H2020)



REC: *research center*, HES: *university*, PRC: *firms*, PUB: *public organizations*, OTH: *other actors*

Most frequent partners

Name	Type	Centrality	Country	Total links
National Technical University of Athens	**HES**	**Top 1%**	**GR**	**76**
Fraunhofer Institute	REC	Top 1%	DE	73
National Centre for Research and Technological Development (EKETA)	**REC**	**Top 1%**	**GR**	**56**
National Research Council	REC	Top 1%	IT	35
Atos Spain Sa	PRC	Top 1%	ES	31
National Centre for Scientific Research - CNRS	REC	Top 1%	FR	30
Aristotle University of Thessaloniki	**HES**	**Top 1%**	**GR**	**28**
Foundation for Research and Technology (ITE)	REC	Top 1%	GR	26
Technology Research Centre	REC	Top 1%	FI	26
National Kapodistrian University of Athens	**HES**	**Top 1%**	**GR**	**24**
Netherlands Organisation for Applied Scientific Research	REC	Peripheral	NL	23
European Atomic Energy Commission	REC	Top 1%	FR	23
Polytechnic University of Milan	HES	Top 1%	IT	23
Atos It Solutions and Services Iberia Sl	PRC	Peripheral	ES	23
Interuniversity Microelectronics Center	REC	Top 1%	BE	22
Polytechnic University of Madrid	HES	Top 1%	ES	21
Fiat Research Centre SCPA	REC	Top 1%	IT	20
University of Patras	**HES**	**Top 1%**	**GR**	**20**
Telefonica Research and Development SA	PRC	Top 1%	ES	19
Netcompany-Intrasoft SA	PRC	Top 1%	LU	18
Agricultural University of Athens	**HES**	**Top 1%**	**GR**	**18**
Polytechnic University of Turin	HES	Top 1%	IT	17
University Of Surrey	HES	Top 1%	UK	17
Engineering - Ingegneria Informatica SPA	PRC	Top 1%	IT	17

Concluding remarks (1)

- Greek young firms participating in FPs are largely k**nowledge-intensive**
- Their presence in FPs is **highly skewed** with a small proportion of them participating in more than 5 projects
- They can assume **multiple project roles** and their participation may be related to their research-intensive orientation.
- Their exact technological specialized knowledge and capabilities can make them **attractive partners** to network incumbents and therefore **facilitate their network entry**.

Concluding remarks (2)

- Employees' human capital (educational background), and heterogenous founding teams (combining technical and managerial/finance background) are important for achieving increased participation in FPs along with multiple project roles, especially those reflecting significant research and technological capabilities.
- Previous participation in FPs, firm size and their project role as technology developers are important drivers of innovation intensity

Concluding remarks (3)

- Greek young firms are embedded in highly interconnected networks, having access to a large amount of technological knowledge and information held by other actors,

- They have the potential to develop relationships and thus exchange technological knowledge and expertise with actors exhibiting a high degree of diversity (in terms of type, sector, and centrality position),

- Often get into the network through their connections with organizations holding very central network positions. Connecting to a prestigious incumbent not only provides superior quality resources but also works as a signal to future collaborations.

Thank you for your time and attention!

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