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SCIENT Student Doctoral Questionnaire

Findings

Analysis of data at 07/10/2015



SCIENT Student Doctoral Questionnaire Summary

The SCIENT project surveyed 1080 PhD STEM students and graduates from across Europe including Italy, Spain, Portugal, Cyprus, Lithuania, the UK and Germany in the summer of 2015.

STEM PhD students show a desire to engage with entrepreneurial activity. Our survey found that 69% of respondents were willing to use their research findings to develop new marketable products and that 59% have considered starting their own business. However, they face barriers to acting on that desire. Gaining access to funding, the costs of patenting, and access to facilities and premises are the three most prominent barriers according to the respondents.

When asked which skills and qualities the respondents needed help to develop six stood out:

- How to go about raising finance
- Determining logistics for manufacture and delivery of product
- Setting prices
- Negotiation of contracts
- Selling of product
- Developing simple and flexible business structures.

Exploring how best to support students in developing their skills made it clear that there is a mismatch between the provision currently offered by Universities and other providers and what students would like to access. Most providers were offering access to bite sized programmes and structured certificated programmes whereas coaching from business expertise and entrepreneurship careers advice was top of the respondents' list. The survey gives providers a strong steer to re-examine their provision so that it focuses on the respondents' top five preferred modes of delivery:

- Coaching from business experts
- Enterprise or entrepreneurship careers services /advice
- Networks and organizations promoting enterprise or entrepreneurship (including clubs and societies)
- Access to pre-accelerators / accelerators / technology hubs / incubators
- Access online courses.

Below a detailed analysis of the online survey findings is provided.



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1.0 Reported Competency on Entrepreneurial Qualities and Skills

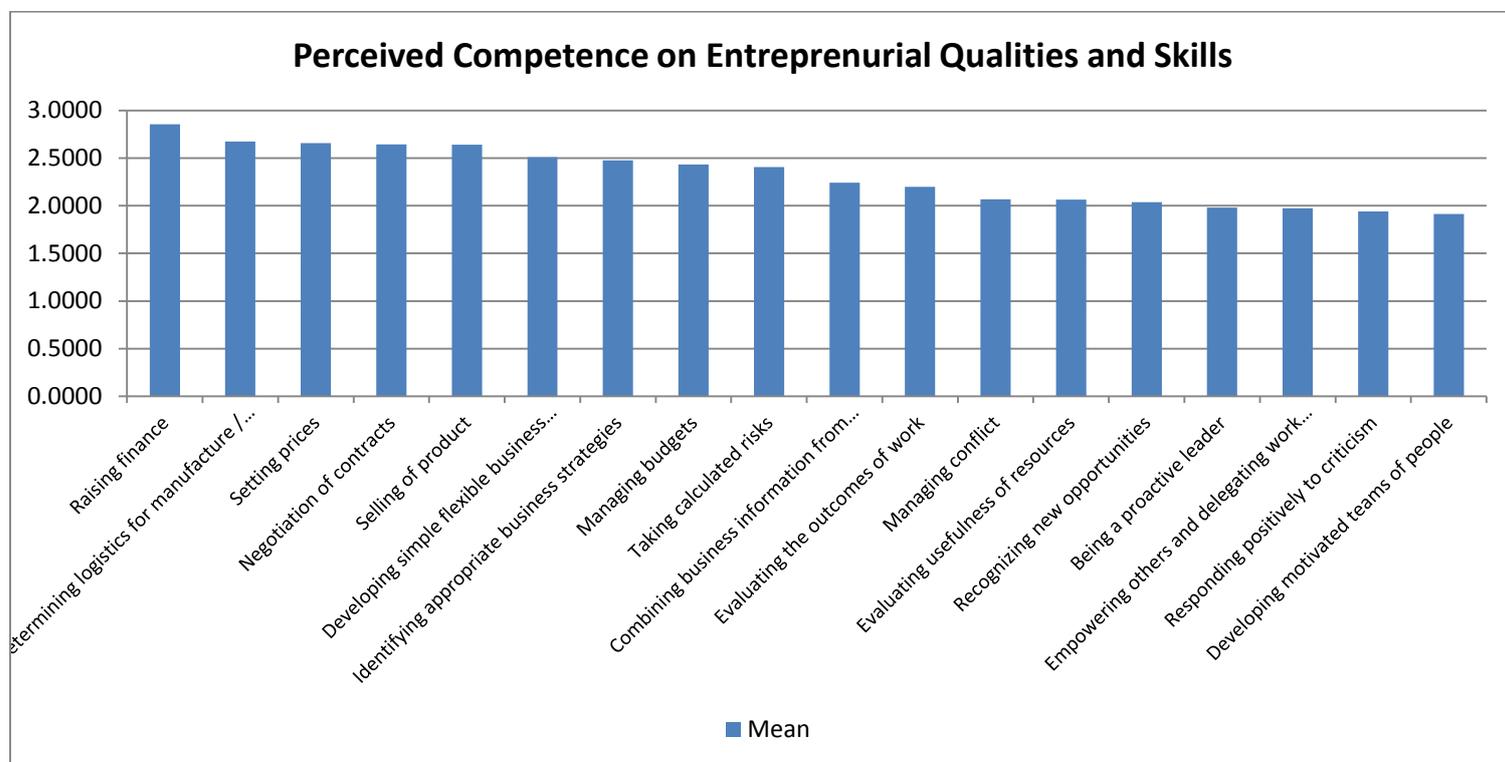


Figure 1: Reported competence on Entrepreneurial Qualities and Skills

Table 1: Reported Competency on Entrepreneurial Qualities and Skills

Qualities and Skills	Mean Competency Score	Std. Deviation	N
Raising finance	2.8562	.85628	765
Determining logistics for manufacture / delivery of product	2.6759	.88905	796
Setting prices	2.6575	.86092	765
Negotiation of contracts	2.6444	.91903	765
Selling of product	2.6418	.89345	765
Developing simple flexible business structures	2.5088	.86798	796
Identifying appropriate business strategies	2.4774	.81232	796
Managing budgets	2.4327	.92223	765
Taking calculated risks	2.4080	.80021	799
Combining business information from different sources	2.2416	.78231	799
Evaluating the outcomes of work	2.1972	.78190	796
Managing conflict	2.0680	.77970	765
Evaluating usefulness of resources	2.0651	.69062	799
Recognizing new opportunities	2.0375	.67989	799
Being a proactive leader	1.9804	.80469	765
Empowering others and delegating work as appropriate	1.9752	.75068	765
Responding positively to criticism	1.9421	.70473	725
Developing motivated teams of people	1.9150	.77382	765



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The results indicate the 6 qualities and skills where respondents on average felt they had limited competence. The respondents mean scores indicate that they feel closer to competent on the remaining skills – but are not highly competent on any of them.

2.0 Delivery Modes

Table 2: Number of responses per mode of delivery

Mode of Training	Offered by institution	Used by Student	Would be used by student
Coaching from business experts	149	130	314
Enterprise or entrepreneurship careers services /advice	177	114	275
Networks and organizations promoting enterprise or entrepreneurship (including clubs and societies)	177	123	272
Access to pre-accelerators / accelerators / technology hubs / incubators	142	101	263
Access online courses	224	212	261
Access to structured certificated programmes	246	153	257
Access to sources of enterprise or entrepreneurship finance (e.g. venture capitalists or business angels)	105	85	250
Access to bite size courses	221	162	231
Enterprise or entrepreneurship competitions	155	104	227

Table 3: Spearman's Rho

	r	p
Offered / used	0.8452	0.00***
Used / Would use	0.05	0.89
Offered / would use	-0.10879	0.78

The results show that 'Coaching from business experts', 'Enterprise or entrepreneurship careers services /advice', and 'Networks and organizations promoting enterprise or entrepreneurship (including clubs and societies)' are the preferred routes to improving entrepreneurship skills from those who responded.

Spearman's Ranked Correlation statistics show that whilst there is a significant association between the number of institutions offering each mode and take up by respondents, that there is a mismatch between the modes offered and the students' preferred modes.



3.0 Barriers to Starting a Business

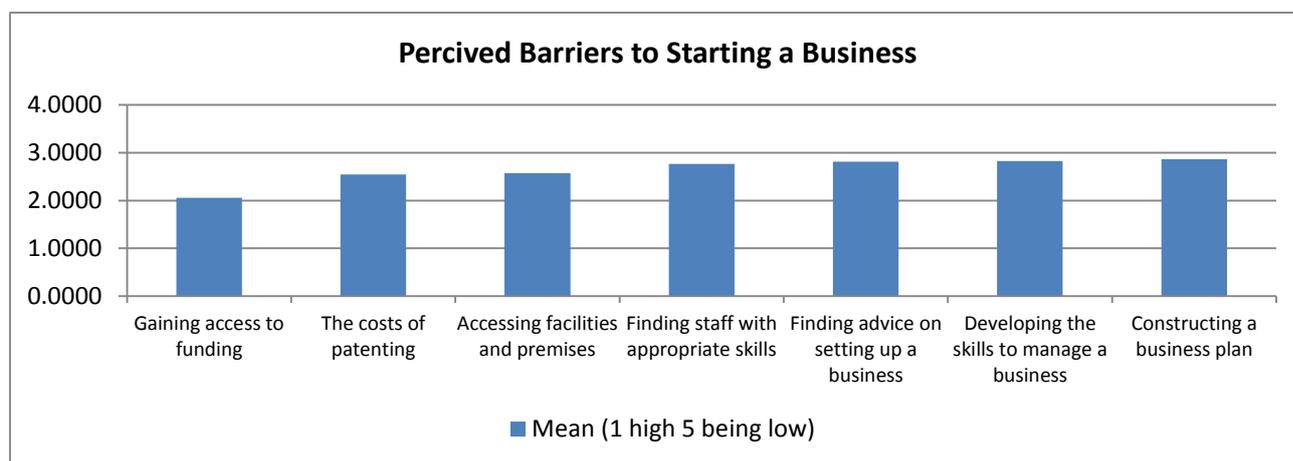


Figure 2: Perceived barriers to starting a business

Table 4: Reported Competency on Entrepreneurial Qualities and Skills

Barrier to starting a Business	Mean (1 high to 5 low)	Std. Deviation	N
Gaining access to funding	2.0545	1.08796	660
The costs of patenting	2.5478	1.17187	648
Accessing facilities and premises	2.5703	1.04586	654
Finding staff with appropriate skills	2.7669	1.14974	652
Finding advice on setting up a business	2.8116	1.12271	653
Developing the skills to manage a business	2.8257	1.12750	654
Constructing a business plan	2.8672	1.18956	655

The results show that ‘Gaining access to funding’, ‘The costs of patenting’, and ‘Accessing facilities and premises’ are perceived to be the most prominent barriers to setting up a business from those who responded. The items ‘Finding advice on setting up a business’, ‘Developing the skills to manage a business’, and ‘Constructing a business plan’ were perceived to be less important barriers, but to be present to some extent.



4.0 Descriptive Statistics

Table 5: Descriptive Statistics

Variable	Category	Percentage
Gender	Female	50.1
	Male	49.9
Age*	18 to 24	19.1
	25 to 34	49.3
	35 to 44	21.0
	45 to 54	8.4
	55 to 64	1.9
	65 to 74	0.2
Country of Study**	Italy	26.2
	Spain	21.8
	Portugal	15.3
	Cyprus	10.5
	Lithuania	10.0
	Other EU country	5.4
	UK	4.7
	Germany	3.1
	Other non-EU country	1.6
	Romania	1.5
Subject of study	Social Sciences, Economics and Law	33.2
	Engineering and Architecture	20.9
	Biological / Biomedical sciences	13.4
	Physical and Natural sciences	9.9
	Computer and Information sciences	7.1
	Science of Humanities, Arts and Education	6.2
	Management, Administration, Business and Commerce	6.1
	Agricultural sciences	3.1
Willing to use research findings to develop new marketable products?	Yes	68.8
	No	31.2
Has been in full time employment before doctoral study?	Yes	53.5
	No	46.5
Has considered starting own business?	Yes	58.5
	No	41.5
Members of family have experience of running their own business?***	Yes	47.2
	Not sure	6.8
	No	46.0

*Later in analysis three categories are conflated to provide a category 45+

**Later other 'Non EU country' is dropped from analysis

***Later in analysis 'Not sure' category is dropped from analysis



5.0 Willingness to share research findings

Table 6: Chi Square Willing to use research findings to Variables

Variables	<i>df</i>	<i>n</i>	χ^2	<i>P</i>
Gender	1	817	7.808	.005
Age	3	820	1.768	.622
Country of Study	8	843	33.120	.000
Subject of study	7	867	46.610	.000
Previous full-time employment	1	830	.359	.549
Considered starting own business	1	829	30.939	.000
Family members with experience of running business	1	763	8.640	.003

The results show that the following groups were more likely than expected to be willing to use their research findings to develop marketable products:

- Males
- Those from Cyprus, Germany and Lithuania
- Those studying Engineering and Architecture, Computer and information sciences, and Agricultural sciences
- Those who had family members with experience of running their own business



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6.0 Considered starting own business

Table 7: Chi Square considered starting own business to Variables

Variables	<i>df</i>	<i>n</i>	χ^2	<i>P</i>
Gender	1	782	4.368	.037
Age	3	783	5.542	.136
Country of Study	8	806	43.640	.000
Subject of study	7	829	34.285	.000
Previous full-time employment	1	829	16.475	.000
Family members with experience of running business	1	764	21.505	.000

The results show that the following groups were more likely than expected to considered having started their own business:

- Males
- Those from Lithuania and other EU countries
- Those studying Engineering and Architecture, Social sciences, and Management
- Those who had previously held full-time employment
- Those who had family members with experience of running



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7.0 Impact of Demographic Factors on Reported Competence

7.1 Gender

Female respondents reported significantly ($P < .05$) less competence on the following qualities and skills:

- Taking calculated risks
- Developing simple flexible business structures
- Determining logistics for manufacture / delivery of product
- Evaluating outcomes of work
- Managing budgets

7.2 Age

Older respondents reported significantly ($P < .05$) more competence on 15 of the 19 qualities and skills:

- Recognizing new opportunities
- Combining business information from different sources
- Taking calculated risks
- Identifying appropriate business strategies
- Determining logistics for manufacture / delivery of product
- Developing simple flexible business structures
- Evaluating the outcomes of work
- Selling of product
- Negotiation of contracts
- Raising finance
- Managing budgets
- Setting prices
- Being a proactive leader
- Empowering others and delegating work as appropriate
- Responding positively to criticism

7.3 Country of study

Respondents studying in different countries reported significantly ($P < .05$) different perceived levels of competence across all but 2 qualities and skills. Although with some



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variations across the skills, respondents from Italy and Lithuania reported less competence on the qualities and skills, whilst those from Portugal, Spain and Cyprus indicated more competence. This suggests that students from these Italy and Lithuania are indicating they need more support than those from other countries.

7.4 Subject Area

Respondents from different subject areas reported significantly ($P < .05$) different perceived levels of competence across all but 3 qualities and skills. These differences were not consistent, with respondents from different subjects showing different perceived levels of competence depending on the qualities and skills.

However, there are patterns with Biological / Biomedical sciences students showing less competence than would be expected over 15 qualities and skills, Computer and Information sciences 12, Physical and Natural sciences 10 and Engineering and Architecture 9.

This indicates that students from these subject groups may need more development than others in the qualities and skills examined.

7.5 Willing to utilise research findings

Respondents who were willing to utilise research findings to develop marketable products reported significantly ($P < .05$) more competence on 9 of the 19 qualities and skills:

- Recognizing new opportunities
- Combining business information from different sources
- Identifying appropriate business strategies
- Developing simple flexible business structures
- Determining logistics for manufacture / delivery of product
- Selling of product
- Raising finance
- Managing budgets
- Setting prices

7.6 Previous full-time employment

Respondents who had previously undertaken full time employment reported significantly ($P < .05$) more competence on 12 of the 19 qualities and skills:



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Combining business information from different sources

- Identifying appropriate business strategies
- Developing simple flexible business structures
- Determining logistics for manufacture / delivery of product
- Evaluating the outcomes of work
- Selling of product
- Negotiation of contracts
- Raising finance
- Managing budgets
- Setting prices
- Developing motivated teams of people
- Being a proactive leader
- Empowering others and delegating work as appropriate

7.7 Considered starting own business

Respondents who had considered starting their own business reported significantly ($P < .05$) more competence on all **bar 2** of the qualities and skills:

- Evaluating usefulness of resources
- Taking calculated risks

7.8 Family members running own business

Respondents who had family members running their own business reported significantly ($P < .05$) more competence on all **bar 6** of the qualities and skills:

- Evaluating usefulness of resources
- Taking calculated risks
- Managing budgets
- Managing conflict
- Responding positively to criticism
- Managing stress and obtaining balance



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8.0 Impact of Demographic Factors on Perceived Barriers to Starting Own Business

8.1 Gender

Gender did not show any significant associations with the items.

8.2 Age

Whilst some associations were significant there was no clear or consistent impact of becoming older on what was viewed as a barrier to starting a business.

8.3 Country of study

Only 'Accessing facilities and premises' showed a significant association with respondents' country of study. Respondents from Cyprus and Italy were more likely and Lithuania and the UK less likely to see this as a significant barrier.

8.4 Subject Area

Only 'Constructing and business plan' showed a significant association with respondents' subject area of study. Respondents who studied Computer and Information sciences and Engineering and Architecture saw this to be a more of a barrier than others.

8.5 Willing to use research findings

Respondents being willing to use research findings to generate marketable products did not show any significant associations with the items.



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8.6 Previous full-time employment

Respondents who had previously undertaken full time employment reported that they saw 'Constructing a business plan' and 'Developing the skills to run a business' as significantly more of a barrier to starting a business than others.

8.7 Considered starting own business

Respondents who had considered starting their own business reported that they saw 'Constructing a business plan' as significantly more of a barrier to starting a business than others.

8.8 Family members running own business

Having family members who had run their own business did not show any significant associations with the items.