THE EMPLOYMENT OUTCOMES OF DOCTORAL DEGREE HOLDERS FROM UNIVERSITIES IN CATALONIA

Study commissioned by the social councils (boards of trustees) of the seven public universities in Catalonia, and the Open University of Catalonia/UOC

AQU Agència per a la Qualitat del Sistema Universitari de Catalunya

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Universitat de Barcelona · Universitat Politècnica de Catalunya BarcelonaTech · UAB Universitat Autònoma de Barcelona · Universitat Pompeu Fabra Barcelona · Universitat de Girona · Universitat de Lleida · Universitat Rovira i Virgili · UOC Universitat Oberta de Catalunya

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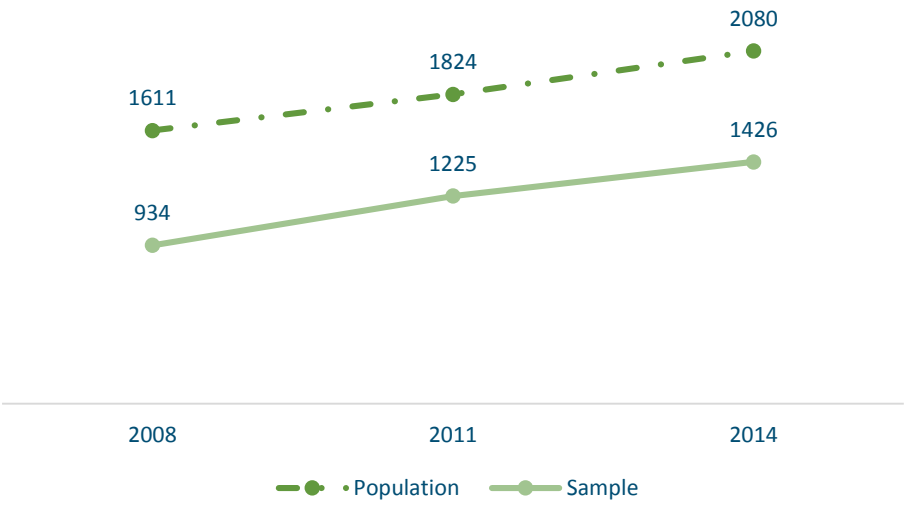
1. INTRODUCTION

1.1. Background

Studies coordinated by AQU Catalunya[1] on the employment outcomes of graduates from Catalan universities are a consequence of the universities' interest, expressed by their social councils (boards of trustees), to obtain data, together with benchmarks, for the quality of the employment outcomes of their graduates.

Studies on the employment outcomes of holders of doctoral degrees (hereinafter doctorate holders) in the university system in Catalonia have been carried out once every three years since 2008, the 2014 study being the third edition (the two previous ones were carried out in 2008 and 2011). Figure 1.1.1 shows the change in the population and sample in each of the three studies.

Figure 1.1.1. Trend in the population and sample of doctorate holders over the three studies



[1] The following universities, together with AQU Catalunya, carried out the first joint employment outcomes study (referred to as labour market outcomes) in 2001: Universitat de Barcelona (UB), Universitat Autònoma de Barcelona (UAB), Universitat Politècnica de Catalunya (UPC), Universitat Pompeu Fabra (UPF), Universitat de Girona (UdG), Universitat de Lleida (UdL), Universitat Rovira i Virgili (URV). The reference population was the cohort that graduated in the 1997-1998 academic year.

Foreign doctorate holders were also included in the 2014 survey and were interviewed online. Although it is impossible to come to any significant conclusions due to the low response rate, an analysis of the profile of foreign students according to country of origin, field of studies, university where they studied, etc. is possible from the database that was set up.

The third edition in this series of studies places the Catalan university system among the few university systems that systematically keep track of doctorate holders[2]. As such, it represents a excellent opportunity for a realistic analysis to be made of the employment outputs of doctorate holders in the university system as a whole, so that relevant actions and policies can be designed to address the needs that have been identified.

1.2. Rationale for the survey

Modern-day doctoral studies began during the nineteenth century in Germany and consisted of the carrying out of original research and defense of the results in the form of a dissertation or thesis before a panel of expert examiners. This model spread quickly around the world, and today it continues to be the highest level of qualification recognised in formal education.

One might think that in the knowledge society, where the ability to adapt, innovate and solve problems have been referred to as essential, this type of professional would be more highly valued. Be that as it may, doctoral studies have been criticised for being too focused on scholarly research, for not encouraging interdisciplinarity and for underestimating the basic skills required for employment in an online world. Doctorate holders need to be trained so they can enter the productive sector (industry) and thereby bolster research and development capability. Different frameworks, ranging from the Irish Universities Association (2008), Vitae (2010), LERU (2010), and The Group of Eight (2013), have all pointed to the need to include a broader range of skills, such as team-working, networking, project and time management in research, ethics, etc.

So if the place of work of doctorate holders is not just limited to academia (universities and research facilities), where are they? What are their duties, roles and responsibilities? How effective is doctoral training, and what is its level of quality? Is it true that doctorate holders only find work abroad? What conditions lead them to leave?

This study on the employment outcomes of doctorate holders addresses these and other issues. The survey takes in information on not just their job situation, but also their satisfaction with their doctoral studies and training and an assessment of doctorate-level job skills acquisition, broadly understood as being those skills they will require as professionals carrying out research in both academic and non-academic contexts.

[2] The report by Auriol et al (2013) is the most recent compilation of data on this group (it is based on data from 2013). The report states that, in most countries, information on the employment outcomes of doctoral degree holders is limited to the data given in the Labour Force Survey, although there is a group of countries, including the US, where there are established surveys for analysing the professional employment outcomes for this group of people. Vitae, in the UK (https://www.vitae.ac.uk), has two studies, one that is quantitative (Mellors et al 2013), and one qualitative (Hooley i Videler, 2009), on the employment outcomes of doctoral degree holders (doctoral graduates in the 2006-2007 academic year, with the data gathered in 2010).

Economic context is clearly a determining factor as far as entry to the labour market is concerned. In addition to the economic and financial crisis and that of the building and construction sector, there has also been the squeeze on spending in the public sector that began in 2010 as a consequence of the swollen public debt crisis and the euro crisis (Fundación CYD, 2012). This report provides a framework for grasping the ways in which the "new rules of the game" may affect doctorate holders.

1.3. International scenario

Concerns about the employability of doctorate holders

The expansion of systems of higher education in developed countries has undoubtedly led to the highest form of academic certification (doctorate) no longer being something for the few. The production of doctorate degrees has increased considerably: according to data from a recent study by the Organisation for Economic Cooperation and Development (OECD)[3], in 2009 around 213,000 new doctoral degrees were awarded across the OECD, a 38% increase compared to 154,000 in 2000. Nearly 1.5 per cent of individuals in a comparable age cohort received a doctoral degree, a figure that was as high as 3.4% in Switzerland and 3% in Sweden, whereas in Spain it was 1%. The increasing presence of women in doctoral programmes partly explains the overall increase in doctorates over the past decade.

While the destination of doctorate holders has customarily and almost exclusively been that of feeding back into the university system itself and its collateral infrastructure for research, the production requirements of a knowledge society have altered the panorama of the professional destinations of doctorate holders. This has led to the development of numerous initiatives to establish the career pathways of doctorate holders and bring about the re-orientation of educational approaches to doctoral study[4].

The problem of the comparability of studies

There is a strong case for international benchmarks for the employment outcomes of doctorate holders to be used in studies like the one being presented here, especially so because of the high level of internationalisation of doctoral studies in both training and employment outcomes. A series of technical problems however weakens the possibilities of comparability.

[3] The report by Auriol et al (2013) presents an analysis of the labour market and mobility indicators generated by the second large-scale data collection on Careers of Doctorate Holders (CDH), a joint project by the OECD, UNESCO Institute for Statistics and Eurostat.

[4] In the UK: the two studies by Mellors et al (2013), and Hooley and Videler (2009) were produced on the basis of the series 'What do researchers do?' by Vitae®. Vitae is an organisation supported by the Research Councils UK (RCUK) that is managed by The Career Development Organisation and receives cooperation from hubs hosted by regional universities. In Australia: The Group of Eight (2013). In France: Calmand and Recotillet (2013)

As pointed out in the OECD study, "unfortunately, evidence is limited and sparse owing, for example, to the fact that standard statistical sources are typically far too small to produce statistically robust results for this population".

The study also recognises the special difficulty of categorising the employment situation of doctorate holders: "unfortunately, it proves extremely difficult to measure the 'post-doc' phenomenon. The diversity of contracts both across institutions and across countries, under which post-docs are administered, makes it impossible to come up with a definition that can be operational in a statistical survey".

There are different independent studies that have analysed the employment situation of doctorate holders, especially in the UK and France. Insight into the experiences of doctorate holders in these countries is clearly of great interest; due to either the time lapse between graduation and the analysis at the time of gaining employment, or because of the work setting and type of monitoring, however, it is difficult to make a comparison with the results obtained on the university system in Catalonia.[5]

Care therefore needs to be taken when comparing evidence on doctorate holders from the international scenario with the results for the employment outcomes of doctorate holders from Catalan universities. The data provided below are intended to help contextualise the internationalisation of doctoral studies that, as the top level of academic qualification, are becoming increasingly globalised.

[5] Data from the UK sample: In 20004/5, there were 15,780 doctoral degree holders who graduated from higher education institutions in the UK. Out of these, 5,587 took part in the DLHE survey (the Destinations of Leavers from Higher Education survey, or DLHE, is a statistical survey of UK and EU domiciled graduates from all higher education programmes in the UK, the aim of which is to establish the type of employment or further study they were engaged in 6 months after graduation). In 2010 this sample was contacted to take part in the Longitudinal DLHE survey, which was a follow-up survey based on the sample that allowed for a more targeted analysis of doctoral degree holders. A total of 2,501 people replied to the second survey, which gave a response rate of 45%. The final database for the **analyses included 2,073 doctoral graduates.**

In the case of France, Céreq periodically carries out a survey of employment outcomes for all levels of education. The sixth survey was presented in March 2014. The results for higher education can be consulted under ***L'insertion des sortants de l'enseignement superior.***

(www.cereq.fr/index.php/sous-themes/Insertion-professionnelle-et-carrieres/L-insertion-des-sortants-de-l-enseignement-superieur). The indicators are available at: www.enseignementsup-recherche.gouv.fr

a) The following should be taken into consideration with regard to the OECD study:

b) The data were collected in 2010 refer to the situation of doctoral degree holders on 1 December 2009

c) The UK, France, Italy, Australia, Austria and Canada did not participate in the study.

d) For the US, doctoral degree holders in the Humanities were not included.

e) The data for Belgium, Germany, Netherlands and Spain refer to graduation since 1990. For the remaining countries, there was no límit to the year of graduation.

f) For Spain, there is a limited coverage of doctoral degree holders for the period from 2007-2009 (the ones that can be best compared with the data for this study). All together, the sample for Spain was 6,000 people, with a response rate of 69%. The interviews were carried out online, in writing and interview. The sample was stratified according to region and age, although it does not appear in the OECD study.

Characteristics in other employment outcome settings

OECD results

- There has been a steady increase in the number of doctoral degrees being awarded across the OECD, and the available evidence points to a sustained labour market premium of doctorate holders relative to other highly qualified individuals.
- The higher education sector is the main sector of employment for doctorates, although demand for doctorates is also apparent across other sectors of the economy. The take-up of jobs outside higher education is often, but not necessarily, related to the take-up of non-research occupations.
- Doctorate holders in Experimental Sciences and Engineering and Architecture are more likely to be engaged in research, while social scientists find more opportunities in non-research occupations.
- International mobility is a widespread and increasingly important phenomenon, although less common than it might be assumed for researchers.

Results in the UK

- Three-and-a-half years after graduation (see note 6) 92% of doctorate holders were working and 2% were unemployed.
- 70% had a permanent or open-ended job contract.
- 80% had stayed in the UK.
- 59% were working in either higher education or other levels of education and research, 11% in the financial sector (24% in Physics and Engineering, compared to 10% in Social Sciences), and 8% in manufacturing industries.

Results in France:

- In 2010 the unemployment rate for the 2007 cohort was 10%.[6]
- 67% had a permanent or open-ended job contract.
- 70% of doctorate holders stated they would like to work in the public research and academic sector. Although this indicator was not available, it has been added here because it is indicative of a very different context to that in the UK and points to the strength of public sector research in France.
- There were few doctorate holders in private research. In 2009 20% of doctorate holders were researchers in private enterprise.
- The majority of doctorate holders had the most skilled occupations in the labour market (91%), and 8% were in intermediate occupations.

[6] Céreq does not consider people on internships to be professionally employed, meaning that the unemployment rate was consequently higher.

1.4. Results

Results of the study on the employment outcomes of doctorate holders from Catalan universities

In order to be able to compare the employment outcomes of doctorate holders from Catalan universities with the findings of the analyses by the OECD, the UK and France, several of the main results obtained from the data for 2014 are given below:

- As shown by the data from the labour force survey (EPA) for Spain as a whole and the data from the employment outcomes survey for AQU Catalunya, doctorate holders are at an advantage in the different indicators of the labour market compared to people with a lower level of education.
- The data corresponding to 2014 show that 93% of doctorate holders from different Catalan universities were employed and 5% were unemployed.
- 88% of doctorate holders had a full-time contract, although only 46% had a permanent or open-ended contract.
- 60% of doctorate holders were working in higher education and research facilities, which means that 40% were in enterprises. 28% of these had duties and responsibilities in research, and 26% had managerial responsibilities, meaning that the majority of those in the private sector were not employed in research.
- According to the discipline, 68% of those in Experimental Sciences and 64% in Engineering were researchers compared to 57% in the Social Sciences.
- The study shows that 14% of doctorate holders were working abroad, a percentage that has increased over time, although it is still far from being widespread.
- With regard to the sector of economic activity, 69% of doctorate holders from Catalan universities were working in education and research. The financial sector employed 10% of doctorate holders in the UK, whereas it accounted for less than 0.5% of doctorate holders from Catalan universities. 5% were employed in manufacturing industries.
- 95% of doctorate holders from Catalan universities accounted for the most highly skilled occupations in the labour market (corresponding to categories 1 and 2 of the Spanish Classification of Occupations, CNO).[7]

Trends in the main indicators on employment outcomes (2008-2014)

The results show that doctorate graduates' satisfaction with their doctoral studies remained stable, together with their rating of the skills they had acquired. Conversely, there was a sharp drop in the employment outcomes of doctorate holders in just three years (2011-2014), not so much in terms of the employment rate, but the quality of employment, job stability, earnings and job satisfaction. The work of the universities therefore continues to be good, but the capacity of the national market to assimilate professionals at doctoral level has declined sharply.

[7] http://www.ine.es/jaxi/menu.do?type=pcaxis&path=/t40/cno11&file=inebase

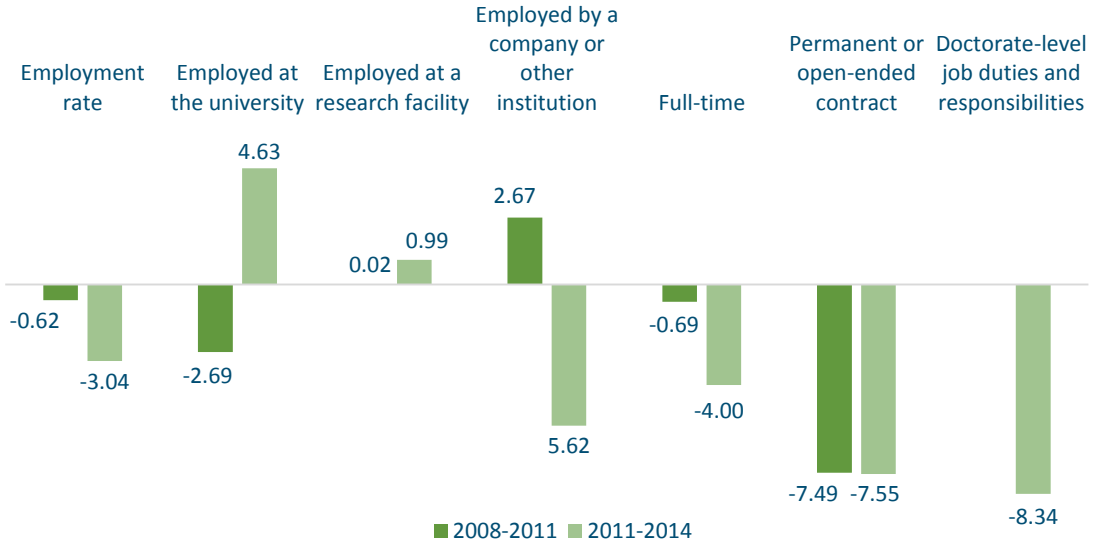
The data also show that two-thirds of doctorate holders were pursuing academic careers, although there were differences according to sector during the period examined. In particular, in the initial stage of the crisis (2008-2011), the relative importance of the universities as employers of doctorate holders decreased by 3%, whereas for private enterprise and industry it increased. On the other hand, the scenario was totally different in the second stage of the crisis (2011-2014) with the universities experiencing an increase in their importance as employers of new doctorate holders, to the detriment of private enterprise and industry. In spite of the cut-backs in the public sector, it appears that the universities continued to recruit new doctorate holders but, as shown throughout this report, with less stable contracts and a higher mismatch. In addition, the initial period of economic crisis mostly affected enterprises needing unskilled labour, whereas over the last few years innovative enterprises seem to have been more affected, as they were relatively less important as regards the recruitment of doctorate holders.

Bearing in mind that 40% of doctorate holders work outside of the academic world and the universities, it would appear that it is essential to strengthen the ties between doctoral training and the business and corporate world in order to improve the match between training and employment. An international trend is also evident, with evidence of new approaches to the training of doctoral students, in particular the creation of professional doctoral studies, mainly in the health sector, education and industry (industrial doctorates).

Table 1.3.1. Trend in the main indicators on the employment outcomes of doctorate holders

Indicator	2008	2011	2014
Employment rate	96.79%	96.16%	93.13%
Unemployment rate	2.46%	1.80%	4.91%
Public sector	69.04%	65.16%	64.53%
Employed at the university	38.19%	35.50%	40.13%
Employed at a research facility	18.88%	18.90%	19.89%
Employed by a company or other institution	42.93%	45.60%	39.99%
Full-time	92.88%	92.19%	88.20%
Permanent or open-ended contract	60.73%	53.25%	45.70%
Temporary contract	31.50%	36.24%	39.14%
Doctorate-level job duties and responsibilities		67.79%	59.45%

Figure 1.3.1. Variations in the main indicators on the employment outcomes of doctorate holders



2. POPULATION AND SAMPLE

The study examines the employment outcomes of 1,426 people, out of a total of 2,080 who were awarded a doctorate in 2009 and 2010, which accounted for 69% of the total, with a sampling error of 1.5%.

In addition to the seven public universities, the Open University of Catalonia (Universitat Oberta de Catalunya, UOC) also participated for the first time in the study.

2.1. Sampling distribution according to university

In 2014 1,426 doctorate holders were interviewed, which accounted for 68.6% of the total number of doctorate holders in 2009 and 2010 in Catalonia. The overall sampling error of the study was 1.49%.

As can be seen from table 2.1.1, the Universitat de Barcelona/UB produced 36% of doctorate holders, followed by the Universitat Autònoma de Barcelona/UAB with 32% and the Universitat Politècnica de Catalunya/UPC/BarcelonaTech with 14%. Each of the other universities mainly produced between 3-5% of doctorate holders. The Open University of Catalonia/UOC, which participated for the first time in the study, has so far only made a very small contribution to the training of doctorate students.

Compared to the data for 2008 and 2011, it can be seen that both the population and the sample increased. In particular, the samples taken in 2008 and 2011 corresponded to 934 and 1,225 observations respectively. On the other hand, the overall sampling error decreased over this period, whereas there was an increase in the response rate.

Table 2.1.1. Population and sample according to university

University	Population	Population /total	Sample	Sample /total	Response	Sampling error
2014						
Universitat de Barcelona	742	35.67%	488	34.22 %	65.8%	2.65%
Universitat Autònoma de Barcelona	669	32.16%	462	32.40 %	69.1%	2.59%
Universitat Politècnica de Catalunya	285	13.70%	198	13.88 %	69.5%	3.93%
Universitat Pompeu Fabra	104	5.00%	74	5.19%	71.2%	6.27%
Universitat de Girona	93	4.47%	71	4.98%	76.3%	5.80%
Universitat de Lleida	61	2.93%	44	3.09%	72.1%	8.02%
Universitat Rovira i Virgili	113	5.43%	77	5.40%	68.1%	6.46%
Universitat Oberta de Catalunya	13	0.63%	12	0.84%	92.3%	8.33%
Total 2014	**2,080**	**100%**	**1,426**	**100%**	**68.6%**	**1.49%**
2011						
Universitat de Barcelona	800	43.86%	503	41.06 %	62.9%	2.72%
Universitat Autònoma de Barcelona	532	29.17%	373	30.45 %	70.1%	2.83%
Universitat Politècnica de Catalunya	238	13.05%	168	13.71 %	70.6%	4.19%
Universitat Pompeu Fabra	61	3.34%	41	3.35%	67.2%	9.02%
Universitat de Girona	62	3.40%	45	3.67%	72.6%	7.87%
Universitat de Lleida	51	2.80%	37	3.02%	72.5%	8.70%
Universitat Rovira i Virgili	80	4.39%	58	4.73%	72.5%	6.93%
Total 2011	**1,824**	**100%**	**1,225**	**100%**	**67.2%**	**1.64%**
2008						
Universitat de Barcelona	775	48.11%	451	48.29 %	58.2%	3.05%
Universitat Autònoma de Barcelona	383	23.77%	208	22.27 %	54.3%	4.69%
Universitat Politècnica de Catalunya	197	12.23%	112	11.99 %	56.9%	6.22%
Universitat Pompeu Fabra	56	3.48%	38	4.07%	67.9%	9.28%
Universitat de Girona	75	4.66%	49	5.25%	65.3%	8.47%
Universitat de Lleida	56	3.48%	38	4.07%	67.9%	9.28%
Universitat Rovira i Virgili	69	4.28%	38	4.07%	55.1%	10.95%
Total 2008	**1,611**	**100%**	**934**	**100%**	**58.0%**	**2.12%**

NB: The data for 2014 refer to doctorate holders who were awarded their degrees in 2009 and 2010; the data for 2011 refer to those awarded their degrees in 2006 and 2007, and the data for 2008 to those awarded their degrees in 2003 and 2004.

2.2. Sampling distribution according to discipline

Experimental Sciences, with 36% of the doctorate holders who obtained their degrees in 2009 and 2010, had the highest proportion of doctorate holders, compared to Humanities (14%), which had the lowest.

The sample proportions according to discipline were similar to those of the population and all of them in this last edition had a sampling error of less than 4%, which ensures the good representativity of the sample.

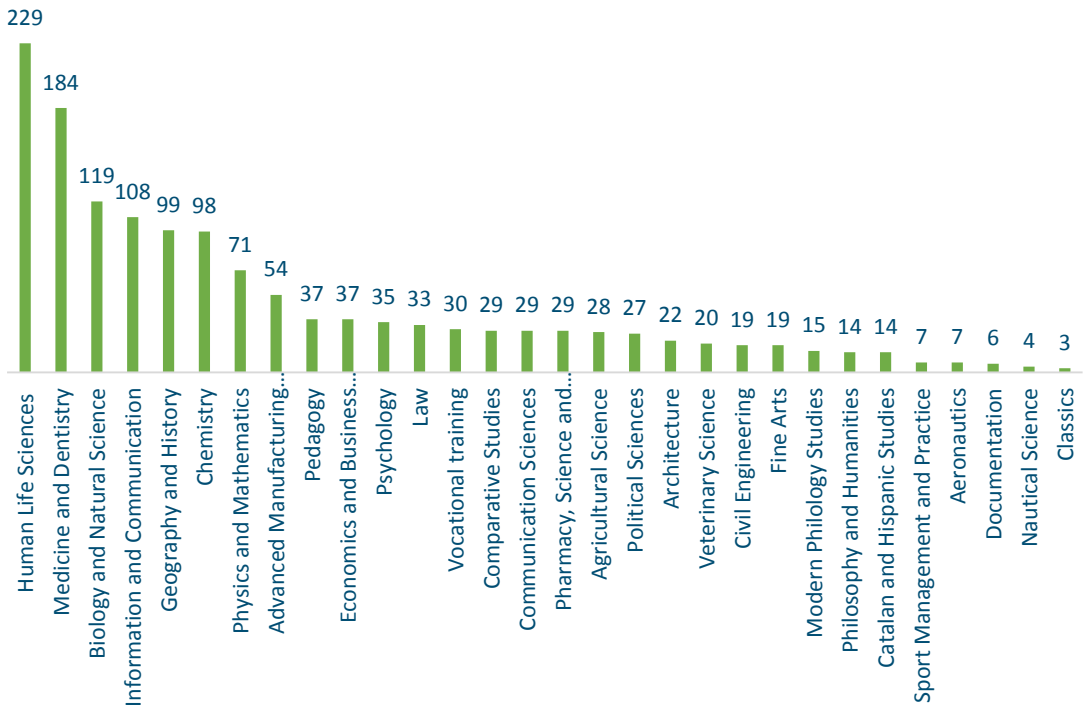
Table 2.2.1. Population and sample according to discipline

Discipline	Population	Population /total	Sample	Sample/total	Response	Sampling error
2014						
Humanities	266	17.12%	193	16.97%	72.6%	3.78%
Social Sciences	312	17.07%	241	16.34%	77.2%	3.08%
Experimental Sciences	791	38.03%	517	36.26%	65.4%	2.59%
Health Sciences	355	15.00%	233	16.90%	65.6%	3.85%
Engineering and Architecture	356	12.79%	242	13.53%	68.0%	3.64%
Total 2014	**2,080**	**100%**	**1,426**	**100%**	**68.6%**	**1.49%**
2011						
Humanities	243	16.50%	175	18.29%	72.0%	4.01%
Social Sciences	223	20.56%	165	18.37%	74.0%	3.98%
Experimental Sciences	682	37.39%	436	35.59%	63.9%	2.88%
Health Sciences	375	12.23%	225	13.47%	60.0%	4.22%
Engineering and Architecture	301	13.32%	224	14.29%	74.4%	3.39%
Total 2011	**1,824**	**100%**	**1,225**	**100%**	**67.2%**	**1.64%**
2008						
Humanities	207	13.53%	130	14.35%	62.8%	5.36%
Social Sciences	258	25.39%	159	21.95%	61.6%	4.92%
Experimental Sciences	519	32.22%	306	32.76%	59.0%	3.67%
Health Sciences	409	16.01%	205	17.02%	50.1%	4.94%
Engineering and Architecture	218	12.85%	134	13.92%	61.5%	5.37%
Total 2008	**1,611**	**100%**	**934**	**100%**	**58.0%**	**2.12%**

From figure 2.2.1 it can be seen that the production of doctoral degrees was concentrated in certain subjects. Biomedical research and Experimental Medicine had the highest number of doctorate holders (Life Sciences, Medicine and Dentistry, Biology and Natural Science), with 37% of the sample.[8]

[8] Human Life Sciences were added in the 2014 edition. This was approved by the working group set up to design the survey on the employment outcomes of Master's programmes, coordinated by AQU Catalunya, which considered that it was necessary to distinguish between the different Master's programmes in Biomedical research, a strategic field for

Figure 2.2.1. Sampling distribution according to subject



The sampling distribution of doctorate holders is fairly similar for all of the years in which it has been examined (see table 2.2.2).

Table 2.2.2. Sampling distribution according to discipline

Discipline	2008		2011		2014	
	n	%	*n*	%	*n*	%
Humanities	130	13.92%	175	14.29%	193	13.53%
Social Sciences	159	17.02%	165	13.47%	241	16.90%
Experimental Sciences	306	32.76%	436	35.59%	517	36.26%
Health Sciences	205	21.95%	225	18.37%	233	16.34%
Engineering and Architecture	134	14.35%	224	18.29%	242	16.97%
Total	**934**	**100%**	**1,225**	**100%**	**1,426**	**100%**

many universities in Catalonia. Human Life Sciences takes in doctoral programmes previously classified under Biology and Natural Sciences, Medicine and Dentistry. It is assigned to Experimental Sciences. This means that the totals for Experimental Sciences and Health Sciences may vary between the 2014 survey and those of 2011 and 2008, due to the change in composition of the discipline.

As in the previous editions, it is noteworthy that the distribution of doctorate holders according to discipline is quite different to that of graduates of undergraduate programmes[9]. 36% of doctorate holders in 2014 took their doctoral degrees in Experimental Sciences; Social Sciences, Health Sciences, and Engineering and Architecture all accounted for around 16% and Humanities 14%.

2.3. Sampling distribution according to gender and discipline

The sampling distribution of doctorate holders who obtained their degrees in 2009 and 2010 according to gender is quite similar with 52% females and 48% males. There were important differences however according to the discipline.

In the Social Sciences and Humanities, the differences according to gender were unimportant. In Health Sciences and Experimental Sciences, however, there were more female doctorate holders, while in Engineering and Architecture there were more male doctorate holders.

Table 2.3.1. Sampling distribution according to gender and discipline

Discipline	Female		Male		Total	
	n	%	*n*	%	*n*	%
2014						
Humanities	103	53.37%	90	46.63%	193	100%
Social Sciences	118	48.96%	123	51.04%	241	100%
Experimental Sciences	300	58.03%	217	41.97%	517	100%
Health Sciences	147	63.09%	86	36.91%	233	100%
Engineering and Architecture	73	30.17%	169	69.83%	242	100%
Total 2014	**741**	**51.96%**	**685**	**48.04%**	**1,426**	**100%**
2011						
Humanities	78	44.57%	97	55.43%	175	100%
Social Sciences	88	53.33%	77	46.67%	165	100%
Experimental Sciences	222	50.92%	214	49.08%	436	100%
Health Sciences	138	61.33%	87	38.67%	225	100%
Engineering and Architecture	70	31.25%	154	68.75%	224	100%
Total 2011	**596**	**48.65%**	**629**	**51.35%**	**1,225**	**100%**
2008						
Humanities	59	45.38%	71	54.62%	130	100%
Social Sciences	72	45.28%	87	54.72%	159	100%
Experimental Sciences	161	52.61%	145	47.39%	306	100%
Health Sciences	110	53.66%	95	46.34%	205	100%
Engineering and Architecture	20	14.93%	114	85.07%	134	100%
Total 2008	**422**	**45.18%**	**512**	**54.82%**	**934**	**100%**

[9] The distribution of graduates according to subject area in 2014 was as follows: 50% Social Sciences, 22% Engineering and Architecture, 11% Health Sciences, 9% Humanities and 7 % Experimental Sciences.

A comparison of these data (according to gender) with the distribution of graduates of undergraduate programmes, however, shows that Engineering and Architecture was the only subject area where the proportion of females increased (7%), whereas in the others the proportion went down.

Table 2.3.2. Proportion of female undergraduate degree and doctorate holders according to discipline

Discipline	Undergraduate degree 2014	Doctorate 2014	Difference (percentage points)
Humanities	69%	53%	-16
Social Sciences	68%	49%	-19
Experimental Sciences	61%	58%	-3
Health Sciences	71%	63%	-8
Engineering and Architecture	23%	30%	+7

3. EMPLOYMENT SITUATION

93% of doctorate holders were working three years after obtaining their doctorate degree.

5% of the doctorate holders interviewed were unemployed (7% in Humanities and Experimental Sciences, and 3% in Health Sciences, Engineering and Architecture and Social Sciences).

As regards the 2008 study, the employment rate dropped by 4%, although unevenly across disciplines: in Health Sciences the rate stayed constant whereas in Humanities it went down by 8%.

88% of employed doctorate holders were working full-time, 4% less than in 2008.

The employment rate was 10% higher than that of the working population aged between 25-44 in Spain (data from the labour force survey/EPA for Spain, first quarter 2013).

The unemployment rate was 2% lower than that of the working population aged between 25-44 in Spain (data from the labour force survey/EPA for Spain, first quarter 2013).

3.1. Contextual data: official statistics

The higher the level of education, the higher the employment rate and the lower the unemployment rate.

The crisis has increased the added value of education as regards the employment and unemployment rates, as the differences between levels of education have increased.

Data from the labour force survey (EPA) for Spain are examined in this section as a means of contextualising the results of the employment outcomes survey.

The data from the two sources are not directly comparable as the reference populations are different. The reference population of the study on the employment outcomes of Catalan

universities is those who completed their studies three years beforehand, a population that in 2014 had an average age of 30. The labour force survey (EPA) for Spain, on the other hand, takes in the economically active population aged over 16 and is designed to give results at national level; as such, it is not possible to obtain statistically representative disaggregated data according to Autonomous Community (region), level of education or age group.[10]

In order to improve comparability between the different groups, the population for this analysis was made up of doctorate holders aged between 25-44. Taking this as the target population, the graphs show the trend indicators for the employment rate, the unemployment rate and the inactivity rate. The first quarter in each year (1stQ) is taken as the base reference to enable comparison to be made with AQU Catalunya's employment outcomes survey, which is carried out from January to March. It should be noted that, from the first quarter of 2014 onwards, the grouping of education levels was modified in the labour force survey (EPA) for Spain, with all of the higher levels of study being reduced to just one group that includes them all. This means that, as of 2014 onwards, it was not possible to obtain data on the employment situation of doctorate holders (at least, from the public and freely available data on the website of the Spanish Institute of Statistics/INE). The trends are therefore given up until the first quarter of 2013.

As can be seen, the economic crisis, which began more or less in 2007 and fundamentally affected the building and construction and financial sectors with a knock-on effect on other sectors of the economy, also had an effect on all levels of education but to varying degrees. In 2010 there was the additional impact of the risk premium and eurozone crisis, which increased the squeeze on the public sector. Different reports distinguish between two periods of crisis, 2007-2009 and 2009-2012; for university graduates, the latter of these two periods was the worst, whereas for people without a university degree the deterioration in the situation was more severe in the first period (Fundación CYD, 2012). As can be seen from table 3.1.1, this trend can also be seen for doctorate holders aged between 25-44. In particular, in the period from 2007-2010 the employment rate of doctorate holders went up by 1.7% and the unemployment rate went down by 1.1%, whereas in the 2010-2013 period the trend of these two variations changed, with the employment rate for doctorate holders dropping by 10% and the unemployment rate increasing by 4.1%.

Table 3.1.1. Variation in the employment and unemployment rates of doctorate holders aged between 25-44, as a percentage (labour force survey/EPA for Spain)

	2007-2013	2007-2010	2010-2013
Variation employment rate	-8.3	1.7	-10.0
Variation unemployment rate	3.0	-1.1	4.1

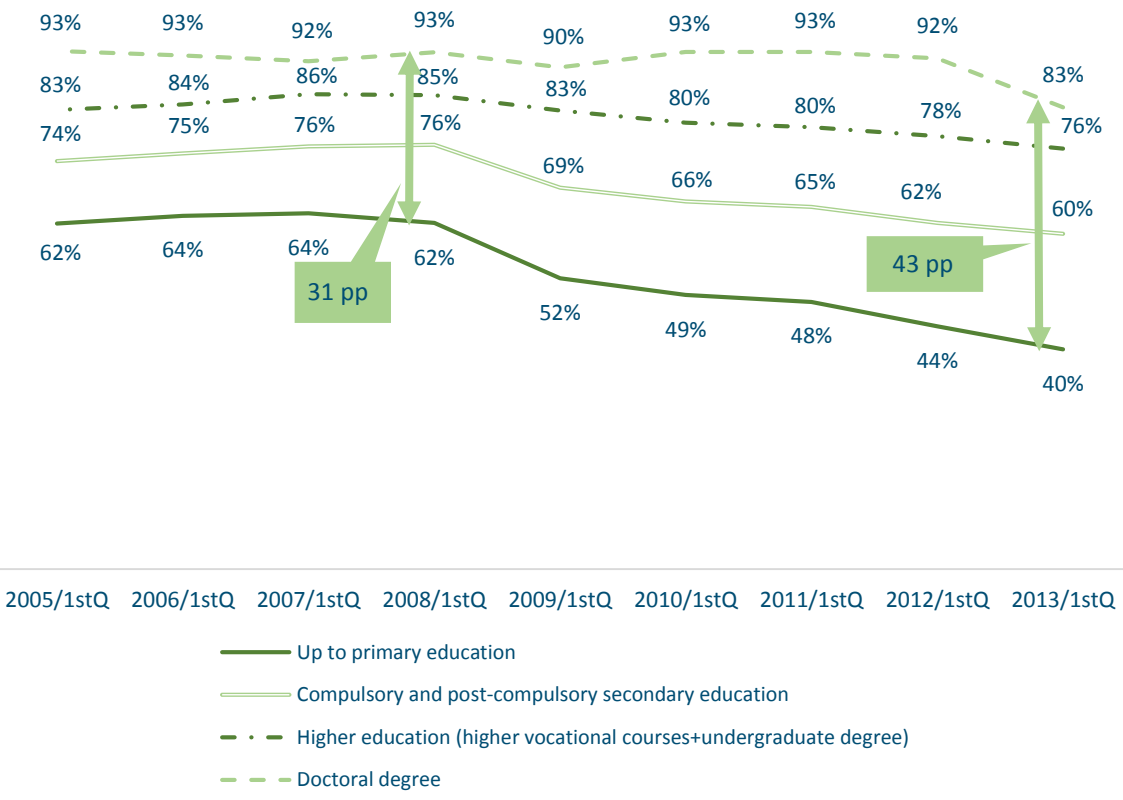
To sum up, the higher the level of education the higher the employment rate and, conversely, the higher the level of education the lower the unemployment rate. This trend is evident in all OECD

[10] Different studies examine the data from the labour force survey/EPA for Spain in greater detail. The following two are of note in that a comparison is made according to level of education: Fundación CYD (2012), Pérez & Serrano (2012).

countries and is consistent over time (OECD, 2013). Furthermore, the added value of having a higher education has increased as a result of the economic crisis, as can be seen from the following figures.

The data on employment outcomes in the following section show that the employment situation of doctorate holders from Catalan universities was slightly better than that shown by the data from the labour force survey (EPA) for Spain (bearing in mind that the data are from the first quarter of 2014).

Figure 3.1.1. Employment trends. Population aged 25-44 (labour force survey/EPA for Spain)[11]



[11] Source: Labour force survey (EPA) for Spain. Compiled by the authors. Data for the first quarter of each year (1st quarter of 2005, 1st quarter of 2006, etc.)

Figure 3.1.2. Unemployment trends. Population aged 25-44 (labour force survey/EPA for Spain)

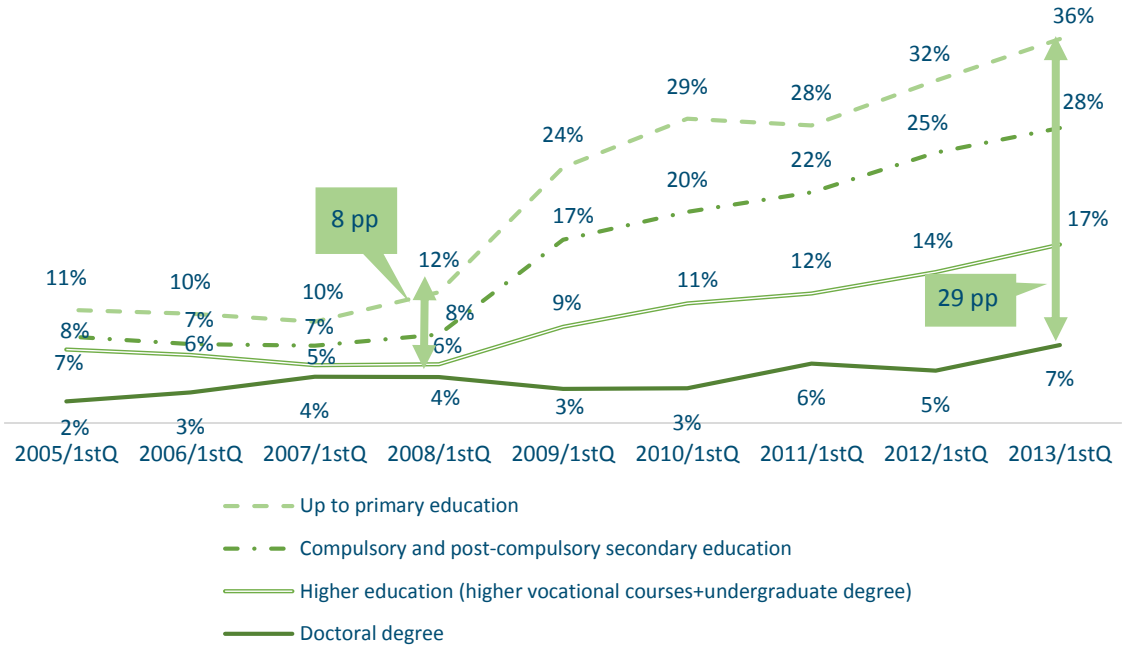
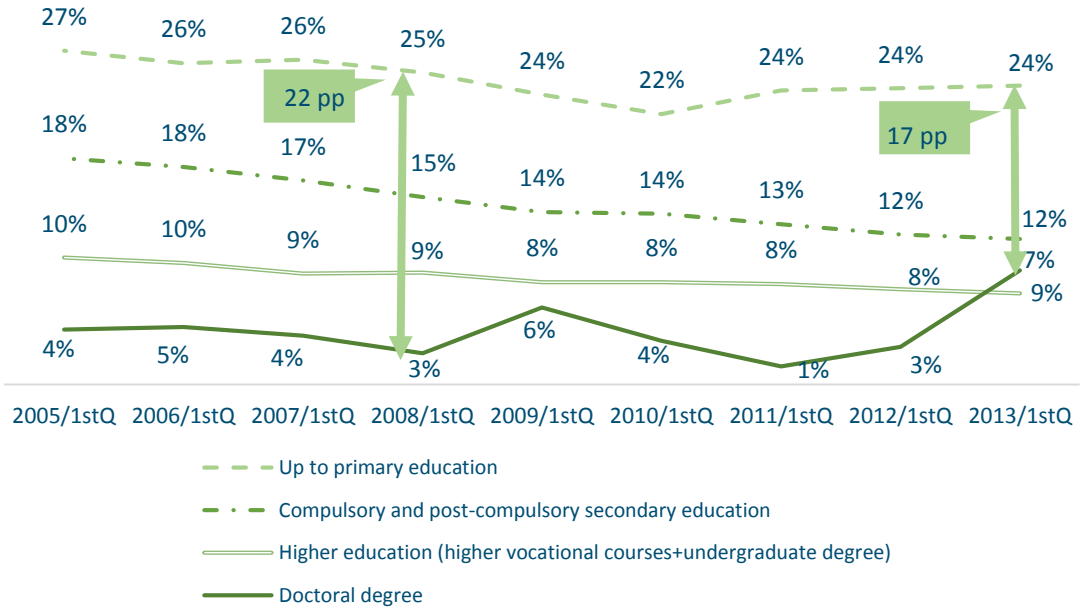


Figure 3.1.3. Inactivity trends. Population aged 25-44 (labour force survey/EPA for Spain)



3.2. Employment situation

93% of doctorate holders who obtained their degree in 2009 and 2010 were working three years after completing their doctoral studies.

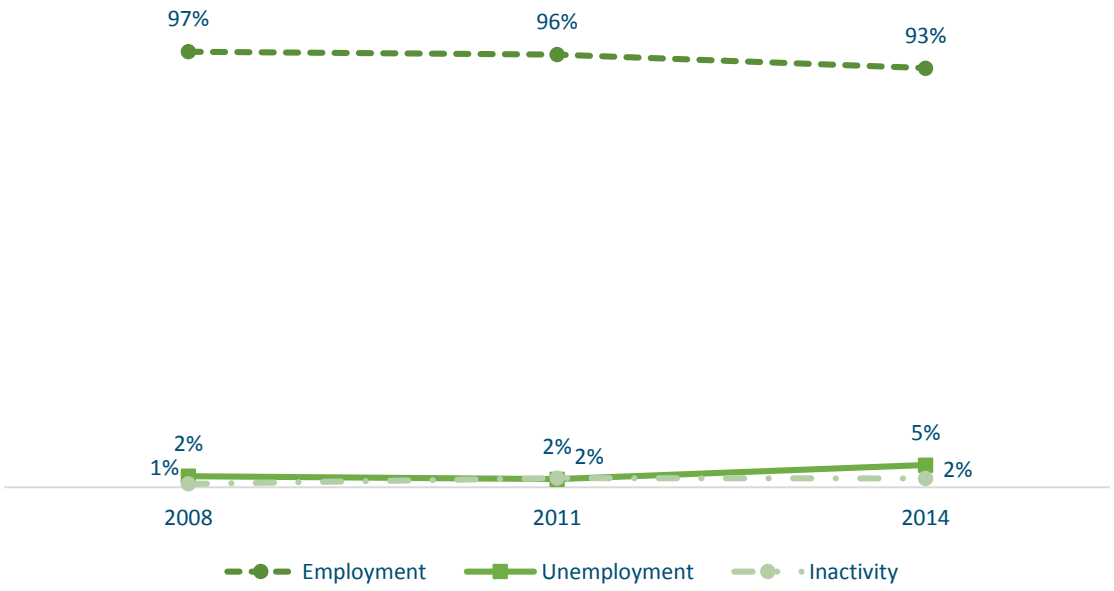
93% of doctorate holders who were awarded their degrees in 2009 and 2010 were working three years after completing their doctoral studies. 5% of doctorate holders were unemployed, with 3% in Engineering and Architecture, Social Sciences and Health Sciences, compared to 7% in Humanities and Experimental Sciences.

There was a decreasing trend in the employment rate for doctorate holders over the 2008-2014 period, except for Health Sciences, where it remained constant. In particular, and distinguishing between different disciplines, the employment rate for doctorate holders declined by around 4% in Engineering and Architecture, Experimental Sciences and Social Sciences, whereas in the Humanities the drop was steeper (8%).

Table 3.2.1. Employment situation according to discipline

	Employed	Unemployed	Inactive	*n*	Total %
2014					
Humanities	88.08%	7.25%	4.66%	193	100%
Social Sciences	95.44%	3.32%	1.24%	241	100%
Experimental Sciences	91.10%	6.77%	2.13%	517	100%
Health Sciences	97.42%	2.58%	0.00%	233	100%
Engineering and Architecture	95.04%	2.89%	2.07%	242	100%
Total 2014	**93.13%**	**4.91%**	**1.96%**	**1,426**	**100%**
2011					
Humanities	94.29%	1.71%	4.00%	175	100%
Social Sciences	96.97%	0.61%	2.42%	165	100%
Experimental Sciences	95.18%	3.44%	1.38%	436	100%
Health Sciences	97.78%	0.89%	1.33%	225	100%
Engineering and Architecture	97.32%	0.45%	2.23%	224	100%
Total 2011	**96.16%**	**1.80%**	**2.04%**	**1,225**	**100%**
2008					
Humanities	96.15%	2.31%	1.54%	130	100%
Social Sciences	99.37%	0.00%	0.63%	159	100%
Experimental Sciences	94.77%	4.58%	0.65%	306	100%
Health Sciences	96.59%	2.44%	0.98%	205	100%
Engineering and Architecture	99.25%	0.75%	0.00%	134	100%
Total 2008	**96.79%**	**2.46%**	**0.75%**	**934**	**100%**

Figure 3.2.1. Trends in employment, unemployment and inactivity



3.3. Full-time or part-time status

88% of doctorate holders had a full-time contract

According to the data for 2014, 88% of doctorate holders had a full-time contract, ranging from 95% in Engineering and Architecture to 73% in Humanities.

As regards the trend for this variable, there was a decrease of 4% in the number of doctorate holders with a full-time contract over the period examined. The largest drop was in Humanities (from 87.5% in 2008 to 73% in 2014), whereas in Engineering and Architecture the rate remained relatively constant (around 94-96%).

Table 3.3.1. Full-time contract according to discipline

	Yes	No	*n*	%
2014				
Humanities	72.87%	27.13%	188	100%
Social Sciences	84.23%	15.77%	241	100%
Experimental Sciences	92.23%	7.77%	502	100%
Health Sciences	89.47%	10.53%	228	100%
Engineering and Architecture	94.56%	5.44%	239	100%
Total 2014	**88.20%**	**11.80%**	**1,398**	**100%**
2011				
Humanities	81.18%	18.82%	170	100%
Social Sciences	90.91%	9.09%	165	100%
Experimental Sciences	95.84%	4.16%	433	100%
Health Sciences	91.56%	8.44%	225	100%
Engineering and Architecture	95.09%	4.91%	224	100%
Total 2011	**92.19%**	**7.81%**	**1,217**	**100%**
2008				
Humanities	87.50%	12.50%	128	100%
Social Sciences	92.41%	7.59%	158	100%
Experimental Sciences	93.42%	6.58%	304	100%
Health Sciences	93.60%	6.40%	203	100%
Engineering and Architecture	96.27%	3.73%	134	100%
Total 2008	**92.88%**	**7.12%**	**927**	**100%**

3.4. The place of work for doctorate holders

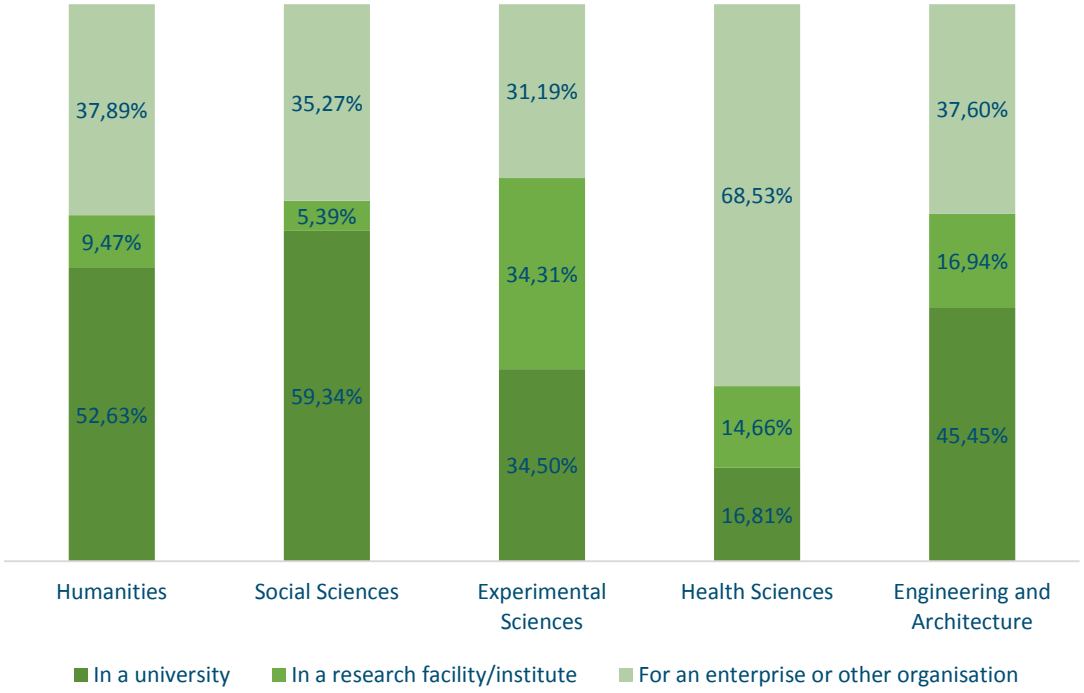
60% of doctorate holders were working in either universities or research institutions. This means that an increasingly important proportion of doctorate holders is working outside of the traditional destination that is academia.

65% of doctorate holders were working in the public sector. The relative importance of the public sector went down by 5% compared to 2008 except for Health Sciences (where it went up by 6%).

The performance of Health Sciences was clearly different to that of the other disciplines: 69% were working in enterprises (in the health and social welfare sector) and 74% were working in the public sector.

Universities and research institutes accounted for 60% of doctorate holders and the rest were employed in enterprises. The percentage varied according to discipline. Doctorate holders in Engineering and Architecture, Social Sciences and Humanities predominated in the universities (45%, 59% and 53%, respectively), but they were relatively less important in research institutes. There was an even balance in the distribution of doctorate holders in Experimental Sciences between universities, research institutes and enterprises. Doctorate holders in Health Sciences, on the other hand, were concentrated in enterprises (69%), due to the fact that an important proportion of doctorate holders in Health Sciences works in hospitals, which form part of the "enterprise or other organisation" group.

Figure 3.4.1. Place of work according to discipline



Throughout the period examined, the relative importance of the universities and research institutes as employers of doctorate holders increased slightly, compared to enterprises and other organisations, which decreased by 3%. This trend is not clear however across all disciplines.

Figure 3.4.2. Trend in the place of work for doctorate holders

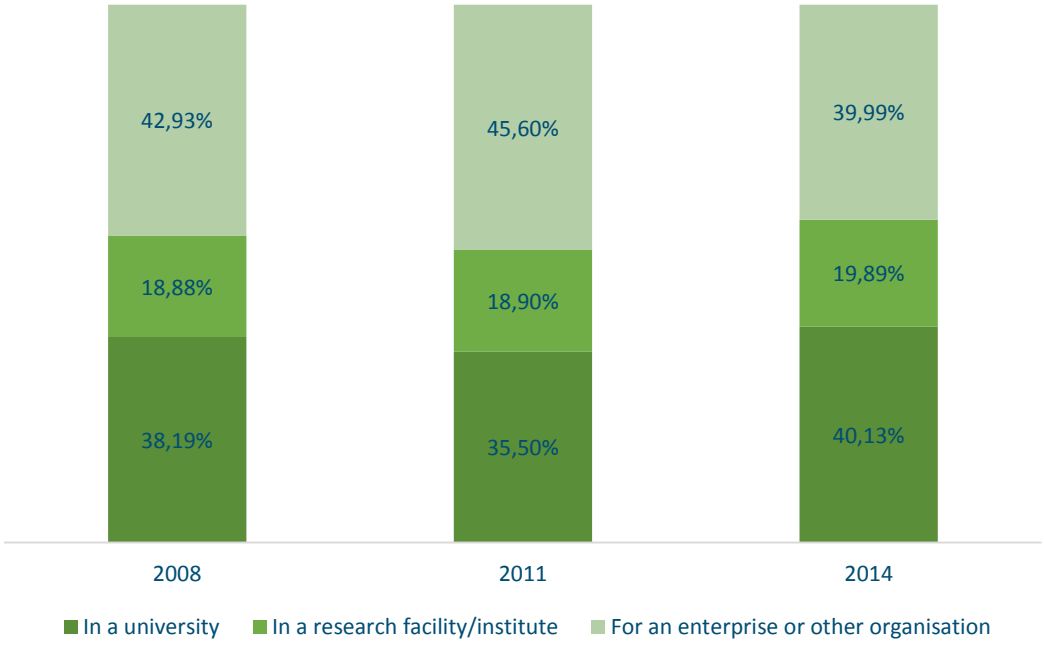


Table 3.4.1. Trend in the distribution of doctorate holders according to the place of work and discipline

	2008	2011	2014
Humanities			
In a university	44.53%	42.35%	52.63%
In a research facility/institute	10.16%	8.24%	9.47%
For an enterprise or other organisation	45.31%	49.41%	37.89%
Total Humanities	**13.81%**	**13.97%**	**13.40%**
Social Sciences			
In a university	58.23%	50.91%	59.34%
In a research facility/institute	4.43%	3.03%	5.39%
For an enterprise or other organisation	37.34%	46.06%	35.27%
Total Social Sciences	**17.04%**	**13.56%**	**17.00%**
Experimental Sciences			
In a university	31.58%	29.79%	34.50%
In a research facility/institute	31.91%	30.48%	34.31%
For an enterprise or other organisation	36.51%	39.72%	31.19%
Total Experimental Sciences	**32.79%**	**35.58%**	**36.18%**
Health Sciences			
In a university	17.73%	11.56%	16.81%
In a research facility/institute	18.23%	20.00%	14.66%
For an enterprise or other organisation	64.04%	68.44%	68.53%
Total Health Sciences	**21.90%**	**18.49%**	**16.36%**
Engineering and Architecture			
In a university	54.48%	54.02%	45.45%
In a research facility/institute	15.67%	15.18%	16.94%
For an enterprise or other organisation	29.85%	30.80%	37.60%
Total Engineering and Architecture	**14.46%**	**18.41%**	**17.07%**

Branch of economic activity

Doctorate holders working in a university or research institute work in education and research, whereas doctorate holders working in enterprises are distributed in different branches of economic activity according to the discipline of their doctorate.

The following table shows the branches of economic activity in which there were at least 5% of doctorate holders in the disciplines. Doctorate holders in Humanities and Social Sciences who were working in enterprises were mainly in education and research, public administration and business services. Doctorate holders in Experimental Sciences were also working in education and research, health and social welfare and the pharmaceutical industry and cosmetics, and doctorate holders in Engineering and Architecture were mainly working in communication

technologies, business services and education and research. 90% of doctorate holders in Health Sciences were working in health and social welfare.

Table 3.4.2. Branch of economic activity of doctorate holders working in enterprises according to discipline

	Humanities	Social Sciences	Experimental Sciences	Health Sciences	Eng. and Architecture
Public administration, defence and social security	20.83%	17.65%	3.14%	0.00%	5.49%
Trade and repairs (marketing, telemarketing, pharmacies, etc.)	2.78%	0.00%	6.92%	0.00%	1.10%
Building and construction	1.39%	1.18%	0.00%	0.00%	6.59%
Education, research and cultural services	47.22%	35.29%	28.93%	3.14%	16.48%
Pharmaceutical industry and cosmetics	0.00%	1.18%	13.84%	3.77%	1.10%
Chemical industry	0.00%	0.00%	9.43%	0.63%	4.40%
Media	5.56%	0.00%	1.89%	0.00%	2.20%
Health and social welfare	4.17%	11.76%	18.24%	89.94%	2.20%
Business services	12.50%	21.18%	5.03%	1.89%	13.19%
Communication technologies	0.00%	0.00%	2.52%	0.00%	21.98%
Others	5.56%	11.76%	10.06%	0.63%	25.27%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

3.5. Recruitment in the public and private sectors

65% of doctorate holders were working in the public sector, with Health Sciences being the discipline with the highest proportion (74%), compared to Experimental Sciences and Engineering and Architecture, which had the lowest (61%).

According to the data for 2014, 65% of doctorate holders were working in the public sector; Health Sciences was the discipline with the highest proportion (74%), compared to Experimental Sciences and Engineering and Architecture, which had the lowest (61%).

There was a noteworthy decrease of 5% in the relative importance of the public sector compared to 2008. This was not the case in all disciplines, however, and in Health Sciences it went up by 6%.

Table 3.5.1. Trend in the distribution of doctorate holders according to public or private sector employment and discipline

	Private	Public	*n*	%
2014				
Humanities	31.58%	68.42%	190	100%
Social Sciences	35.27%	64.73%	241	100%
Experimental Sciences	39.38%	60.62%	513	100%
Health Sciences	26.29%	73.71%	232	100%
Engineering and Architecture	39.26%	60.74%	242	100%
Total 2014	**35.47%**	**64.53%**	**1,418**	**100%**
2011				
Humanities	35.88%	64.12%	170	100%
Social Sciences	25.45%	74.55%	165	100%
Experimental Sciences	39.91%	60.09%	431	100%
Health Sciences	32.59%	67.41%	224	100%
Engineering and Architecture	33.48%	66.52%	224	100%
Total 2011	**34.84%**	**65.16%**	**1,214**	**100%**
2008				
Humanities	27.34%	72.66%	128	100%
Social Sciences	24.05%	75.95%	158	100%
Experimental Sciences	33.88%	66.12%	304	100%
Health Sciences	32.51%	67.49%	203	100%
Engineering and Architecture	33.58%	66.42%	134	100%
Total 2008	**30.96%**	**69.04%**	**927**	**100%**

As can be seen from the following table, 86% of doctorate holders working in a university were in the public sector, as were 66% of those working in research institutes and 43% of those working in enterprises.

Table 3.5.2. Distribution of doctorate holders according to public or private sector employment and place of work

	Private	Public	Total
In a university	14.41%	85.59%	100%
In a research facility/institute	34.40%	65.60%	100%
For an enterprise or other organisation	57.14%	42.86%	100%
Total	**35.47%**	**64.53%**	**100%**

The scope covered by enterprises varied according to discipline. For example, 20% and 22% respectively of doctorate holders in Engineering and Architecture and Experimental Sciences were working for enterprises in the public sector; in the case of Social Sciences and Humanities, it was almost 50%; and in Health Sciences 72% of doctorate holders were working for enterprises in the public sector (these are generally organisations in the field of health).

Table 3.5.3. Public or private sector according to place of work and discipline

	Private	Public	*n*	%
Humanities				
In a university	15.00%	85.00%	100	100%
In a research facility/institute	38.89%	61.11%	18	100%
For an enterprise or other organisation	52.78%	47.22%	72	100%
Total Humanities	**31.58%**	**68.42%**	**190**	**100%**
Social Sciences				
In a university	23.78%	76.22%	143	100%
In a research facility/institute	46.15%	53.85%	13	100%
For an enterprise or other organisation	52.94%	47.06%	85	100%
Total Social Sciences	**35.27%**	**64.73%**	**241**	**100%**
Experimental Sciences				
In a university	12.43%	87.57%	177	100%
In a research facility/institute	31.82%	68.18%	176	100%
For an enterprise or other organisation	77.50%	22.50%	160	100%
Total Experimental Sciences	**39.38%**	**60.62%**	**513**	**100%**
Health Sciences				
In a university	10.26%	89.74%	39	100%
In a research facility/institute	38.24%	61.76%	34	100%
For an enterprise or other organisation	27.67%	72.33%	159	100%
Total Health Sciences	**26.29%**	**73.71%**	**232**	**100%**
Engineering and Architecture				
In a university	6.36%	93.64%	110	100%
In a research facility/institute	36.59%	63.41%	41	100%
For an enterprise or other organisation	80.22%	19.78%	91	100%
Total Engineering and Architecture	**39.26%**	**60.74%**	**242**	**100%**
Total	**35.47%**	**64.53%**	**1,418**	**100%**

3.6. Job-skills match

59% of all doctorate holders interviewed had doctorate-level job duties and responsibilities. The proportion was highest in Experimental Sciences (68%), followed by Engineering and Architecture (64%).

97% of doctorate holders had at least graduate-level job duties and responsibilities and 99% were in occupations that required a high level of skills.

Health Sciences had the lowest proportion (43%), as job duties and responsibilities in the sector are typically those of pre-doctorate studies.

Compared to 2011, there was a decrease in the job-skills match in universities and enterprises and, to a greater degree, research institutes. This would appear to indicate a certain deterioration in the situation of R&D in all sectors.

The job-skills match in the "traditional" areas of doctoral training (universities and research institutes) was higher than the match for enterprises (85% for those working in a university compared to 27% of those in enterprises).

An added value of doctoral training is to bolster innovation and development in an organisation, but this only occurred with 27% of doctorate holders. Doctorate holders in Engineering and Architecture and Experimental Sciences had the highest match in the productive sector (38 and 34% respectively), whereas the match was lowest in Humanities (14% of those working in enterprises had doctoral-level duties and responsibilities).

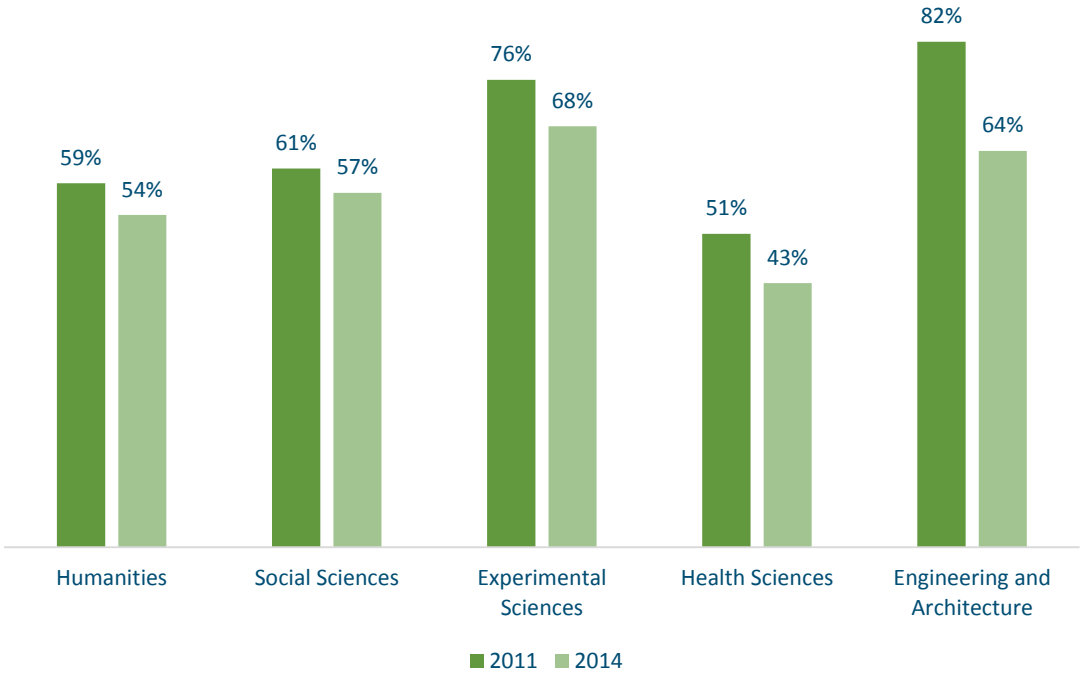
As for doctorate holders who were working abroad, the match was 89%, compared to 55% and 54% for those working in Spain and Catalonia respectively.

There was an increase in the added value of looking for a job abroad, not so much because of the increase in match abroad, but because of the marked decrease in the quality of employment in Spain. The percentage of those who had doctoral-level duties and responsibilities was 11% lower (55% in 2014 compared to 66% in 2011).

The data for 2014 show that 59% of doctorate holders had doctoral-level tasks. This percentage ranged from 68% in Experimental Sciences to 43% in Health Sciences.

It is also noteworthy that the job-skills match of doctorate holders dropped by 8% between 2011 and 2014, a trend that is evident across all disciplines (see figure 3.6.1).

Figure 3.6.1. Job-skills match according to discipline



On the other hand, 97% of doctorate holders had at least graduate-level job duties and responsibilities. This percentage remained unchanged from the previous edition of the survey and ranged from 94% in Humanities to 99% in Health Sciences and Engineering and Architecture.

Table 3.6.1. Distribution of doctorate holders according to whether they had at least graduate-level job duties and responsibilities or not, by discipline

	At least graduate-level job duties and responsibilities	No graduate-level job duties and responsibilities
2014		
Humanities	93.68%	6.32%
Social Sciences	96.27%	3.73%
Experimental Sciences	97.27%	2.73%
Health Sciences	99.14%	0.86%
Engineering and Architecture	99.17%	0.83%
Total 2014	**97.25%**	**2.75%**
2011		
Humanities	92.35%	7.65%
Social Sciences	95.76%	4.24%
Experimental Sciences	96.30%	3.70%
Health Sciences	98.22%	1.78%
Engineering and Architecture	97.77%	2.23%
Total 2011	**96.30%**	**3.70%**

The data from the survey of the employment outcomes of the graduate population from Catalan universities (graduates of First and Second Cycle pre-Bologna degree courses, *diplomatures*, *llicenciatures* and undergraduate degree courses in Engineering and Architecture), show that 74% had graduate-level job duties and responsibilities. The risk of a having a job that did not require a university education was therefore lower for doctorate holders. Nevertheless, there was a higher risk for doctorate holders of a job-skills mismatch (59%).

Job-skills match and the place of work of doctorate holders

The job-skills match of doctorate holders in 2014 differs significantly according to the place of work. Doctorate holders working in a university or research institute mostly had doctorate-level job duties and responsibilities (85% and 73% respectively), whereas only 27% of doctorate holders who were working in enterprises had jobs that matched their level of education (see figure 3.6.2).

According to the discipline, it can be seen there were big differences in the proportions of doctorate holders with doctorate-level tasks in enterprises. This percentage ranged from 38% in Engineering and Architecture to 14% in Humanities.

Figure 3.6.2. Job-skills match according to the place of work

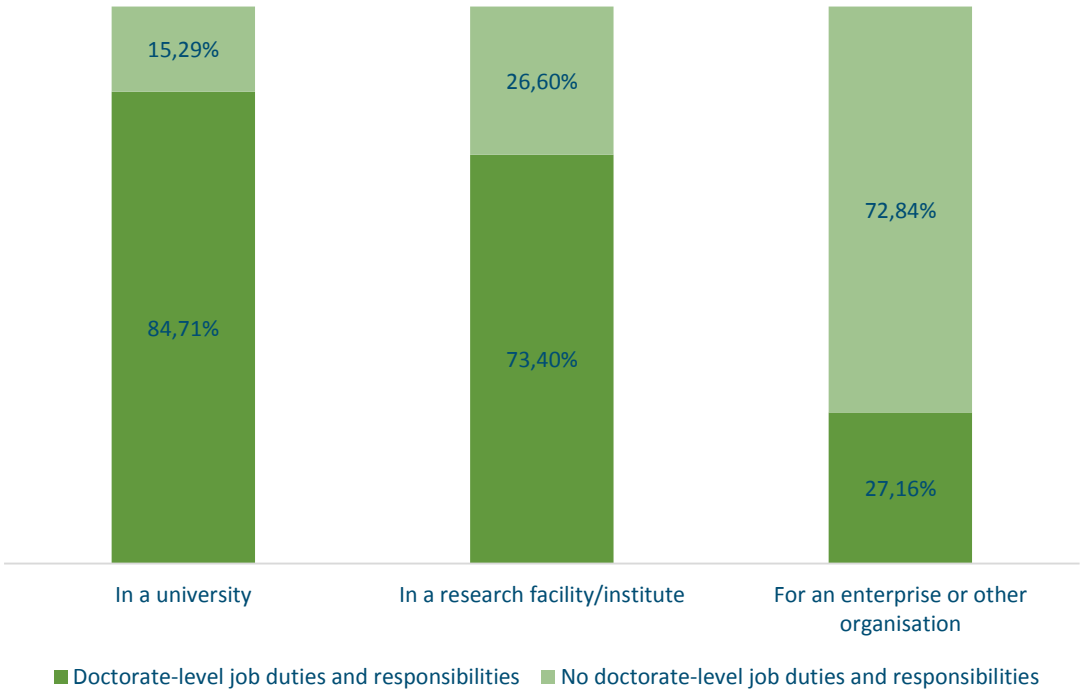
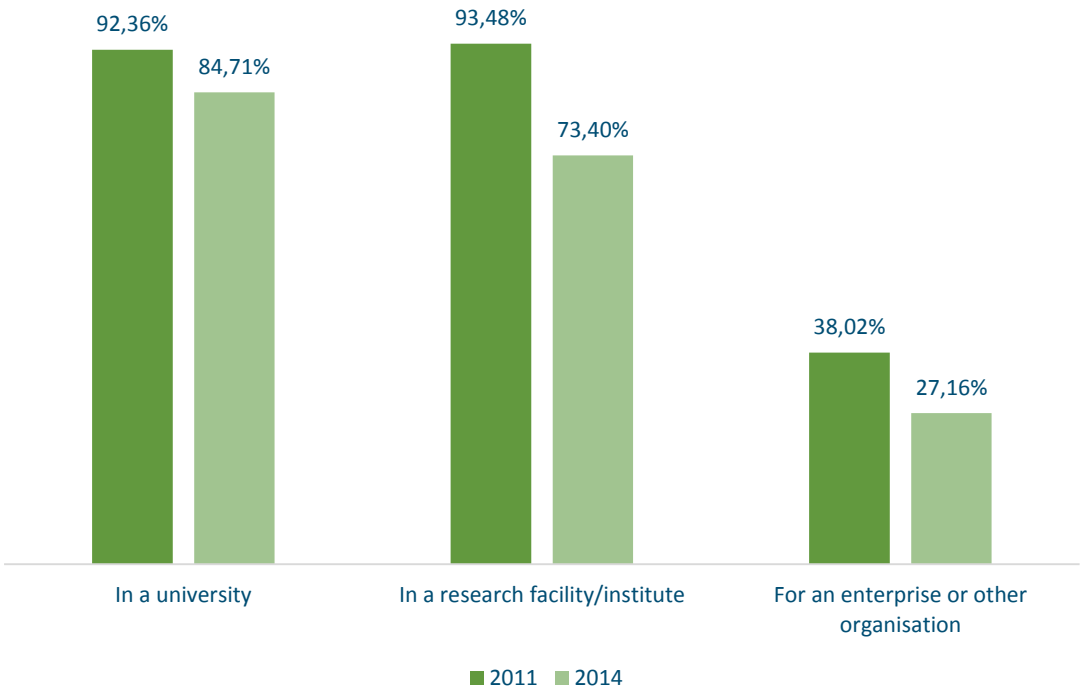


Table 3.6.2. Job-skills match according to the place of work and discipline

	Doctorate-level job duties and responsibilities	No doctorate-level job duties and responsibilities	*n*	%
Humanities				
In a university	81.00%	19.00%	100	100%
In a research facility/institute	61.11%	38.89%	18	100%
For an enterprise or other organisation	13.89%	86.11%	72	100%
Total Humanities	**53.68%**	**46.32%**	**190**	**100%**
Social Sciences				
In a university	83.22%	16.78%	143	100%
In a research facility/institute	46.15%	53.85%	13	100%
For an enterprise or other organisation	15.29%	84.71%	85	100%
Total Social Sciences	**57.26%**	**42.74%**	**241**	**100%**
Experimental Sciences				
In a university	89.27%	10.73%	177	100%
In a research facility/institute	77.27%	22.73%	176	100%
For an enterprise or other organisation	34.38%	65.63%	160	100%
Total Experimental Sciences	**68.03%**	**31.97%**	**513**	**100%**
Health Sciences				
In a university	84.62%	15.38%	39	100%
In a research facility/institute	73.53%	26.47%	34	100%
For an enterprise or other organisation	25.79%	74.21%	159	100%
Total Health Sciences	**42.67%**	**57.33%**	**232**	**100%**
Engineering and Architecture				
In a university	82.73%	17.27%	110	100%
In a research facility/institute	70.73%	29.27%	41	100%
For an enterprise or other organisation	38.46%	61.54%	91	100%
Total Engineering and Architecture	**64.05%**	**35.95%**	**242**	**100%**
Total	**59.45%**	**40.55%**	**1,418**	**100%**

In addition, there was a decrease in the proportion of doctorate holders with doctorate-level job tasks across all places of work: 8% in the universities, 20% in research institutes and 11% in enterprises and other organisations.

Figure 3.6.3. Trend in the percentage of doctorate holders with a job-skills match (i.e. with doctorate-level job duties and responsibilities) according to their place of work



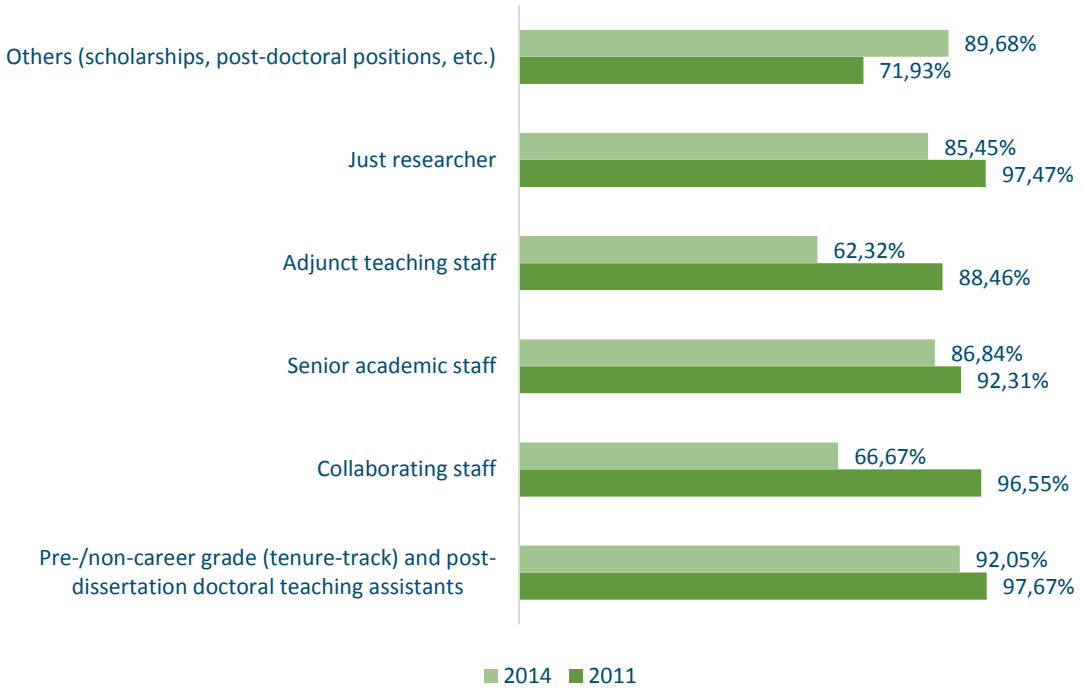
Job-skills match and type of contract at university

The data for 2014 show that 84% of doctorate holders working in a university had doctorate-level job tasks although this percentage differed according to their professional category.

A higher proportion of doctorate holders with contracts as senior academic staff (public service/ *funcionari* and contract/*agregat*), pre-/non-career grade (tenure-track, *lector*) teaching staff and post-dissertation doctoral teaching assistants (*ajudant doctor*), researchers and other types (scholarship holder, post-doctoral positions, etc.), had doctorate-level job duties and responsibilities, although not so in the case of adjunct (*professorat associat*) or "collaborating" (*professorat col·laborador*) teaching staff.

With regard to the trend as compared to 2011, doctorate holders hired as adjunct and collaborating teaching staff experienced the most important drop (between 25 and 30%) in the job-skills match. On the other hand, this was not the case with doctorate holders with scholarships, post-doctoral positions, etc., who saw an improvement in the job-skills match (from 72% to 90%) during this period.

Figure 3.6.4. Trend in the percentage of doctorate holders who were working in a university and with doctorate-level job duties and responsibilities according to type of contract

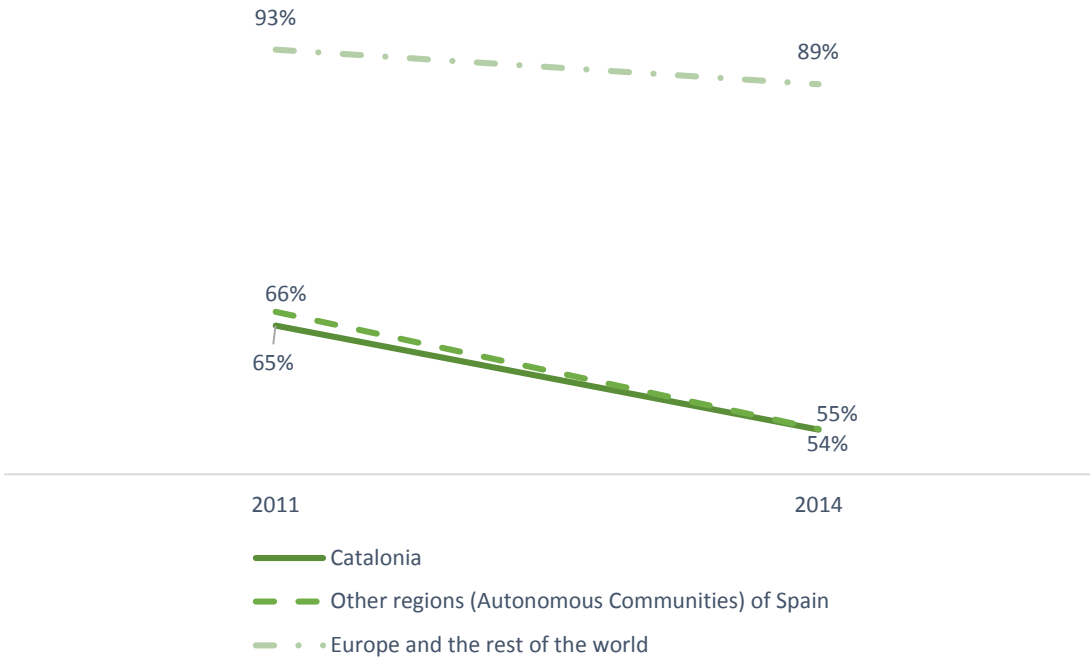


Job-skills match and job location

89% of doctorate holders who were working in Europe and elsewhere in the world had doctorate-level job tasks. This value differs substantially from the match of doctorate holders in Catalonia and other regions (Autonomous Communities) in Spain, which was 54% and 55%, respectively.

Regardless of job location, the percentage of doctorate holders who had doctorate-level tasks decreased in comparison to 2011. The differences between doctorate holders according to job location also increased, with a match for doctorate holders who emigrated and had doctorate-level tasks that in 2011 was 27%-28% higher than that of those who stayed in Spain, and in 2014 34%-35% higher.

Figure 3.6.5. Percentage of doctorate holders with doctorate-level job duties and responsibilities according to job location



Emigration was therefore one way for doctorate holders to avoid over-education, as they achieve a higher match level.

The quality of employment: analysis according to the Spanish Classification of Occupations (CNO)

In this (2014) edition of the survey, and for the first time, the open question regarding the description of job quality was coded according to the 2011 Spanish Classification of Occupations-11. This classification aggregates occupations on the basis of two concepts: the type of work (or employment) and the type of skills.[12]

This classification offers the advantage of information that can be compared at international level. As can be seen from the following table, the occupations in group 1-3 require higher-level skills.

[12] For more information (INE): http://www.ine.es/daco/daco42/clasificaciones/Introduccion_CNO11.V02.pdf

Table 3.6.3. Spanish Classification of Occupations

	Occupation groups	Level of skills
1	Directors and managers	Highly skilled occupations
2	Scientific and intellectual technicians and professionals	
3	Technical activities; professional support activities	
4	Accounting, administrative and other office employees	Medium skill level occupations
5	Workers in catering, personal, and protection services and trade salespersons	
6	Skilled agricultural, livestock, forestry and fishery workers	
7	Skilled manufacturing industry and construction crafts persons and workers (except installation and machinery operators)	
8	Plant and machine operators, and assemblers	
9	Elementary occupations	Low skill level occupations

Table 3.6.4. shows the results of this objective match indicator. 99% of doctorate holders were in occupations that required high-level skills, with the percentage for doctorate holders in Humanities being slightly lower (96%). The results shown by this objective indicator are consistent with the results of the subjective indicator given in table 3.6.1, which shows that 97% of doctorate holders at least had graduate-level job duties and responsibilities.

Table 3.6.4. Objective match according to discipline

	Highly skilled occupations	Medium skill level occupations	Low skill level occupations	*n*	%
Humanities	96.32%	2.63%	1.05%	190	100%
Social Sciences	99.59%	0.41%	0.00%	241	100%
Experimental Sciences	98.83%	0.78%	0.39%	513	100%
Health Sciences	99.57%	0.43%	0.00%	232	100%
Engineering and Architecture	99.17%	0.83%	0.00%	242	100%
Total	**98.80%**	**0.92%**	**0.28%**	**1,418**	**100%**

The distribution of doctorate holders in the different highly skilled occupations, which is given in the following table, shows that 89% of doctorate holders are scientific and intellectual technicians and professionals (the occupation of all doctorate holders who were working in either a university or research institute), and 6% were directors and/or managers. Only 5% of doctorate holders had occupations in technical activities and professional support activities.

Table 3.6.5. Distribution of doctorate holders in highly skilled occupations

	Directors and managers	Scientific and intellectual technicians and professionals	Technical activities; professional support activities	*n*	%
Humanities	7.10%	91.26%	1.64%	183	100%
Social Sciences	8.33%	89.58%	2.08%	240	100%
Experimental Sciences	6.11%	86.59%	7.30%	507	100%
Health Sciences	3.03%	93.51%	3.46%	231	100%
Engineering and Architecture	8.33%	84.58%	7.08%	240	100%
Total	**6%**	**89%**	**5%**	**1,401**	**100%**

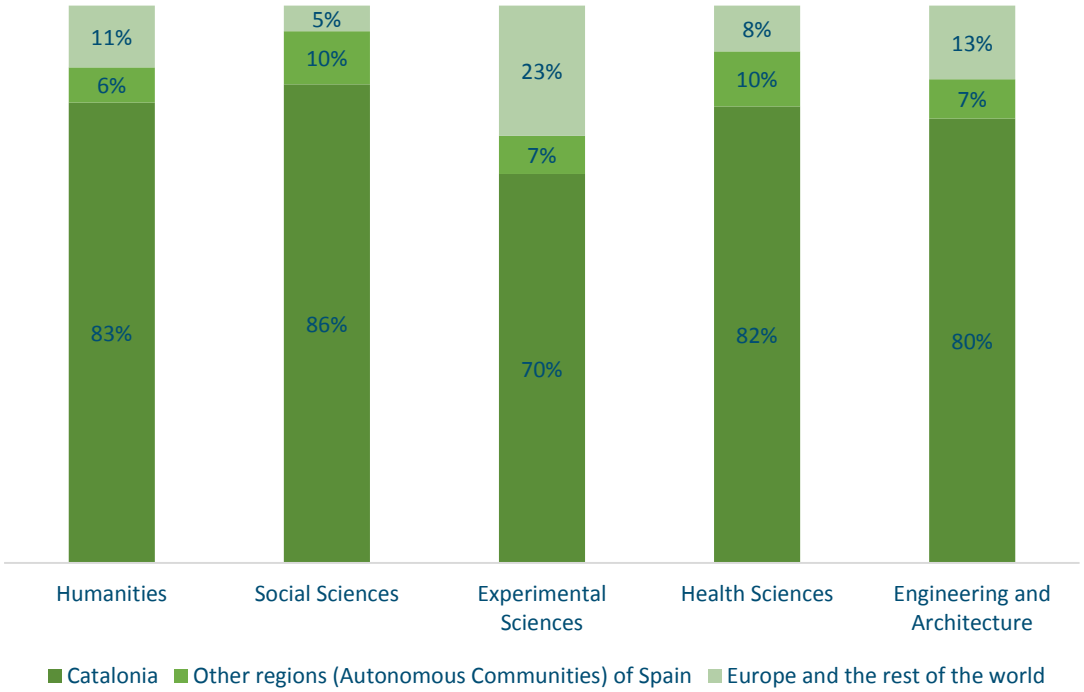
3.7. Mobility

78% of doctorate holders from Catalan universities were working in Catalonia.

It can be seen there is a growing trend in the percentage of doctorate holders who were working abroad (outside of Spain): 8% in 2008, 10% in 2011 and 14% in 2014.

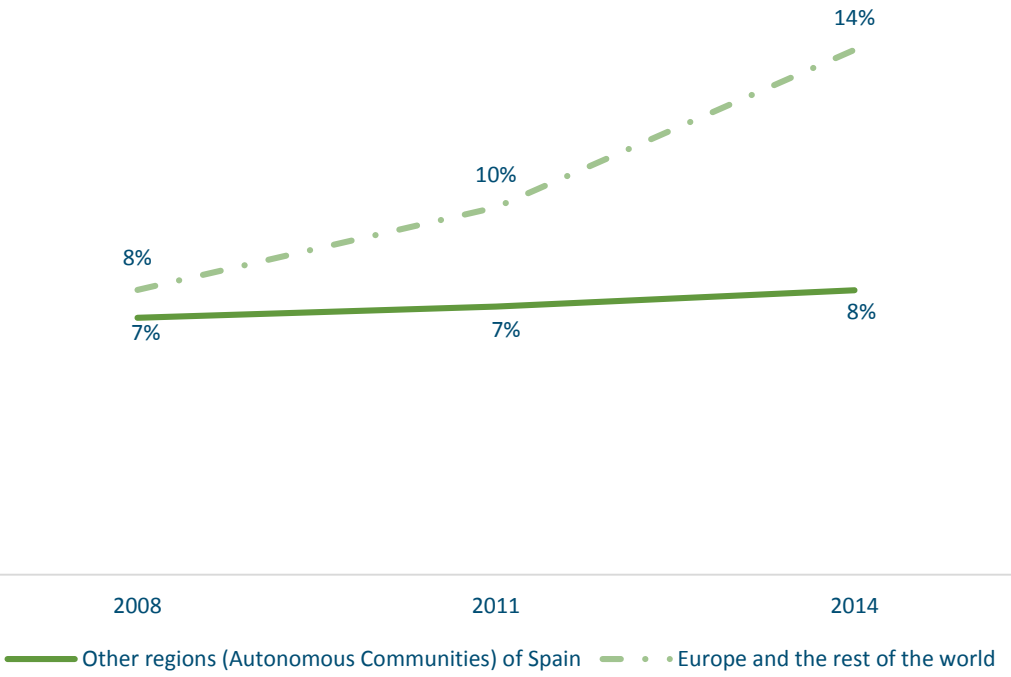
78% of holders of doctoral degrees from Catalan universities were working in Catalunya, which ranged from 70% in Experimental Sciences to 86% in Social Sciences. Conversely, the percentage of doctorate holders working abroad (outside of Spain) was highest in Experimental Sciences (el 23%), compared to 5% in Social Sciences.

Figure 3.7.1. Job location according to discipline



A comparison of these data with those for 2008 and 2011 shows that, while the number of doctorate holders increased, the proportion of doctorate holders who were working in Catalonia went down, and those who were working in other regions (Autonomous Communities) of Spain remained constant. The importance of the labour market outside of Spain as an employer of doctorate holders from Catalan universities therefore increased during this period and grew from 8% to 14%.

Figure 3.7.2. Trend in the percentage of doctorate holders according to job location



3.8. Type of contract

Only 46% of doctorate holders had a permanent or open-ended contract.

Contractual stability declined 15% compared to 2008. This drop was more pronounced in the university sector (21%) and less in enterprises (9%).

Stability was highest among those working in enterprises (73%) and lowest amongst those working in a university (25%). Instability was thus linked to the "traditional" areas of employment for doctorate holders (university and research institutes).

Doctorate holders who were working abroad had a higher job stability (19% had a permanent or open-ended contract compared to 50% with temporary contracts).

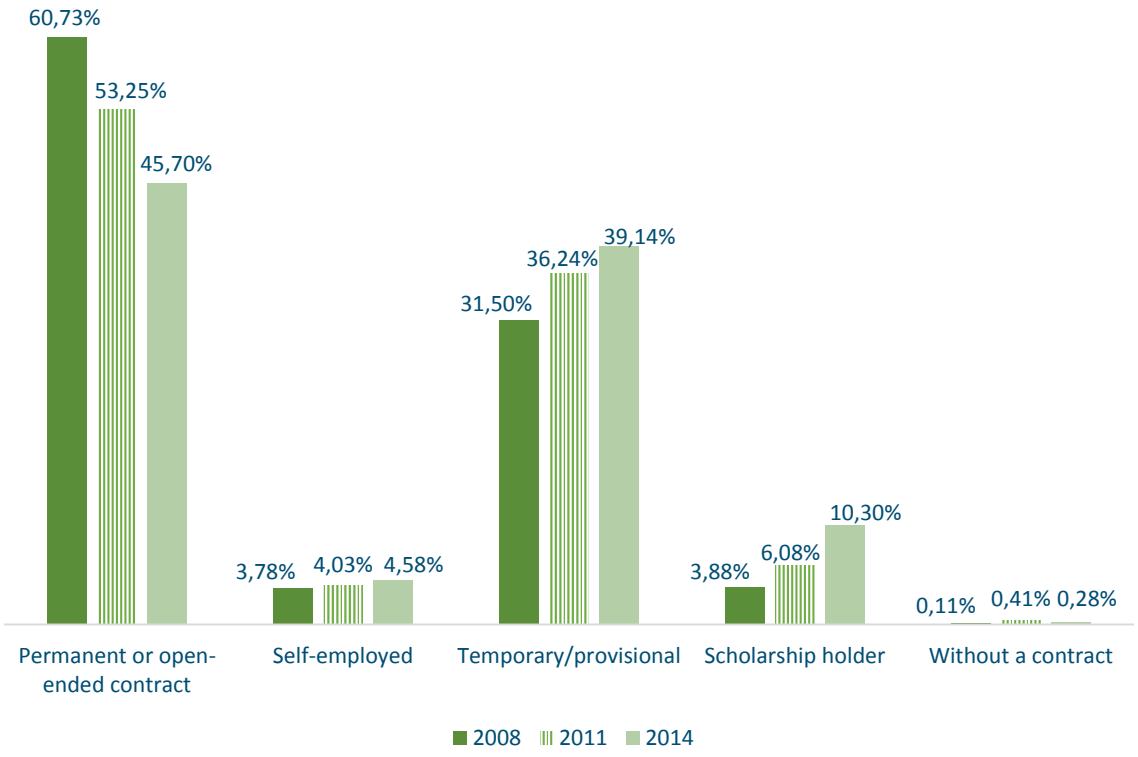
The data for 2014 show that 46% of doctorate holders had a permanent or open-ended contract, a value that ranged from 33% of doctorate holders in Experimental Sciences to 64% in Health Sciences. The second most common type, that of a temporary or provisional contract, accounted for 39% of doctorate holders, again with differences according to discipline, ranging from 27% of doctorate holders with a temporary or provisional contract in Health Sciences to 50% in Experimental Sciences.

Table 3.8.1. Type of contract according to discipline

	Permanent or open-ended	Temporary / provisional	Self-employed	Scholarship	Without a contract	*n*	%
Humanities	39.47%	41.58%	6.84%	11.05%	1.05%	190	100%
Social Sciences	51.45%	31.54%	7.47%	9.13%	0.41%	241	100%
Experimental Sciences	33.33%	50.29%	2.34%	13.84%	0.19%	513	100%
Health Sciences	64.22%	26.72%	3.45%	5.60%	0.00%	232	100%
Engineering and Architecture	53.31%	33.06%	5.79%	7.85%	0.00%	242	100%
Total	**45.70%**	**39.14%**	**4.58%**	**10.30%**	**0.28%**	**1,418**	**100%**

The trend in the relative importance of the different types of contracts was affected by the economic crisis. The relative importance of permanent and open-ended contracts among doctorate holders dropped from 61% in 2008 to 46% in 2014, whereas that of temporary contracts and scholarships went up considerably (8% and 6%, respectively).

Figure 3.8.1. Trend in the distribution of doctorate holders according to type of contract



Significant differences are apparent from the distribution of doctorate holders according to type of contract and place of work. More than half of those who were working in a university or research institute in Spain had a temporary or provisional contract compared to 15% for those working in enterprises (where 74% either had a permanent or open-ended contract).

For those who were working abroad, there was a higher level of instability due to the fact that only 19% had either a permanent or open-ended contract whereas for those who stayed in Spain it was 50%.

Table 3.8.2. Type of contract and place of work

	Permanent or open-ended contract	Temporary / provisional	Self-employed	Scholar-ship	Without a contract	*n*	%
Spain							
In a university	29.17%	53.51%	0.44%	16.89%	0.00%	456	100%
In a research facility/institute	35.14%	59.91%	1.35%	3.15%	0.45%	222	100%
For an enterprise or other organisation	74.30%	14.71%	10.61%	0.00%	0.37%	537	100%
Total Spain	**50.21%**	**37.53%**	**5.10%**	**6.91%**	**0.25%**	**1,215**	**100 %**
Outside of Spain							
In a university	9.73%	43.36%	0.88%	45.13%	0.88%	113	100%
In a research facility/institute	16.67%	65.00%	0.00%	18.33%	0.00%	60	100%
For an enterprise or other organisation	56.67%	36.67%	6.67%	0.00%	0.00%	30	100%
Outside of Spain	**18.72%**	**48.77%**	**1.48%**	**30.54%**	**0.49%**	**203**	**100 %**
Total	**45.70%**	**39.14%**	**4.58%**	**10.30%**	**0.28%**	**1,418**	**100 %**

This distribution can be seen for all disciplines, although there are certain differences. For example, temporary and provisional contracts were more important with universities and research institutes, although for Social Sciences it was less so and there was a higher proportion of doctorate holders with a permanent or open-ended contract. In the case of enterprises, 80% of doctorate holders in Health Sciences had a permanent or open-ended contract, whereas in Social Sciences and Humanities the percentage was lower (69% and 67%, respectively).

Table 3.8.3. Type of contract according to place of work and discipline

	Permanent or open-ended contract	Self-employed	Temporary / provisional	Scholar-ship	Without a contract	*n*	%
In a university	**25.31%**	**0.53%**	**51.49%**	**22.50%**	**0.18%**	**569**	**100%**
Humanities	22.00%	0.00%	59.00%	19.00%	0.00%	100	100%
Social Sciences	39.86%	0.70%	44.06%	15.38%	0.00%	143	100%
Experimental Sciences	9.04%	0.56%	55.37%	34.46%	0.56%	177	100%
Health Sciences	17.95%	0.00%	58.97%	23.08%	0.00%	39	100%
Engineering and Architecture	38.18%	0.91%	45.45%	15.45%	0.00%	110	100%
In a research facility/institute	**31.21%**	**1.06%**	**60.99%**	**6.38%**	**0.35%**	**282**	**100%**
Humanities	27.78%	11.11%	44.44%	11.11%	5.56%	18	100%
Social Sciences	61.54%	0.00%	38.46%	0.00%	0.00%	13	100%
Experimental Sciences	24.43%	0.57%	69.32%	5.68%	0.00%	176	100%
Health Sciences	41.18%	0.00%	47.06%	11.76%	0.00%	34	100%
Engineering and Architecture	43.90%	0.00%	51.22%	4.88%	0.00%	41	100%
For an enterprise or other organisation	**73.37%**	**10.41%**	**15.87%**	**0.00%**	**0.35%**	**567**	**100%**
Humanities	66.67%	15.28%	16.67%	0.00%	1.39%	72	100%
Social Sciences	69.41%	20.00%	9.41%	0.00%	1.18%	85	100%
Experimental Sciences	70.00%	6.25%	23.75%	0.00%	0.00%	160	100%
Health Sciences	80.50%	5.03%	14.47%	0.00%	0.00%	159	100%
Engineering and Architecture	75.82%	14.29%	9.89%	0.00%	0.00%	91	100%
Total	**45.70%**	**4.58%**	**39.14%**	**10.30%**	**0.28%**	**1,418**	**100 %**

The trend in the different types of contract varies according to the place of work (see figure 3.8.2):

- **In a university**, the relative importance of those with a permanent or open-ended job contract was halved, and only 25% had a permanent or open-ended job contract. The type of contract that increased the most was that of scholarships, which in 2008 accounted for 8% of new doctorate holders whereas in 2014 it had increased to 23%. The importance of temporary and provisional contracts increased slightly from 46 to 51%.
- **In a research institute,** there were fewer with a permanent or open-ended job contract (from 42% to 31%) while there was an increase in temporary contracts (from 53% to 61%).
- **In enterprises,** the distribution is clearly quite different with permanent or open-ended contracts being more important, although there was a decrease over the period examined (from 82% in 2008 to 73% in 2014). Conversely, there was an increase in temporary contracts (from 9% to 16%).

Figure 3.8.2. Type of contract according to the place of work

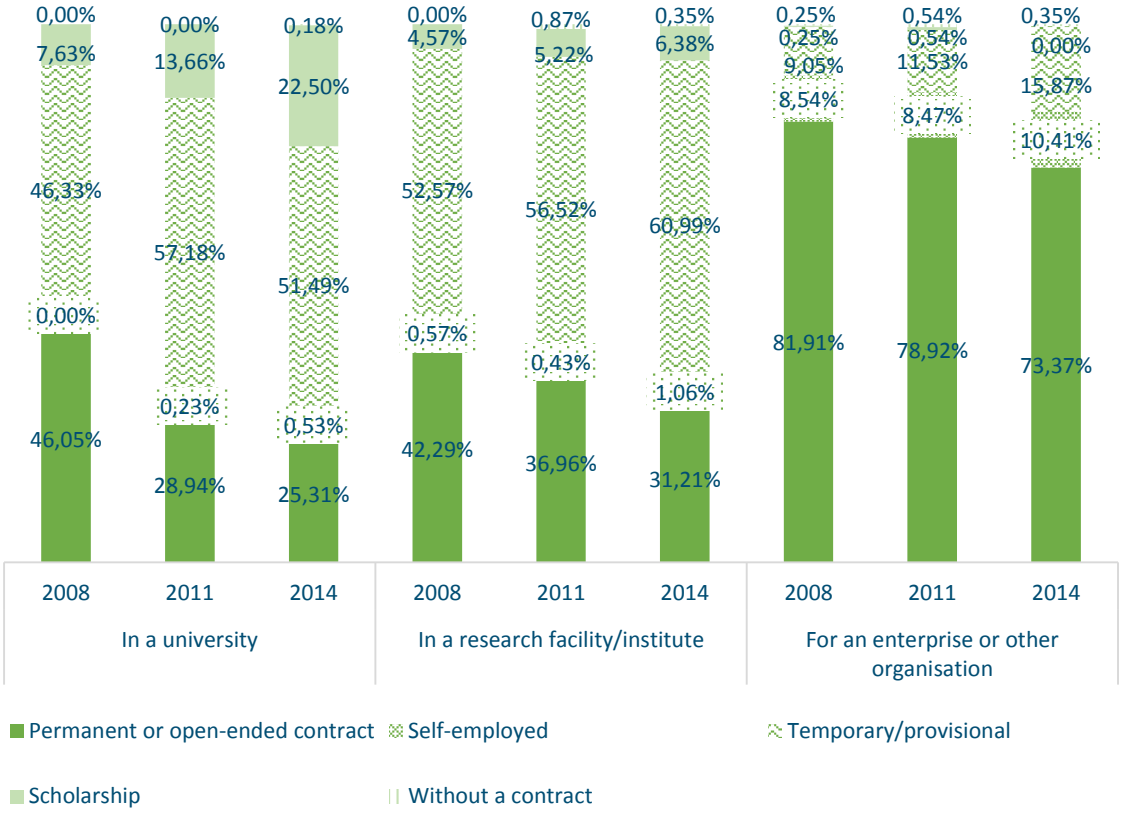
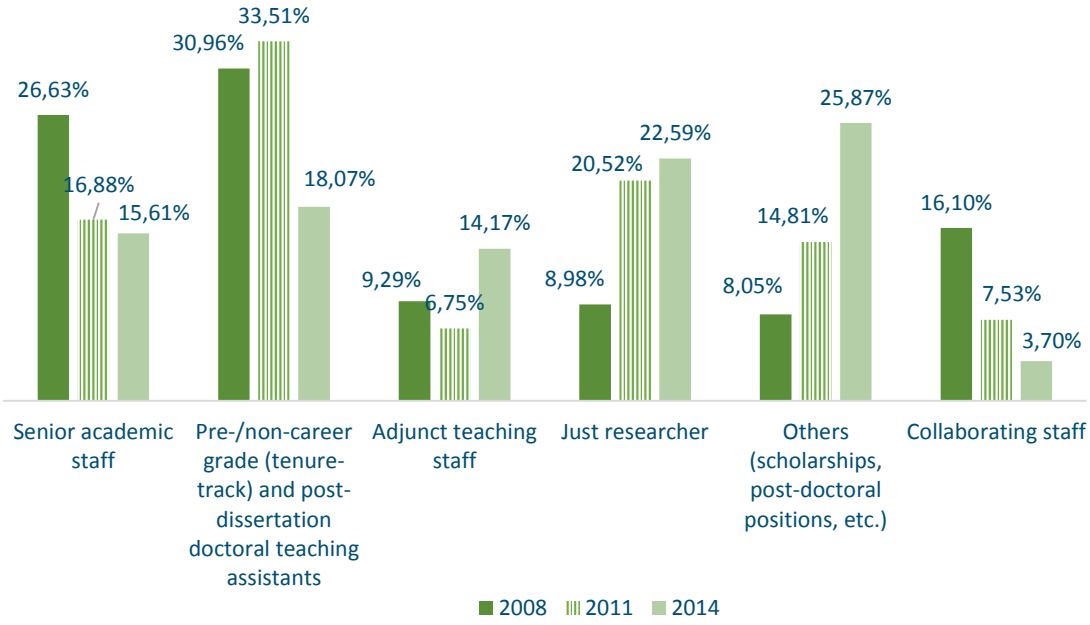


Table 3.8.4. Type of contract of doctorate holders working in a university according to discipline

	Senior academic staff	Tenure-track and post-diss. assistants	Adjunct teachers	Just researcher	Others (scholarships, postdocs., etc.)	Collaborating	*n*	%
Humanities	11.76%	21.18%	32.94 %	8.24%	22.35%	3.53%	85	100%
Social Sciences	20.18%	24.77%	16.51 %	11.93%	20.18%	6.42%	109	100%
Experimental Sciences	6.45%	10.32%	7.74%	36.13%	38.71%	0.65%	155	100%
Health Sciences	5.71%	8.57%	22.86 %	34.29%	25.71%	2.86%	35	100%
Engineering and Architecture	31.07%	23.30%	2.91%	21.36%	15.53%	5.83%	103	100%
Total	**15.61%**	**18.07%**	**14.17 %**	**22.59%**	**25.87%**	**3.70%**	**487**	**100 %**

Figure 3.8.3. Trend in the type of contract of doctorate holders working in a university



Entrepreneurship

The number of people who decide to start a business is connected with economic dynamism, although a positive performance of the economy is dependent on other factors as well and not only the number of enterprises. A high level of self-employment is not the equivalent of a high level of development or productivity, and for this to happen enterprises have to deliver value, which more often than not means they need to be technology-based and have management capability.

According to a recent study (Pérez and Serrano, 2012), there is a lower probability of a person with a higher education having a business enterprise (with or without employees), but a higher probability of them being a director or manager. The authors claim that a university education is not a requirement for setting up a business or starting a company, whereas it is to be hired for a senior management (director) tasks (a person's education is a sign of greater capability). Both groups (business people and senior management) need entrepreneurial skills, but of a different kind and the risks they will face are different.

This section examines two indicators associated with the entrepreneurial skills of doctorate holders, taken to mean senior management duties and responsibilities, either through setting up their own business or company (freelance self-employed) or for having these duties and responsibilities in another organisation.

As can be seen from the following table, 91% of self-employed doctorate holders were self-employed. In Health Sciences and Social Sciences 100% are self-employed, compared to 75% in Experimental Sciences.

Table 3.8.5. Type of self-employment according to discipline

	Economically dependent self-employed	Freelance self-employed	n	%
Humanities	7.69%	92.31%	13	100.00%
Social Sciences	0.00%	100.00%	18	100.00%
Experimental Sciences	25.00%	75.00%	12	100.00%
Health Sciences	0.00%	100.00%	8	100.00%
Engineering and Architecture	14.29%	85.71%	14	100.00%
Overall total	**9.23%**	**90.77%**	**65**	**100.00%**

On the other hand, 26% of doctorate holders held managerial positions (their own company, management, production, financial, etc.) three years after completing their doctoral degree studies. Engineering and Architecture and Social Sciences were the disciplines with the highest proportion of people with managerial tasks (both with 40%), compared to just 12% in Health Sciences.

Table 3.8.6. Percentage of doctorate holders in managerial positions according to discipline[13]

	Managerial positions	Non-managerial positions	n	%
Humanities	28.79%	71.21%	105	100%
Social Sciences	39.43%	60.57%	132	100%
Experimental Sciences	17.89%	82.11%	358	100%
Health Sciences	12.14%	87.86%	197	100%
Engineering and Architecture	39.96%	60.04%	139	100%
Overall total	**25.77%**	**74.23%**	**931**	**100%**

[13] Doctoral degree holders working in public universities were not asked this question, so they were not included here in the sample.

3.9. Gross annual earnings

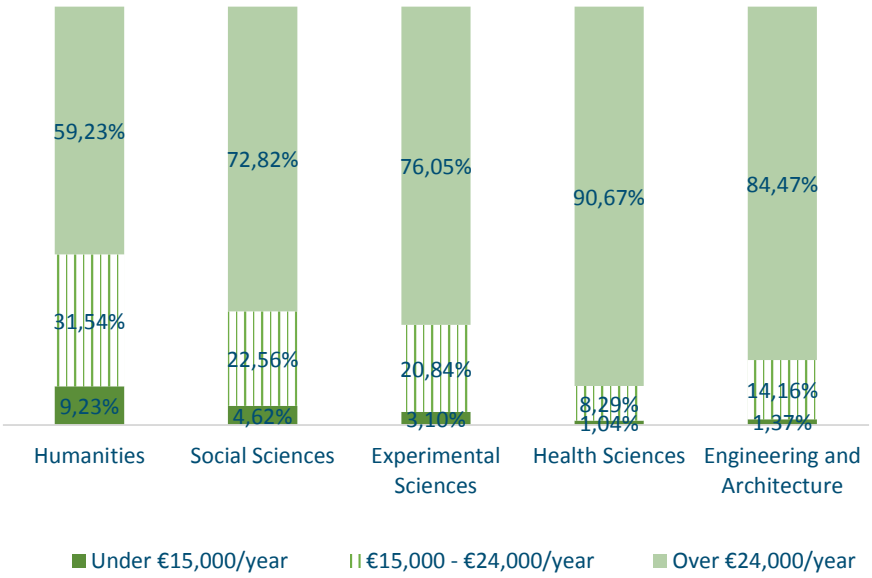
78% of full-time employed doctorate holders were earning more than €24,000 a year. Only 3% were earning less than €15,000 a year.

The majority (69%) of doctorate holders earning more than €24,000 were in the €24,000-€40,000 bracket, with the exception of doctorate holders in Health Sciences where the majority were earning more than €40,000 (62%).

78% of doctorate holders with a full-time contract were earning more than €24,000, according to the data for 2014.

A higher proportion of doctorate holders in Engineering and Architecture and Health Sciences were concentrated in the high end of the salary scale (84% and 91% respectively), whereas the proportion was significantly lower in Experimental Sciences, Social Sciences and Humanities (76%, 73% and 59% respectively).

Figure 3.9.1. Gross annual earning according to discipline (full-time employment)



The majority (69%) of doctorate holders earning more than €24,000 were in the €24,000-€40,000 bracket, with the exception of doctorate holders in Health Sciences where the majority were earning more than €40,000 (62%).

Table 3.9.1. Gross annual earnings over €24,000 according to discipline (full-time employment)

	Between €24,000 and €30,000	Between €30,000 and €40,000	Between €40,000 and €50,000	Over €50,000	*n*	%
Humanities	54.55%	33.77%	9.09%	2.60%	77	100%
Social Sciences	30.99%	36.62%	11.97%	20.42%	142	100%
Experimental Sciences	40.82%	37.61%	12.54%	9.04%	343	100%
Health Sciences	19.43%	18.29%	25.14%	37.14%	175	100%
Engineering and Architecture	31.89%	40.54%	14.05%	13.51%	185	100%
Total	**34.60%**	**34.06%**	**14.86%**	**16.49%**	**922**	**100%**

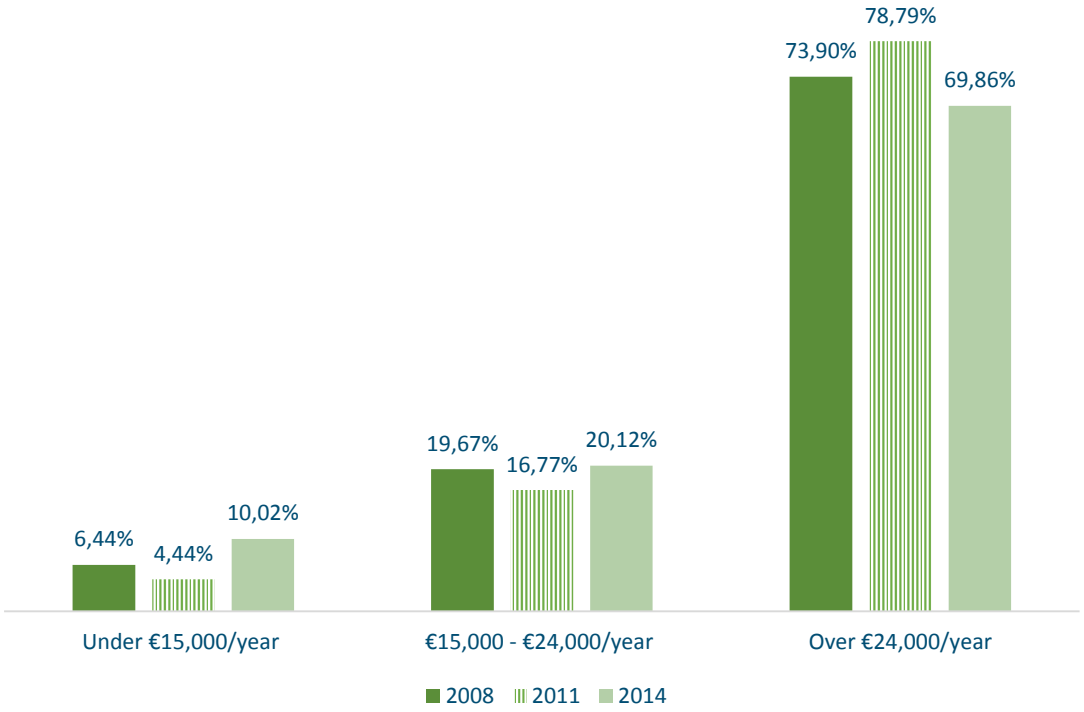
It can also be seen there were differences according to the place of work. 62% of doctorate holders who were working for enterprises had earnings over €30,000 a year. The corresponding proportion for doctorate holders working in a university or research institute was less than 50%.

Table 3.9.2. Gross annual earnings according to the place of work (full-time employment)

Earnings (€)	In a university	In a research facility/institute	For an enterprise or other organisation	Total
Less than €9,000	0.44%	0.00%	1.45%	1%
€9,000 - 12,000	0.66%	0.40%	0.62%	1%
€12,000 - 15,000	1.75%	2.02%	2.28%	2%
€15,000 - 18,000	4.16%	1.61%	3.31%	3%
€18,000 - 24,000	20.79%	16.13%	10.77%	16%
€24,000 - 30,000	30.63%	34.27%	19.46%	27%
€30,000 - 40,000	27.13%	26.21%	25.88%	26%
€40,000 - 50,000	9.85%	9.68%	14.08%	12%
Over 50,000	4.60%	9.68%	22.15%	13%
Total	**100.00%**	**100.00%**	**100.00%**	**100%**

With regard to the trend in the distribution of doctorate holders according to gross annual earnings, it can be seen that the percentage of doctorate holders in the high earnings bracket (over €24,000) went down in 2014 compared to previous editions.

Figure 3.9.2. Trend in the distribution of doctorate holders according to gross annual earnings (full-time employment)



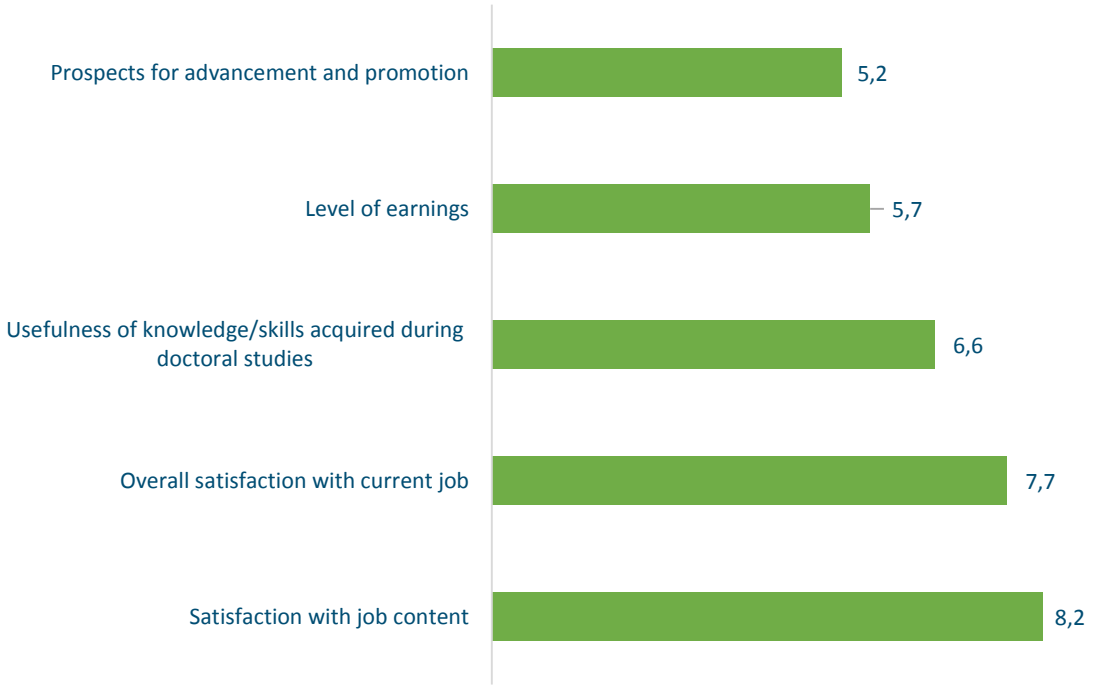
3.10. Current job satisfaction

Doctorate holders rated their overall satisfaction with their current job as 8.2 on a scale from 0 to 10.

As regards the trend in job satisfaction, the most significant change compared to the data for 2008 was in relation to the prospects for advancement, which dropped from 6.3 to 5.2. Satisfaction with the level of earnings also decreased (from 6 to 5.7).

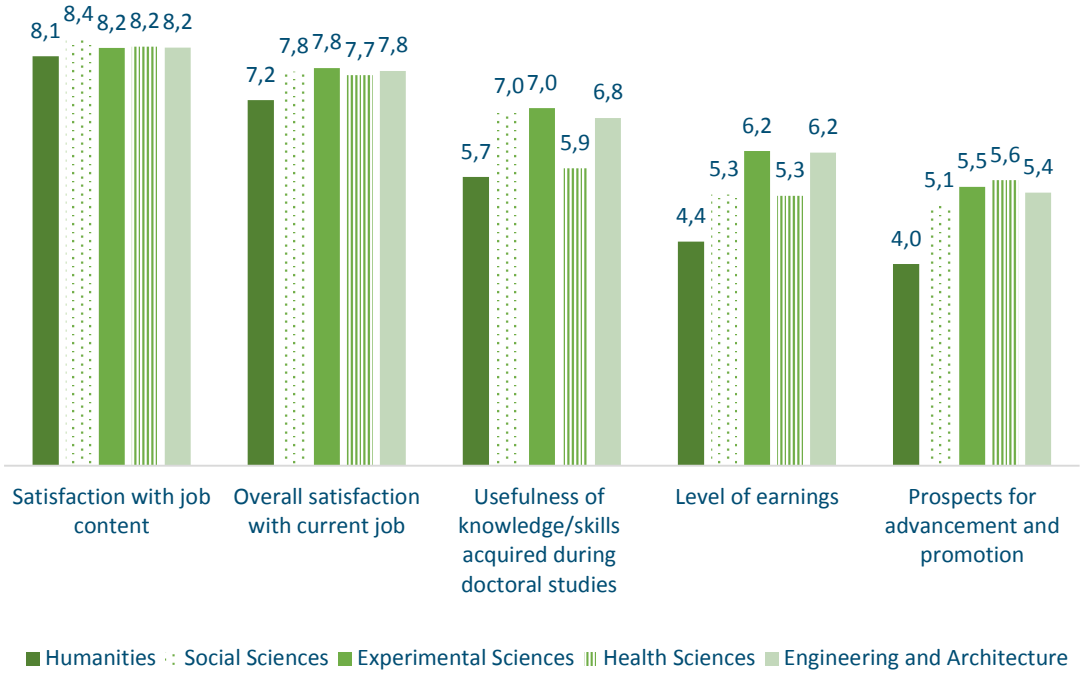
Doctorate holders rated job content very highly (8.2 on a scale from 0 to 10). Satisfaction with the job-skills match however was rated at 6.6; the level of earnings 5.7; and the prospects for advancement and job promotion 5.2. Their overall satisfaction with their current job was 7.7.

Figure 3.10.1. Satisfaction with one's current job (scale from 0 to 10)



The level of satisfaction of doctorate holders in Humanities, for all of the aspects examined, was below the average for all disciplines. Doctorate holders in Social Sciences were least satisfied with the prospects for advancement and promotion and the level of earnings, whereas doctorate holders in Health Sciences were less satisfied with the level of earnings and the prospects for advancement and promotion.

Figure 3.10.2. Satisfaction with one's current job according to discipline (scale from 0 to 10)



As shown in the figure below, there were differences in the satisfaction of doctorate holders according to their place of work. In particular, those who were working in enterprises were more satisfied as regards their prospects for advancement and promotion than doctorate holders working in either a university or research institute. On the other hand, those working in either a university or research institute were more satisfied with the usefulness of knowledge/skills acquired during doctoral studies than those working for an enterprise.

Figure 3.10.3. Satisfaction with one's current job according to the place of work (scale from 0 to 10)

It can also be seen that the satisfaction of doctorate holders with certain issues has varied over time. The most significant change compared to the data for 2008 is their level of satisfaction with their prospects for advancement, which dropped from 6.3 to 5.2. Their level of satisfaction with their level of earnings also fell slightly (from 6 to 5.7). The other aspects remained fairly constants over the entire period examined.

Table 3.10.1. Trend in the satisfaction with one's current job according to discipline (scale from 0 to 10)

	2008	2011	2014
Satisfaction with job content	8.1	8.3	8.2
Overall satisfaction with one's job	7.6	7.7	7.7
Satisfaction with the usefulness of knowledge/skills acquired during doctoral studies	6.6	6.9	6.6
Satisfaction with one's level of earnings	6.0	6.2	5.7
Satisfaction with the prospects for advancement and promotion	6.3	6.2	5.2

4. SATISFACTION WITH DOCTORAL STUDIES

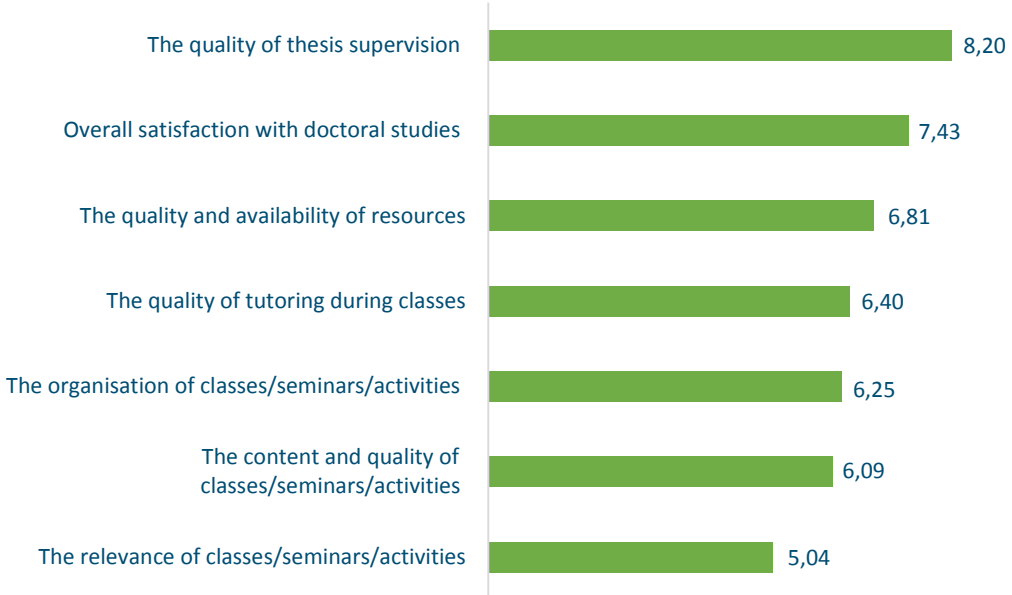
Doctorate holders rated their overall level of satisfaction with their doctoral studies as 7.4 (on a scale from 0 to 10), which means that it has increased over time since 2008.

This trend is evident in all aspects associated with undertaking a doctoral thesis.

4.1. Satisfaction with doctoral studies

The data show that doctorate holders rated their overall satisfaction with their doctoral studies as 7.4 (on a scale from 0 to 10). The most highly rated aspects, in order of decreasing importance, were: the quality of thesis supervision (8.2), the quality and availability of resources (6.81), the quality of tutoring during classes (6.40), the organisation of classes/seminars/activities (6.25), and the content and quality of classes/seminars/activities (6.09). The relevance of classes/seminars/activities during doctoral studies was rated as 5.

Figure 4.1.1. Satisfaction with doctoral studies (scale from 0 to 10)



According to disciplines, doctorate holders in Engineering and Architecture had the highest level of satisfaction, while those in Health Sciences and Experimental Sciences were the least satisfied. Of note with regard to the Humanities was the low level of satisfaction of doctorate holders with the quality and availability of resources.

Table 4.1.1. Satisfaction with doctoral studies according to discipline (scale from 0 to 10)

	Humanities	Social Sciences	Experimental Sciences	Health Sciences	Engineering and Architecture	Total mean
The quality of thesis supervision	8.31	8.40	7.96	8.57	8.06	8.20
Doctoral studies as a whole	7.29	7.44	7.50	7.21	7.60	7.43
The quality and availability of resources	5.96	6.19	7.40	6.56	7.06	6.81
The quality of tutoring in classes	6.88	6.83	6.19	5.45	6.86	6.40
The organisation of classes/seminars/activities	6.68	6.68	6.11	5.65	6.33	6.25
The content and quality of classes/seminars/activities	6.39	6.38	5.95	5.64	6.28	6.09
The relevance of classes/seminars/activities	5.13	5.67	4.93	4.03	5.51	5.04

With regard to the trend in the level of satisfaction of doctorate holders with their doctoral studies, it can be seen that their overall level of satisfaction with doctoral studies increased over time from 6.72 in 2008 to 7.43 in 2014. Their satisfaction with the content and quality of classes/seminars/activities, with the quality and availability of resources, and with the quality of thesis supervision also slightly improved over this period. Satisfaction with the remaining factors, associated with classes and learning activities, also improved in comparison with 2008, although it was slightly below the level of 2011.

Table 4.1.2. Trend in the satisfaction of doctorate holders with their doctoral studies according to discipline (scale from 0 to 10)

	2008	2011	2014	Difference 2008-2014
The quality of thesis supervision	7.98	7.95	8.20	0.22
Doctoral studies as a whole	6.72	7.24	7.43	0.71
The quality and availability of resources	6.49	6.79	6.81	0.32
The quality of tutoring in classes	6.14	6.55	6.40	0.26
The organisation of classes/seminars/activities	6.00	6.41	6.25	0.25
The content and quality of classes/seminars/activities	5.69	5.97	6.09	0.40
The relevance of classes/seminars/activities	4.99	5.26	5.04	0.05

4.2. Skills rating

Doctorate holders rated the majority of the skills between 7 and 8 (on a scale from 0 to 10), which meant a slight decrease with regard to 2008.

The most highly rated skills were those traditionally associated with research, including the ones corresponding to the effective communication of research.

The rating of skills that have more recently been added as being necessary in a doctorate holder's professional career (networking, funding and resources for research, and teaching skills) were rated more discretely.

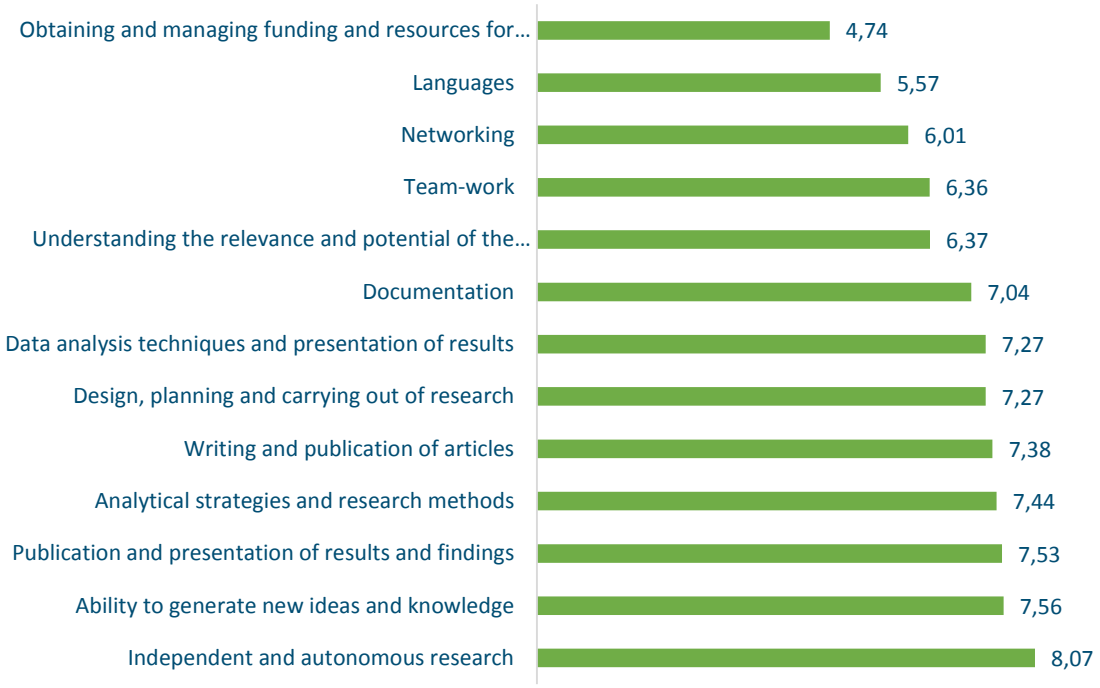
As pointed out in the introduction, there has been a redefinition of the skills (competence) profile of doctoral training (Irish Universities Association, 2008; Vitae, 2010; LERU, 2010). This redefinition has consisted of a broadening of the skills needed by doctorate holders to cope with changes in the way that research work is carried out (a global workplace, networking, the need to manage complex projects, competitive funding, etc.).

Doctorate holders rated the majority of the skills acquired during their doctoral studies between 7 and 8 (on a scale from 0 to 10). Their rating of team-work and languages, however, was 6.4 and 5.6 respectively.

If, as according to LERU (2010), the education of doctorate holders is defined by their ability to make a significant original contribution to knowledge as judged by a panel of experts, Catalan universities are doing a good job (see the mean rating for the ability to carry out independent and autonomous research, and to generate new ideas and knowledge). The rating is high, not only for these skills, but also for the communication of the results of research to more open audiences and the publication of articles.

The LERU paper also points out that the sector of research and innovation in the knowledge economy is international, interdisciplinary and increasingly intersectoral; there is therefore potential here for the improvement of skills in languages, team-work and networking. Furthermore, according to the Researcher Development Framework (Vitae, 2010), doctorate holders should have teaching skills, and also be capable of understanding the relevance and potential of their research. There is also room for improvement in these skills.

Figure 4.2.1. Rating of skills acquisition (scale from 0 to 10)



All together, there are two main groups of skills, one connected with what has traditionally been associated with doctoral studies and where the universities have, on average, provided a good training; and a second newer group of skills that involves the future professionalisation of doctorate holders beyond research in an isolated sense, where the results are also positive, but where there is still large room for improvement.

According to disciplines, it can be seen that the ratings of doctorate holders in Experimental Sciences and Engineering and Architecture are more positive for practically all skills. Comparatively speaking, those that stand out in Experimental Sciences were skills in documentation and team-work (particularly low in the other disciplines). Doctorate holders in Humanities were more critical (especially as regards the publishing and presentation of results and findings) and Health Sciences (especially as regards analytical strategies and research methods).

Table 4.2.1. Rating of skills acquisition according to discipline (scale from 0 to 10)

	Humanities	Social Sciences	Experimental Sciences	Health Sciences	Engineering and Architecture	Total mean
independent and autonomous research	8.01	8.28	8.12	7.56	8.27	8.07
Ability to generate new ideas and knowledge	7.53	7.44	7.63	7.23	7.84	7.56
Publication and presentation of results and findings	6.88	7.30	7.82	7.53	7.65	7.53
Analytical strategies (theories, fundaments and approaches) and research methods	7.46	7.25	7.75	6.99	7.40	7.44
Writing and publication of articles	6.56	6.90	7.60	7.55	7.85	7.38
Data analysis techniques and presentation of results	6.66	6.88	7.69	7.02	7.45	7.27
Design, planning and carrying out of research	6.91	7.10	7.48	7.33	7.19	7.27
Documentation	6.84	6.99	7.27	7.01	6.75	7.04
Understanding the relevance and potential of the impact of research on society	5.82	6.53	6.50	6.64	6.08	6.37
Team-work	4.97	5.13	7.40	6.59	6.23	6.36
Networking	5.04	5.92	6.35	6.18	5.98	6.01
Languages	4.44	4.94	6.30	5.05	6.03	5.57
Obtaining and managing funding and resources for research	4.06	4.56	4.75	4.78	5.41	4.74

With regard to the trend in the rating between 2008 and 2014, doctorate holders rated all skills more negatively except for team-work and the ability to generate new ideas and knowledge.

Table 4.2.2. Trend in the level of skills acquisition (scale from 0 to 10)

	2008	2011	2014	Difference 2008-2014
Ability to generate new ideas and knowledge	7.52	7.10	7.56	0.04
Publication and presentation of results and findings	7.66	6.88	7.53	-0.13
Analytical strategies (theories, fundaments and approaches) and research methods	7.62	6.60	7.44	-0.18
Data analysis techniques and presentation of results	7.45	6.57	7.27	-0.18
Design, planning and carrying out of research	7.50	6.76	7.27	-0.23
Team-work	5.73	5.87	6.36	0.63
Documentation	8.19	6.65	7.04	-1.15
Languages	6.45	5.17	5.57	-0.88

4.3. The impact of doctoral studies

Half of all the doctorate holders stated that their doctoral studies had a positive impact on their employment situation.

The impact of doctoral studies is reflected in four items that cover objective change (see table 4.3.1), and five items that cover a subjective appreciation of the improvement in the professional duties and tasks of doctorate holders (see figure 4.3.1).

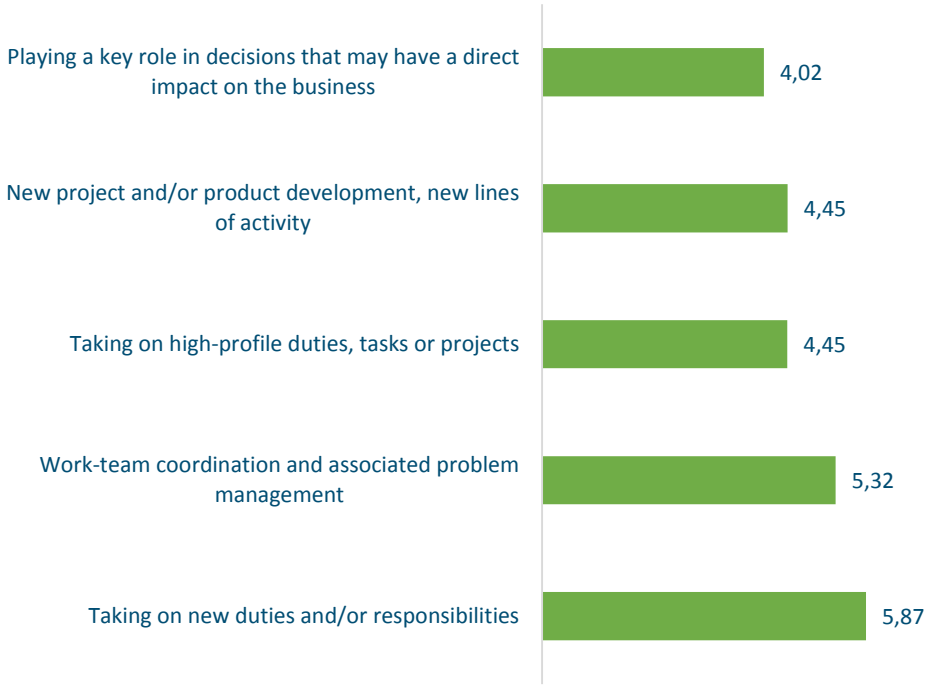
Almost half of all the doctorate holders stated that their doctoral studies had a positive impact on their employment situation in the labour market in the form of job promotion, better contract conditions and an increase in earnings. In Humanities and Health Sciences, however, this percentage was much lower (30%).

Table 4.3.1. Objective indicators on the impact of doctoral studies according to discipline

	Job promotion after obtaining doctorate	Better contract conditions	Increase in earnings	Increase in the working week (hours/week)	*n*
Humanities	30.81%	30.80%	30.08%	34.61%	164
Social Sciences	51.37%	46.69%	48.59%	33.32%	214
Experimental Sciences	60.07%	64.35%	67.88%	23.84%	400
Health Sciences	33.33%	34.41%	36.66%	23.21%	201
Engineering and Architecture	60.56%	61.07%	67.14%	27.52%	200
Total	**48.86%**	**49.92%**	**52.65%**	**27.22%**	**1,179**

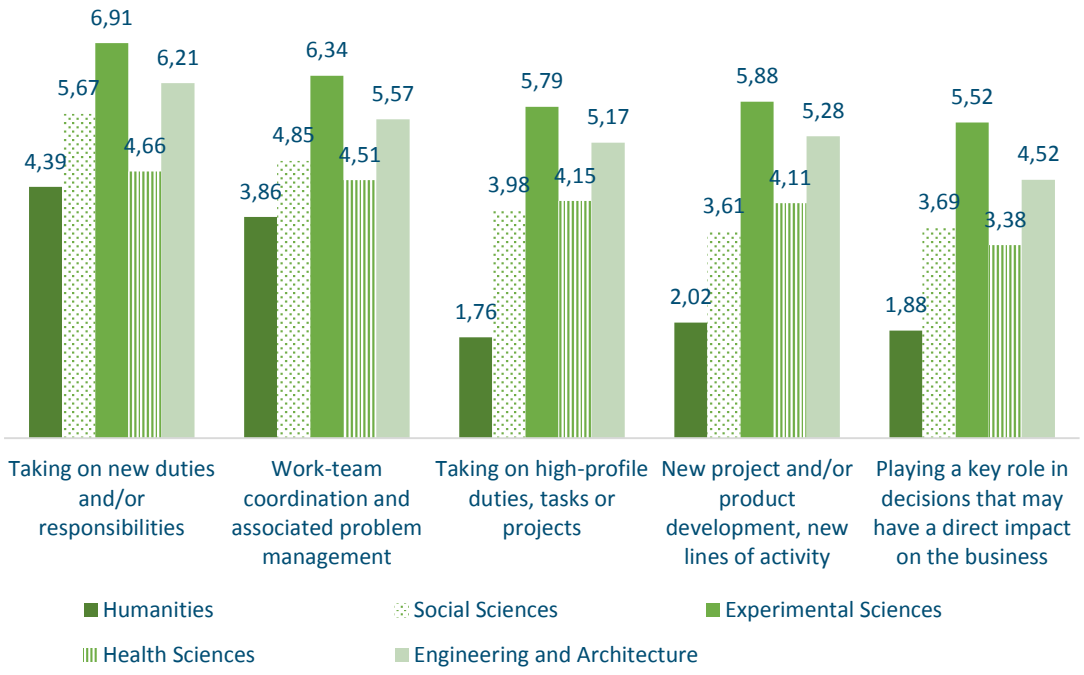
The perception of improvement (figure 4.3.1) was quite low as regards the tasks included in the questionnaire. Overall, there was no mean above 6 (on a scale from 0 to 10). The aspect where there was most improvement as a result of having undertaken doctoral studies was “Taking on new duties and/or responsibilities different to those assumed normally” (5.9); with least improvement for “Playing a key role in decisions that may have a direct impact on the business”. Given that all of these items were taken from a scale of organisational practices connected with the work of managerial positions, it would seem that doctoral studies are not linked to changes in such responsibilities.

Figure 4.3.1. Subjective indicators on the impact of doctoral studies (scale from 0 to 10)



The highest ratings, according to discipline, were in Experimental Sciences and Engineering and Architecture, and the most negative in Humanities.

Figure 4.3.2. The impact of doctoral studies according to discipline (subjective indicators)

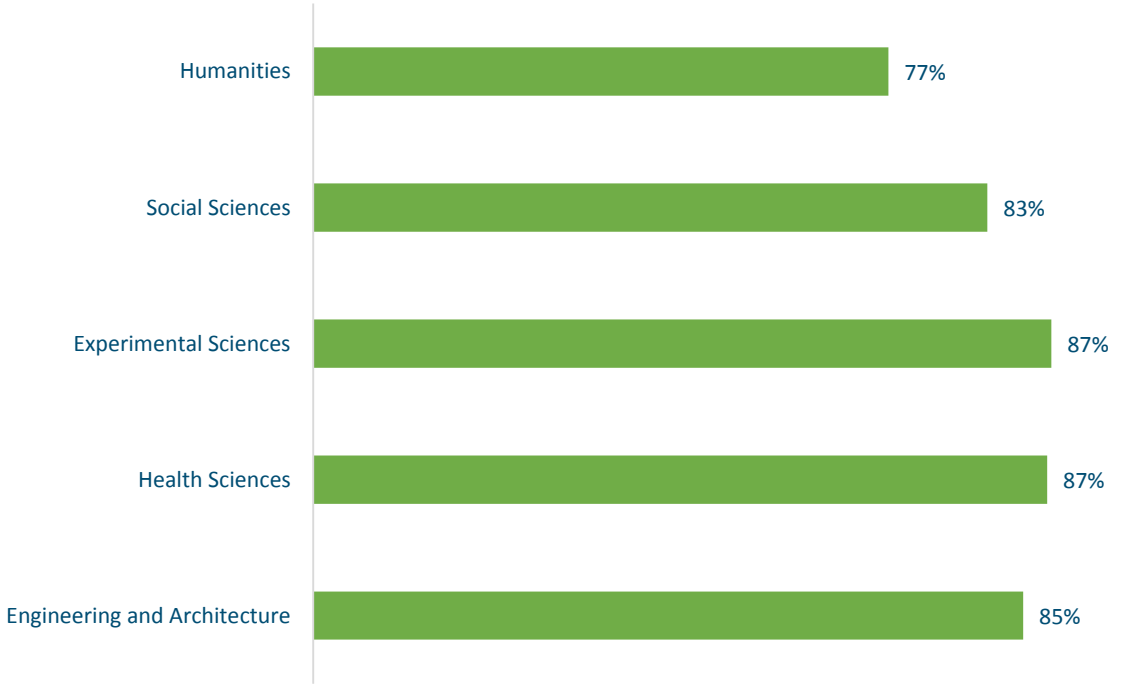


4.4. Intention of doctorate holders to repeat doctoral studies

85% of doctorate holders would repeat their doctoral studies again.

85% of doctorate holders stated they would repeat their doctoral studies, a percentage which ranged from 87% in Experimental Sciences and Health Sciences to 77% in Humanities.

Figure 4.4.1. Percentage of doctorate holders who would repeat the same doctoral studies according to discipline



There is no clear change in the trend regarding this variable, as the percentage of doctorate holders who would repeat their doctoral studies remained constant over the entire period. Nevertheless, there was a downward trend in the percentage of doctorate holders in Humanities who would repeat their doctoral studies (a decrease of 7% from 2008 to 2014).

Table 4.4.1. Trend in the percentage of doctorate holders who would repeat their doctoral studies according to discipline

	Yes	No	*n*	%
2014				
Humanities	76.84%	23.16%	190	100%
Social Sciences	83.19%	16.81%	238	100%
Experimental Sciences	87.28%	12.72%	511	100%
Health Sciences	87.01%	12.99%	231	100%
Engineering and Architecture	85.48%	14.52%	241	100%
Total 2014	**84.83%**	**15.17%**	**1,411**	**100%**
2011				
Humanities	82.46%	17.54%	171	100%
Social Sciences	88.82%	11.18%	161	100%
Experimental Sciences	84.52%	15.48%	420	100%
Health Sciences	84.75%	15.25%	223	100%
Engineering and Architecture	89.64%	10.36%	222	100%
Total 2011	**85.80%**	**14.20%**	**1,197**	**100%**
2008				
Humanities	83.85%	16.15%	130	100%
Social Sciences	79.87%	20.13%	159	100%
Experimental Sciences	85.62%	14.38%	306	100%
Health Sciences	85.85%	14.15%	205	100%
Engineering and Architecture	84.33%	15.67%	134	100%
Total 2008	**84.26%**	**15.74%**	**934**	**100%**

5. CHARACTERISTICS OF THE THESIS AND OTHER ACADEMIC ASPECTS

The mean duration for doctoral studies was 5.6 years.

Students of doctoral programmes are people who work, either undertaking an internship (50%) or working in graduate-level jobs (jobs on a level with the degree qualification that granted admission to the doctorate programme) (27%) or as teachers or researchers (13%).

Two-thirds of all doctorate holders carried out their thesis as part of a research group.

The monograph continues to be the main way of presenting the thesis (71%), together with the empirical thesis (80%).

5.1. Duration of doctoral studies[14]

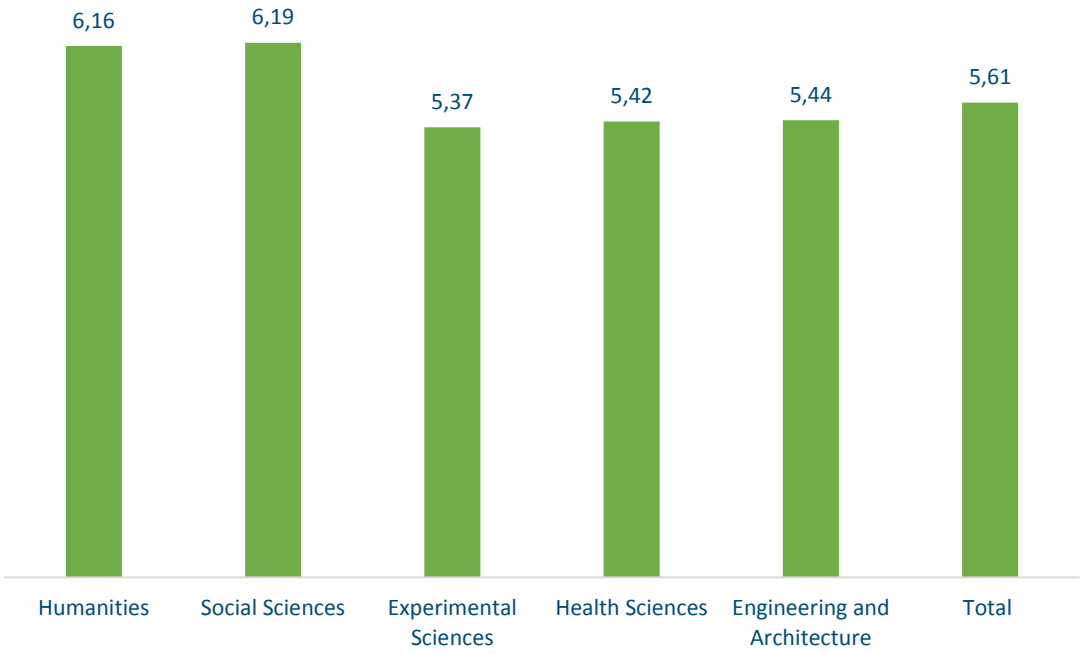
The mean duration of doctoral studies was 5.6 years.

Doctorate holders with a grant or scholarship for their doctoral studies and who formed part of a research group tended to obtain their doctorate degree in less time.

The mean duration of doctoral studies was 5.6 years. According to disciplines, doctorate holders in Humanities and Social Sciences took longer to complete their doctoral studies (6.2 years) than those in Experimental Sciences, Health Sciences and Engineering and Architecture (5.4 years).

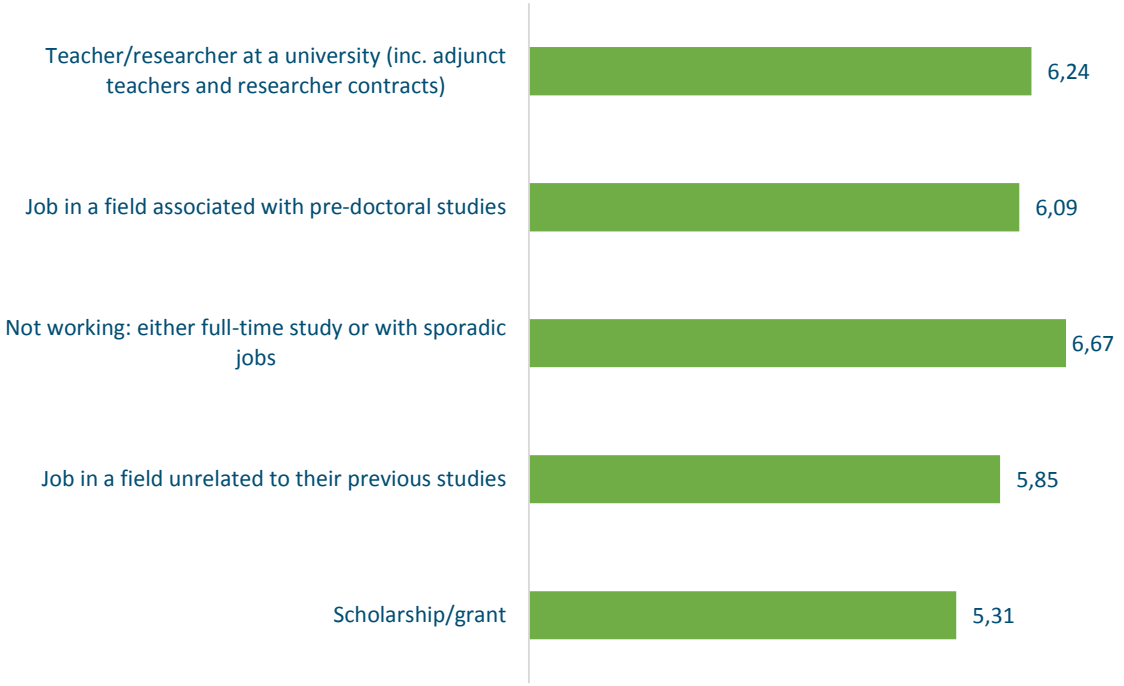
[14] In calculating the duration of doctoral studies, those who took either less than two years or more than ten years were not included as they were considered to be outliers. These represented 11.8% of the 2014 sample.

Figure 5.1.1. Duration of doctoral studies according to discipline (mean number of years)



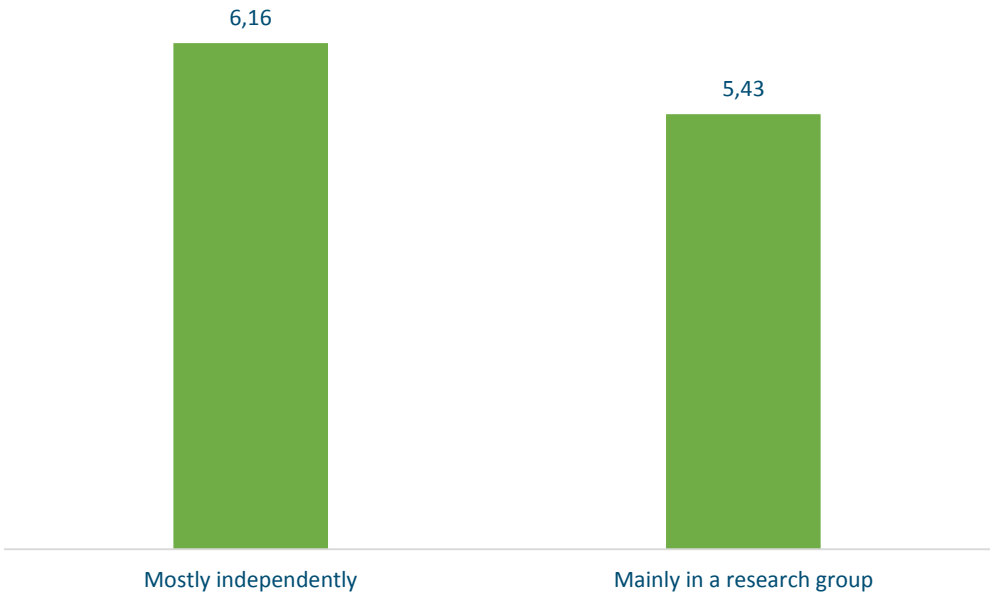
Doctorate holders who financed their doctoral studies through a grant or scholarship tended to obtain their doctorate degree in less time. Conversely, those who financed their doctoral studies by way of a teaching or research contract at a university or through a job in a field associated with their pre-doctoral studies tended to take longer to obtain their degree. Doctorate holders who were not working took even longer, although it is noteworthy that the sample was very small (6 observations).

Figure 5.1.2. Duration of doctoral studies according to the source of funding (mean number of years)



Having links with a research group during doctoral studies also appears to have contributed to doctoral students obtaining their doctorate six months ahead of those who carried out the work on their thesis mostly on their own (independently).

Figure 5.1.3. Duration of doctoral studies according to whether the thesis was undertaken in a research group or not (mean number of years)



5.2. Employment situation during doctoral studies

Students of doctoral programmes are people who work, either undertaking an internship (50%) or working in graduate-level jobs (jobs on a level with the degree qualification that granted admission to the doctorate programme) (27%) or as teachers or researchers (13%).

Only 4% had jobs during their doctoral studies that were not connected with their pre-doctoral studies. Only 1% were not working.

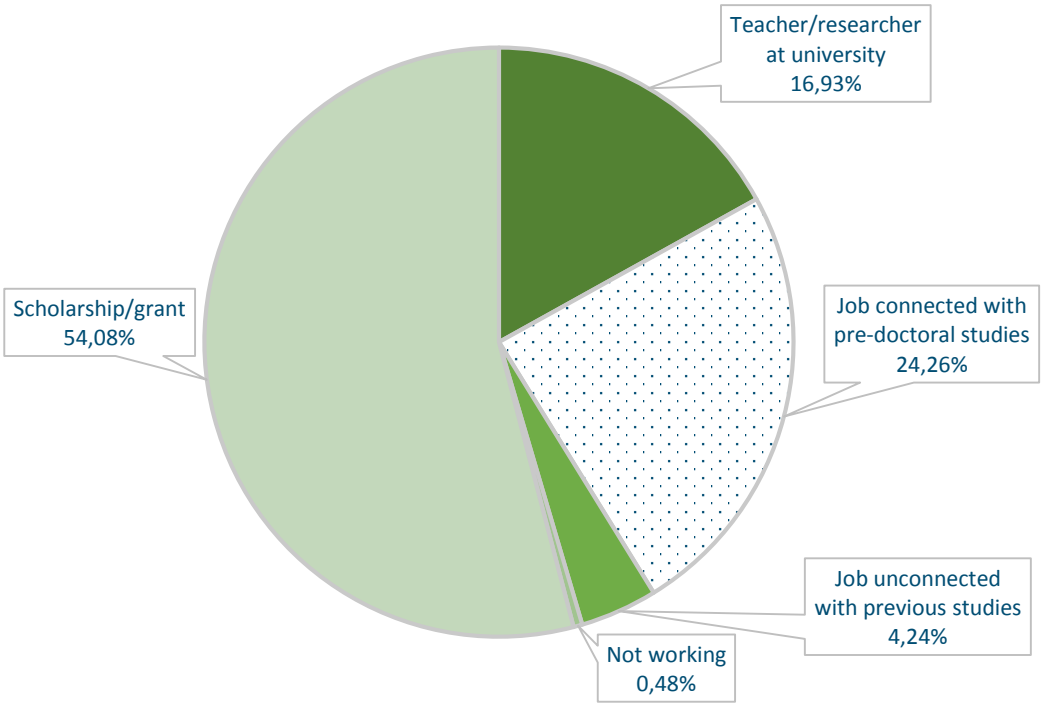
There were substantial differences in the distribution of scholarships and grants according to discipline (77% in Experimental Sciences compared to 32% in Health Sciences).

As is to be expected, those taking doctoral programmes are the most mature students in the university system. This circumstance, together with the broad duration of doctoral studies, means that their source of income during doctoral studies is of particular significance.

55% of doctorate holders who obtained their degrees in 2009 and 2010 financed their doctoral studies by means of a grant or scholarship, whereas 27% paid for their studies by way of a job

connected with their pre-doctoral studies, and 4% did so in a job unconnected with their pre-doctoral studies. 13% of doctorate holders had already acquired a job as a teacher or researcher at university while they were taking their doctoral studies.

Figure 5.2.1. Source of finance for doctoral studies



There were significant differences according to disciplines. On the one hand, the percentage of doctorate holders who had a scholarship or grant ranged between 77% in Experimental Sciences to 32% in Health Sciences. In this regard, 62% of doctorate holders in Health Sciences had had a job connected with their pre-doctoral studies.

Engineering and Architecture and Social Sciences had the highest proportion of doctorate holders who financed their doctoral studies as university teaching staff (24% and 22%, respectively).

Table 5.2.1. Source of finance for doctoral studies according to discipline

	Humanities	Social Sciences	Experimental Sciences	Health Sciences	Engineering and Architecture	Total
Teacher/ researcher at a university (inc. adjunct teachers and researcher contracts)	11.36%	21.80%	10.87%	4.20%	23.73%	13.08%
Job in a field associated with pre-doctoral studies	29.25%	30.76%	10.61%	61.94%	13.02%	27.09%
Job in a field unrelated to previous studies	13.41%	6.98%	1.09%	1.90%	3.83%	4.32%
Not working: either full-time study or with just sporadic jobs	1.36%	1.51%	0.06%	0.00%	0.35%	0.50%
Scholarship/grant	44.62%	38.94%	77.38%	31.96%	59.08%	55.01%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

With regard to the trend in the source of funding, of note is the increase in importance of scholarships and grants as a main source of funding, which went up from 49% of doctorate holders in 2008 to 58% in 2014. Conversely, the proportion of doctorate holders working in jobs unrelated to their pre-doctoral studies went down from 8% to 4% between 2008 and 2014).

Table 5.2.2. Trend in the source of funding for doctoral studies

	2008	2011	2014	Difference 2008-2014
Teacher/researcher at a university (inc. adjunct teachers and researcher contracts)	17.67%	13.06%	14.03%	-3.64
Job in a field associated with pre-doctoral studies	23.34%	24.65%	23.14%	-0.2
Job in a field unrelated to previous studies	8.14%	6.53%	3.79%	-4.35
Not working: either full-time study or with just sporadic jobs	1.82%	1.14%	0.70%	-1.12
Scholarship/grant	49.04%	54.61%	58.35%	9.31
Total	**100%**	**100%**	**100%**	

5.3. Work on the thesis

Two-thirds of doctorate holders wrote their theses mainly as part of a research group. According to discipline, this percentage ranged from 90% in Experimental Sciences to 41% in Social Sciences.

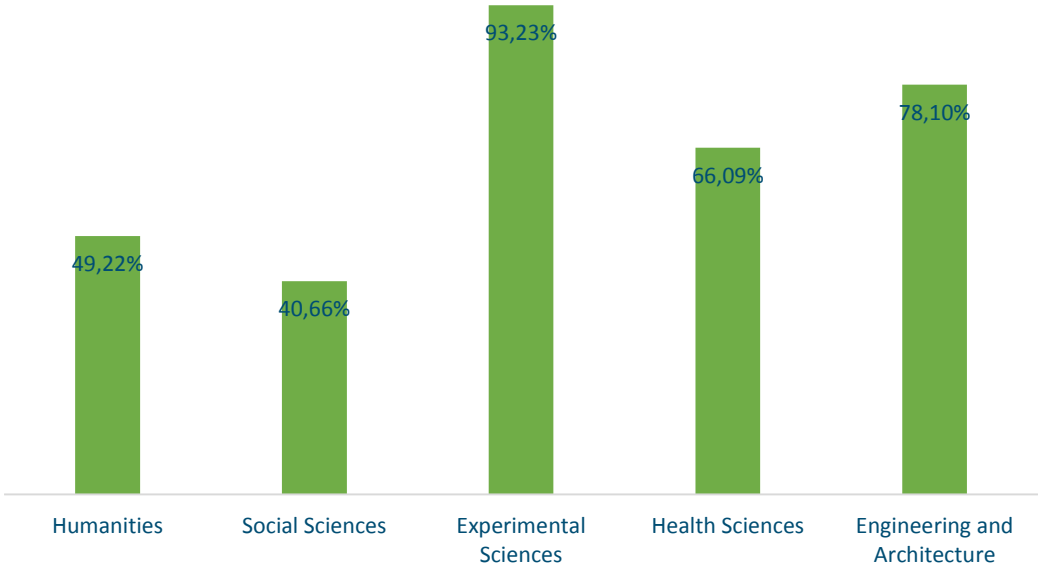
There was a considerable increase in the percentage of theses undertaken in research groups (10% since 2008). Working as part of a research group is associated with a higher rating for the acquisition of core skills.

75% of doctorate holders presented their research in internal seminars in the department.

Work on the doctoral thesis can either be done individually or as part of a research group. If it is done individually, there is probably greater autonomy, both in terms of the subject to be developed and the way in which the thesis is carried out. In the latter case, as part of a research group, the work environment is more similar to the way in which research work is usually carried out, with greater possibilities for interaction; on the other hand, there is the risk of an individual's contribution being diluted.

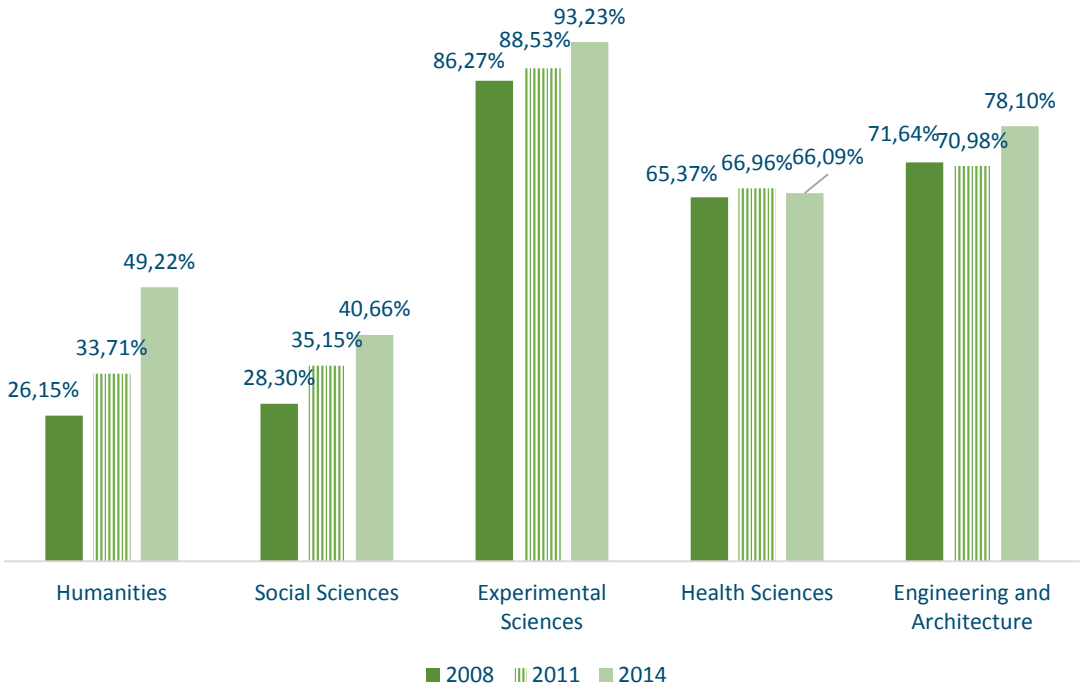
67% of doctorate holders wrote their thesis as part of a research group although this percentage varied considerably according to discipline, ranging from 90% in Experimental Sciences to 41% in Social Sciences.

Figure 5.3.1. Percentage of doctorate holders who mainly worked on their theses as part of a research group, according to discipline



It can also be seen that there is a clear and increasing trend for students to work on their theses as part of a research group, except in Health Sciences, where the percentage remained relatively constant.

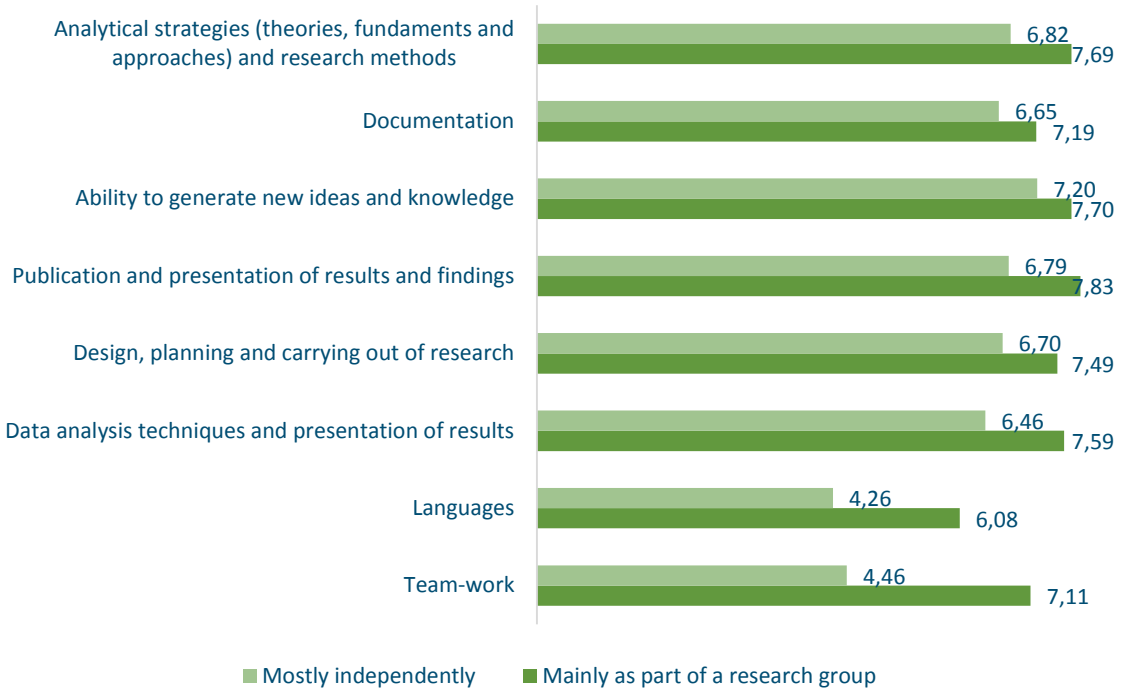
Figure 5.3.2. Trend in the percentage of doctorate holders who mainly worked on their theses as part of a research group, according to discipline



Working on the doctoral thesis as part of a research group resulted in a higher degree of satisfaction, as far as the development of all the skills is concerned, than that of doctorate holders who wrote their theses independently. The biggest disparities can be seen in languages and team-work, which as a whole had the lowest level of satisfaction.

Forming part of a research group when developing the doctoral thesis increases the skills of doctorate holders and, as a consequence, their level of satisfaction.

Figure 5.3.3. Skills development according to thesis work done individually or as part of a research group



Presentation of research in internal seminars

75% of doctorate holders presented their research in internal seminars in the department. According to disciplines, it can be seen that approximately 3 out of 4 doctorate holders did so in Engineering and Architecture, Health Sciences and Experimental Sciences, whereas in Social Sciences and Humanities it was 2 out of 4. It is also important to note that these percentages increased in all disciplines between 2008-2014.

Figure 5.3.4. Percentage of doctorate holders who presented their research work in internal seminars in the department

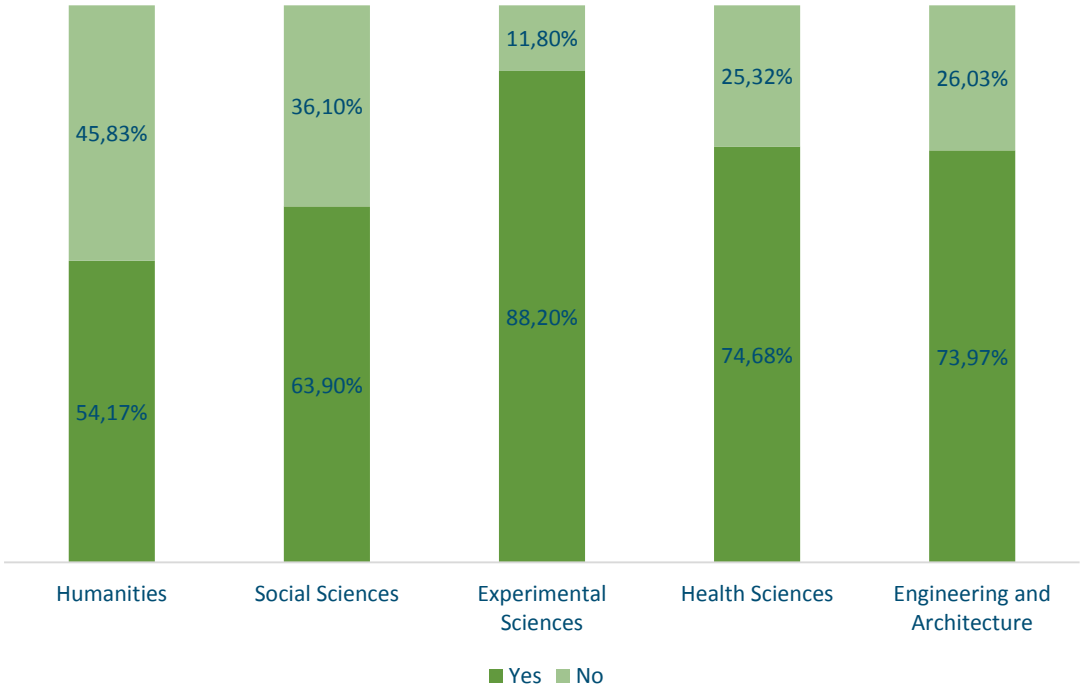
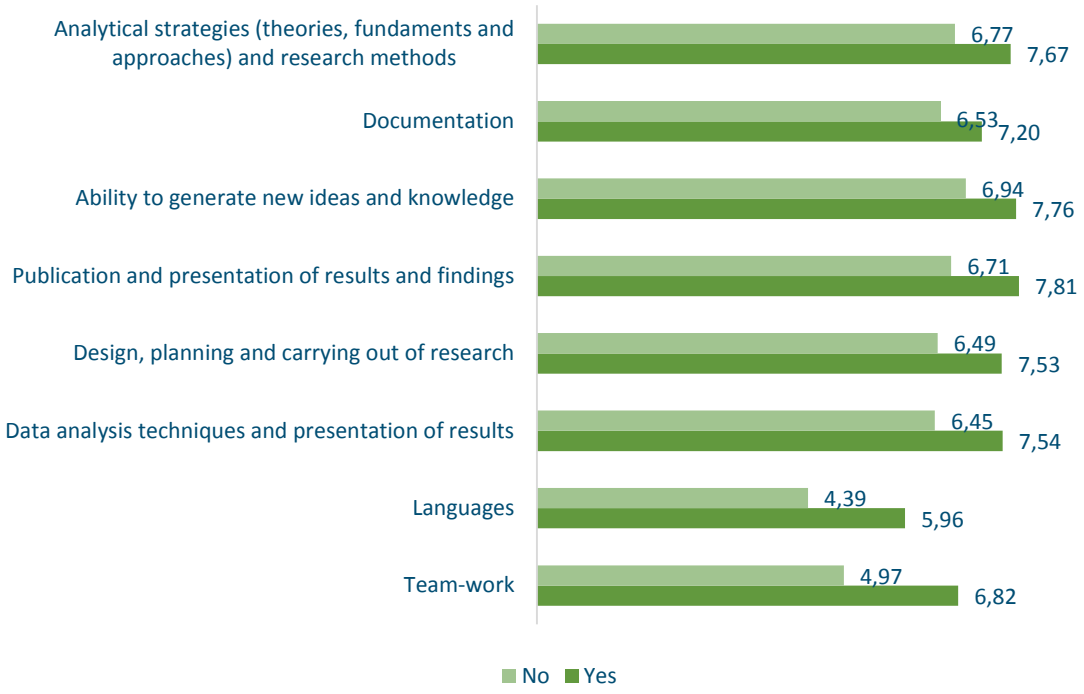


Table 5.3.1. Trend in the percentage of doctorate holders who presented their research work in internal seminars in the department

	No	Yes	Total
2014			
Humanities	45.83%	54.17%	100%
Social Sciences	36.10%	63.90%	100%
Experimental Sciences	11.80%	88.20%	100%
Health Sciences	25.32%	74.68%	100%
Engineering and Architecture	26.03%	73.97%	100%
Total 2014	**25.12%**	**74.88%**	**100%**
2011			
Humanities	60.34%	39.66%	100%
Social Sciences	47.27%	52.73%	100%
Experimental Sciences	19.63%	80.37%	100%
Health Sciences	21.43%	78.57%	100%
Engineering and Architecture	32.14%	67.86%	100%
Total 2011	**31.80%**	**68.20%**	**100%**
2008			
Humanities	57.69%	42.31%	100%
Social Sciences	49.69%	50.31%	100%
Experimental Sciences	27.78%	72.22%	100%
Health Sciences	27.80%	72.20%	100%
Engineering and Architecture	27.61%	72.39%	100%
Total 2008	**35.65%**	**64.35%**	**100%**

Doctorate holders who had participled in internal seminars in the department rated their level of skills acquisition more positively than those who had not. The skill most associated with presentations was the publication and presentation of results and findings, although it can be seen there were positive differences as far as this skill was concerned, as well as with other apparently unrelated skills, such as team-work, languages and data analysis techniques, which would suggest that there are in fact numerous elements in the learning process that converge to create a positive impact on skills acquisition (working mainly as part of a research group/s, developing empirical theses, presenting the thesis in both internal seminars in the department and national and/or international seminars, etc.).

Figure 5.3.5. Level of skills development according to whether doctorate holders made presentations of research in internal seminars (scale from 0 to 10)



5.4. Type of doctoral thesis: the monograph as opposed to a collection of articles

The monograph continues to be the predominant way of presenting the doctoral thesis (71%). This proportion varied considerably according to the discipline, ranging from 92% in Humanities to 49% in Health Sciences.

No clear change in the trend was evident for this indicator.

The doctoral thesis can be developed either as a monograph or as a collection of articles. The format for the type of thesis depends on the tradition at national level and also according to the discipline (MIRROR, 2006).

71% of doctorate holders presented the thesis as a monograph, and 29% as a collection of articles. According to discipline, Health Sciences stand out with 52% of theses being presented as a collection of articles. Due to the fact that a person's academic career is assessed mainly on the basis of their publications in high impact journals, it is understandable for this way of developing a thesis to be promoted. Publication is a very long process, however (up to a year-and-a-half, on average), which makes it unviable in many subjects.

Figure 5.4.1. Percentage of doctorate holders who present their thesis as a collection of articles, according to discipline

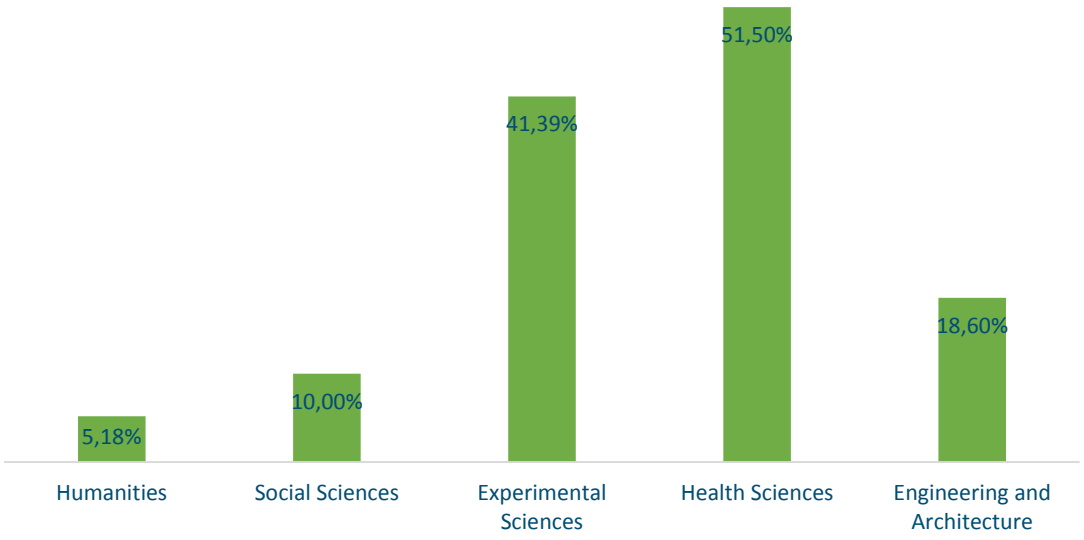


Table 5.4.1. Type of doctoral thesis according to discipline

	Monograph	Collection of articles	n	%
2014				
Humanities	94.82%	5.18%	193	100%
Social Sciences	90.00%	10.00%	240	100%
Experimental Sciences	58.61%	41.39%	517	100%
Health Sciences	48.50%	51.50%	233	100%
Engineering and Architecture	81.40%	18.60%	242	100%
Total 2014	**71.02%**	**28.98%**	**1,425**	**100%**
2011				
Humanities	96.00%	4.00%	175	100%
Social Sciences	88.82%	11.18%	161	100%
Experimental Sciences	57.47%	42.53%	435	100%
Health Sciences	60.00%	40.00%	225	100%
Engineering and Architecture	69.37%	30.63%	222	100%
Total 2011	**69.79%**	**30.21%**	**1,218**	**100%**
2008				
Humanities	95.38%	4.62%	130	100%
Social Sciences	89.31%	10.69%	159	100%
Experimental Sciences	66.01%	33.99%	306	100%
Health Sciences	60.49%	39.51%	205	100%
Engineering and Architecture	73.88%	26.12%	134	100%
Total 2008	**73.98%**	**26.02%**	**934**	**100%**

5.5. Empirical theses

80% of theses are empirical, a percentage that ranges between 91% in Experimental Sciences to 51% in Humanities.

Empirical theses have a positive effect on all skills, especially data analysis techniques and the presentation of results and findings, as well as team-work.

An empirical thesis involves the handling of data, either from a laboratory, clinical data, from field work, surveys, statistics, etc. and in general the use of techniques for collecting, analysing and presenting data. Although empirical work is the predominant way of carrying out research in many disciplines, it is not always so, and in certain disciplines, like Philosophy, Mathematics and Law, it is not the main way of generating knowledge.

80% of theses are empirical-based, and this percentage also varies considerably according to discipline, ranging from 91% in Experimental Sciences to 51% in Humanities.

As for any trend in the percentage of empirical theses, they have predominated over the entire period although no clear change in the trend is evident.

Figure 5.5.1. Percentage of doctorate holders doing an empirical thesis according to discipline

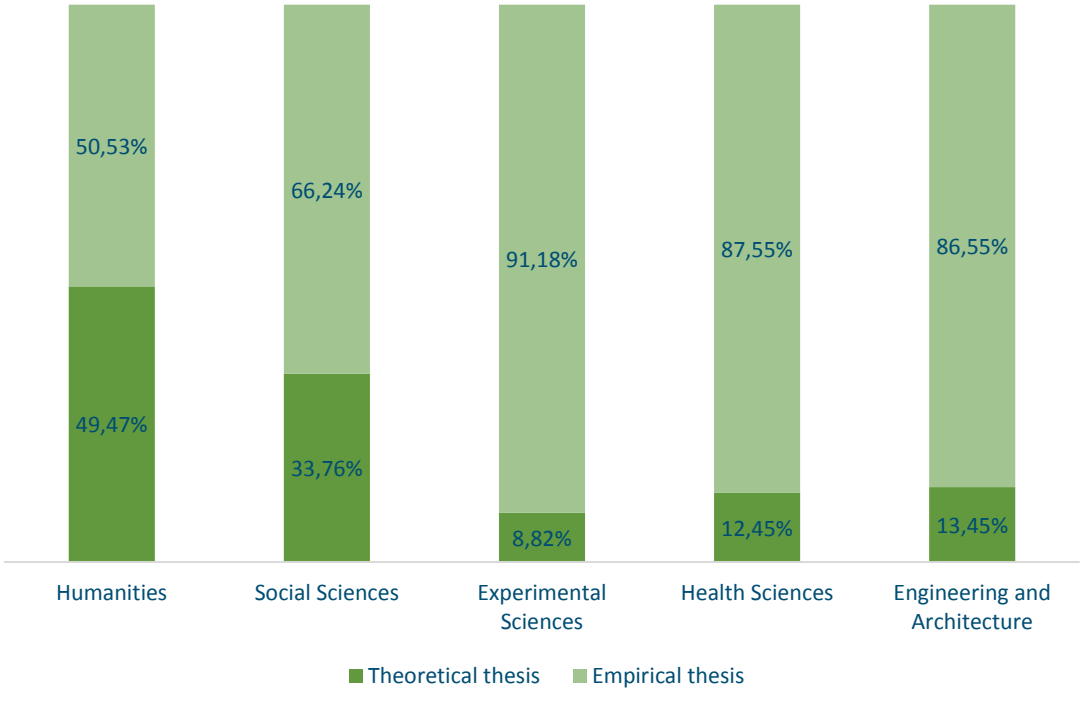
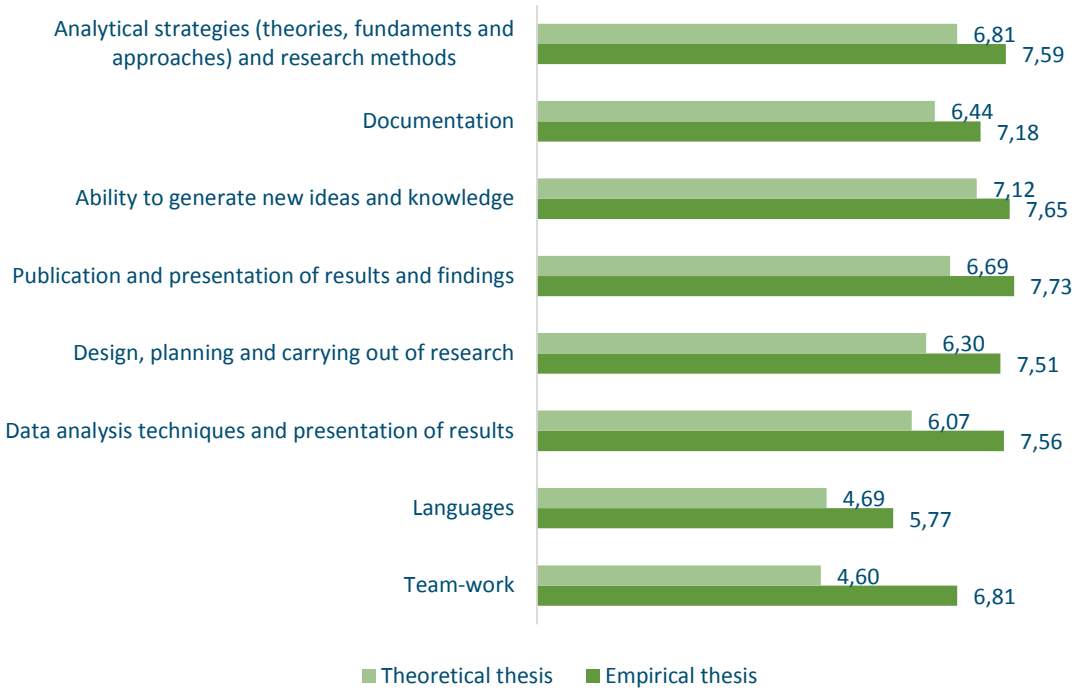


Table 5.5.1. Trend in the percentage of doctorate holders doing an empirical thesis according to discipline

	Theoretical thesis	Empirical thesis	*n*	%
2014				
Humanities	49.47%	50.53%	190	100%
Social Sciences	33.76%	66.24%	234	100%
Experimental Sciences	8.82%	91.18%	510	100%
Health Sciences	12.45%	87.55%	233	100%
Engineering and Architecture	13.45%	86.55%	238	100%
Total 2014	**19.86%**	**80.14%**	**1,405**	**100%**
2011				
Humanities	64.57%	35.43%	175	100%
Social Sciences	40.85%	59.15%	164	100%
Experimental Sciences	14.45%	85.55%	436	100%
Health Sciences	25.78%	74.22%	225	100%
Engineering and Architecture	21.97%	78.03%	223	100%
Total 2011	**28.62%**	**71.38%**	**1,223**	**100%**
2008				
Humanities	62.31%	37.69%	130	100%
Social Sciences	33.33%	66.67%	159	100%
Experimental Sciences	11.76%	88.24%	306	100%
Health Sciences	12.68%	87.32%	205	100%
Engineering and Architecture	18.66%	81.34%	134	100%
Total 2008	**23.66%**	**76.34%**	**934**	**100%**

The level of skills development is higher for doctorate holders doing an empirical thesis. In particular, the biggest difference was in team-work, which was rated as 6.8 by doctorate holders doing an empirical thesis compared to 4.6 as rated by those doing a theoretical degree. Also of note was the difference in analytical techniques and the presentation of results, which are clearly linked to empirical work.

Figure 5.5.2. Level of skills development according to whether the thesis was empirical or theoretical (scale from 0 to 10)



6. INTERNATIONALISATION

This section examines a series of indicators connected with the internationalisation of doctoral programmes. There are two types of indicator:

- The number of non-Spanish doctorate holders and their country of origin.
- Survey data on the degree of internationalisation of the doctoral programme.

The first type are administrative indicators, whereas the second type are indicators from the survey itself.

Indicators on the population of non-Spanish doctorate holders:

- **The high level of attractiveness of the Catalan university system, as regards doctoral degrees, is reflected in the fact that one-third of all doctoral degree holders between 2009 and 2010 were non-Spanish.**
- **60% of non-Spanish doctorate holders came from Latin America (Mexico, Colombia, Argentina, Chile). 32% came from Europe.**

Indicators on the internationalisation of doctoral programmes:

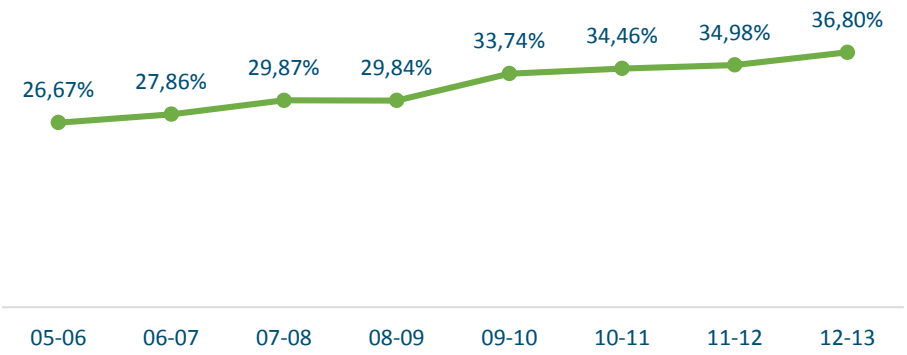
- **33% of theses read in 2014 were defended in English. The number of theses written in English was 54% higher than in 2008.**
- **The number of European doctorate holders increased from 10% in 2008 to 14% in 2014**
- **86% participated at conferences at national and/or international level. 53% had experience of pre-doctoral mobility abroad, and 31% post-doctoral mobility.**

6.1. Contextual data from official sources

UNEIX is the Secretariat for Universities and Research's university indicator system, which ensures transparency and equity in the analysis of information on degree programmes and facilitates accountability in accordance with European benchmarks for quality in higher education.

The following table shows the trend in the percentage of non-Spanish doctorate holders[15] who obtained their doctorate at a university in Catalonia according to UNEIX data. It can be seen that the proportion of non-Spanish doctorate holders increased by 10% in seven (7) years. In particular, it went up from 27% in the 2005-2006 academic year to 37% in the 2012-2013 academic year.

Figure 6.1.1. Trend in the percentage of non-Spanish doctorate holders who obtained their doctorate at a Catalan university (UNEIX)



More recent data for the 2012-2013 academic year show that 54% of non-Spanish doctorate holders who took doctoral programmes in Catalonia came from Latin America and the Caribbean. 27% came from the EU-15 and 7% from other European countries. It is noteworthy, however, that there was a considerable decline in the proportion of doctorate holders from Latin America and the Caribbean as in 2005-2006 they accounted for 73% of non-Spanish doctorate holders. On the other hand, the proportion of those from the EU-15 increased two-fold, and those from Asia and Oceania increased from 2% in 2005-2006 to 8% in 2012-2013.

[15] Non-Spanish origin doctoral degree holders.

Figure 6.1.2. Distribution of non-Spanish doctorate holders according to place of origin, 2012-2013 academic year (UNEIX)

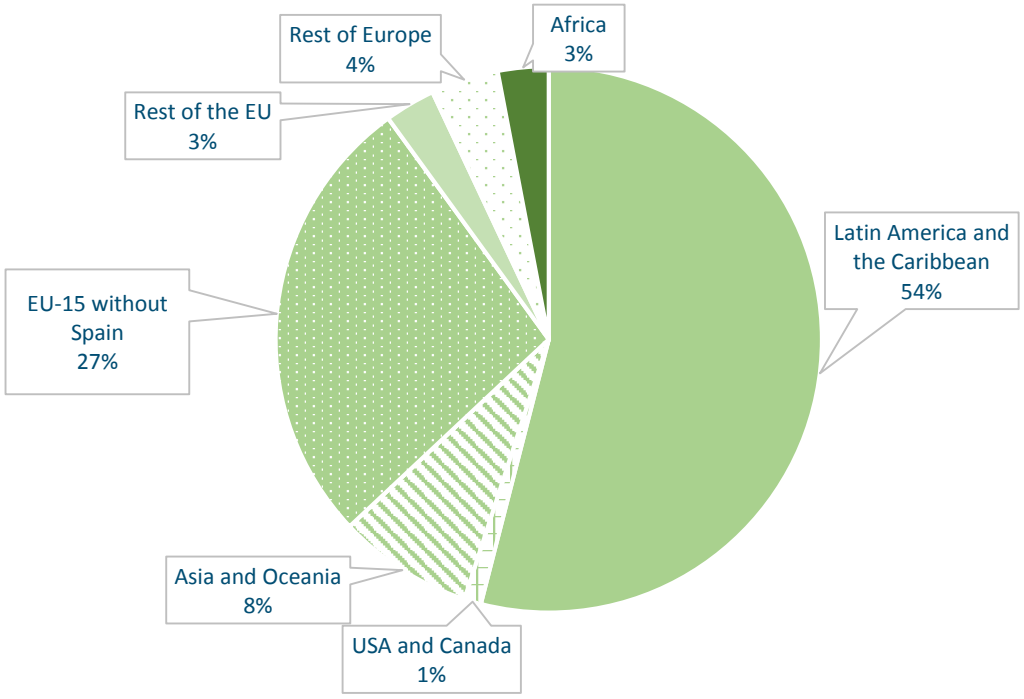


Table 6.1.1. Trend in the distribution of non-Spanish doctorate holders according to place of origin (UNEIX)

	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13
EU-15	15%	18%	20%	20%	21%	28%	26%	27%
Rest of EU	3%	3%	4%	6%	6%	6%	5%	3%
Rest of Europe	1%	2%	1%	3%	3%	3%	3%	4%
Africa	4%	3%	2%	3%	3%	3%	2%	3%
Latin America and the Caribbean	73%	70%	68%	61%	61%	52%	56%	54%
USA and Canada	1%	1%	2%	2%	1%	1%	1%	1%
Asia and Oceania	2%	2%	4%	4%	5%	7%	8%	8%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

6.2. Non-Spanish doctorate holders

The high level of attractiveness of the Catalan university system, as regards doctoral degrees, is reflected in the fact that one-third of all doctoral degree holders between 2009 and 2010 were non-Spanish.

60% of non-Spanish doctorate holders came from Latin America (Mexico, Colombia, Argentina, Chile). 32% came from Europe.

There was a higher tendency for doctoral students from Europe to take doctoral programmes in Experimental Sciences.

In total, 969 non-Spanish doctorate holders were awarded a doctorate from a Catalan university in 2009 and 2010[16]. Bearing in mind that 2,080 people of Spanish nationality were awarded a doctorate in this same reference period of two years, around one-third of all those awarded a doctorate in the university system in Catalonia were non-Spanish.

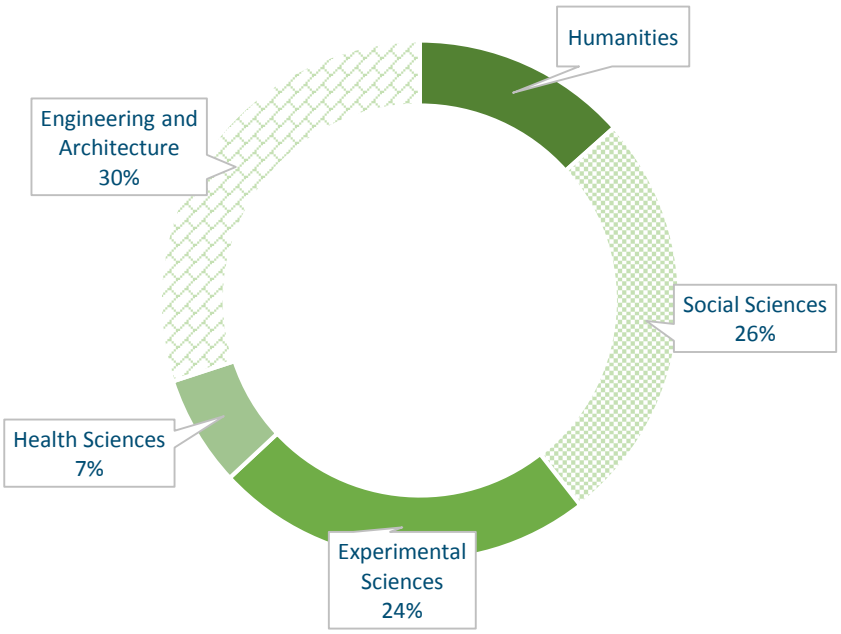
The trend in the number of non-Spanish people who were awarded a doctorate in Catalonia is an indicator of the attractiveness of the Catalan university system.

Table 6.2.1. Population of non-Spanish and Spanish doctorate holders (2009 and 2010)

	Population of non-Spanish doctorate holders	Population of Spanish doctorate holders	Total	% non-Spanish doctorate holders
Humanities	130	266	396	32.83%
Social Sciences	252	312	564	44.68%
Experimental Sciences	229	791	1.020	22.45%
Health Sciences	67	355	422	15.88%
Engineering and Architecture	291	356	647	44.98%
Total	**969**	**2,080**	**3,049**	**31.78%**

[16] The data are underestimated because only the population for which administrative information was available to code the subject of the thesis was considered.

Figure 6.2.1. Distribution of non-Spanish doctorate holders according to discipline



The main place of origin of those choosing to take a doctoral programme in Catalonia was Latin America, followed by Europe. There were very few people awarded a doctorate from Asia, Africa or Oceania in this period.

Figure 6.2.2. Distribution of non-Spanish doctorate holders according to the continent of origin

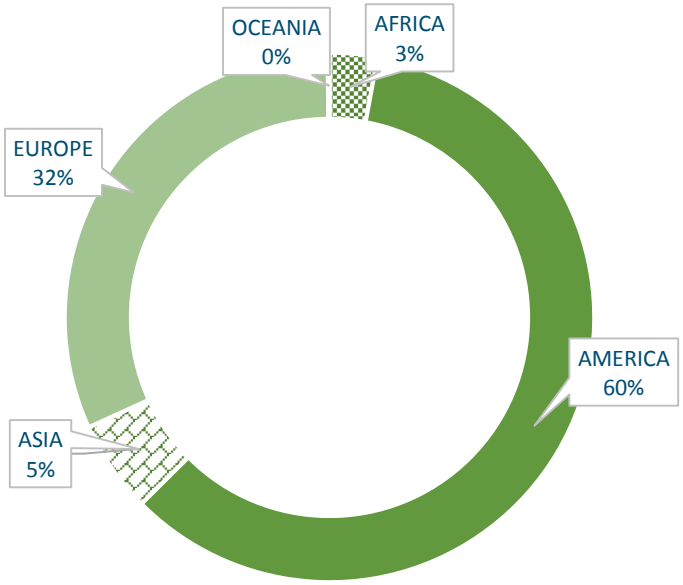
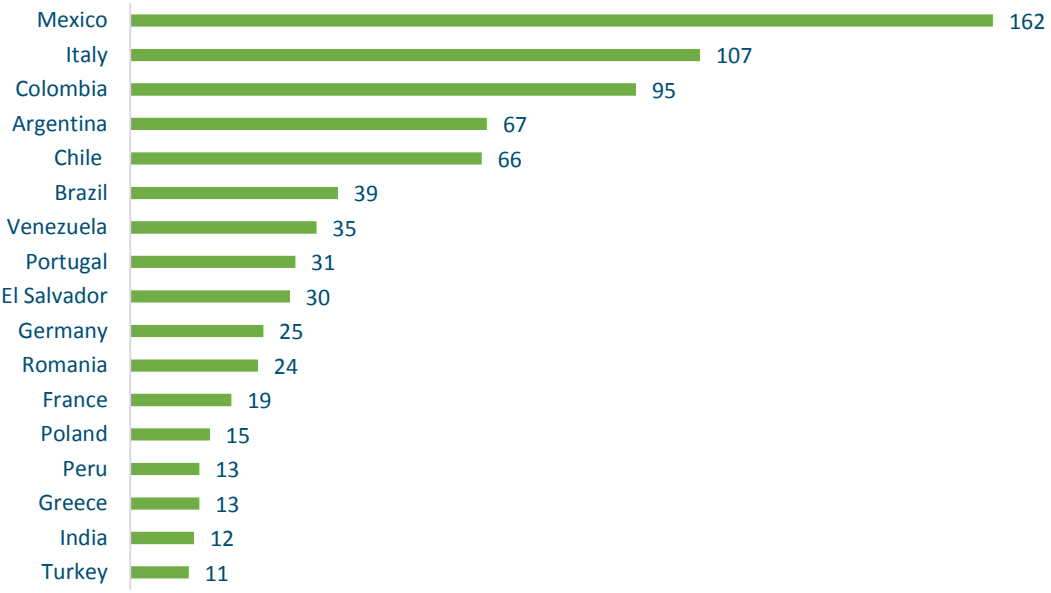


Figure 6.2.3. Country of origin of non-Spanish doctorate holders



NB: Countries with less than two doctorate holders are not shown.

The distribution of doctoral studies according to continent of origin and discipline given in the following table shows that Experimental Sciences attracted doctoral students from countries in Europe and Asia, and Engineering and Architecture attracted doctoral students from Africa and Latin America.

Table 6.2.2. Continent and discipline of doctoral studies

	n	Humanities	Economics, Law, Business Mgmt	Social Sciences	Experimental Sciences	Health Sciences	Engineering and Architecture	Total
Africa	28	3.57%	14.29%	0.00%	17.86%	17.86%	46.43%	100.00%
Latin America	574	11.67%	11.85%	16.38%	18.12%	8.01%	33.97%	100.00%
Asia	54	20.37%	18.52%	0.00%	31.48%	3.70%	25.93%	100.00%
Europe	305	16.07%	13.44%	9.51%	33.77%	4.59%	22.62%	100.00%
Oceania	1	0.00%	0.00%	100.00 %	0.00%	0.00%	0.00%	100.00%
Total	**962**	**13.31%**	**12.79%**	**12.89%**	**23.80%**	**6.96%**	**30.25%**	**100.00 %**

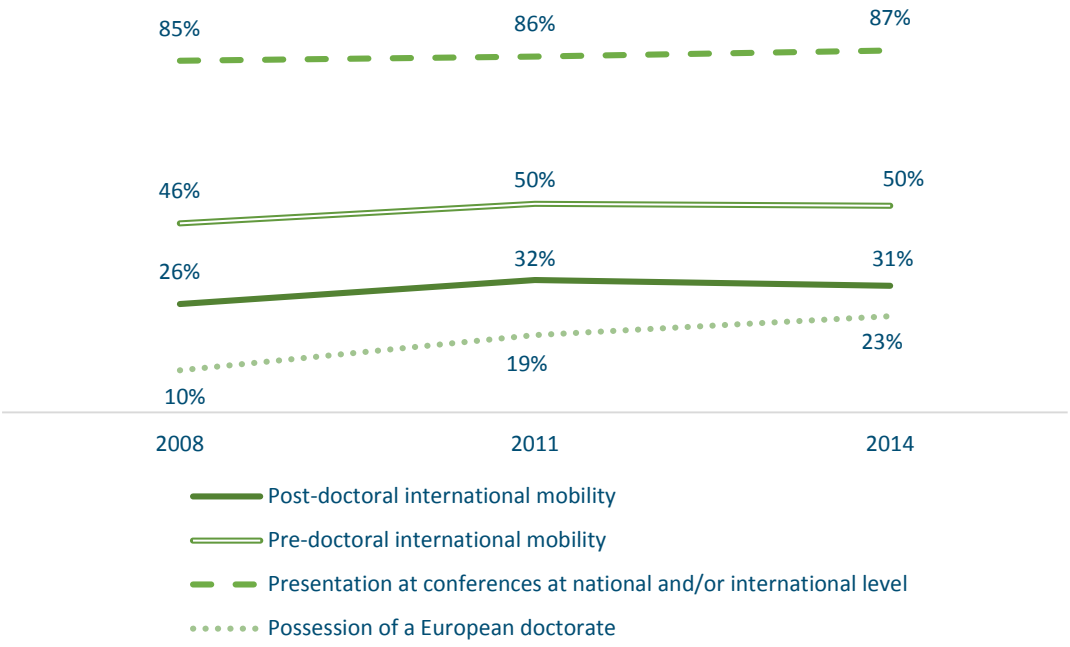
6.3. Indicators of internationalisation

87% of doctorate holders participated at conferences at national and international level.

As regards international mobility, 50% had experience with mobility while they were doing their doctoral thesis, and 31% had experience with post-doctoral mobility.

23% of doctorate holders obtained a European doctorate in 2014. This indicator shows the clearest increase (in 2008 the proportion was only 10%).

Figure 6.3.1. Trend in the main indicators on internationalisation



Presentation of research work

Practically all doctorate holders had the opportunity to participate at conferences at national and/or international level (86%), a practice that increased over the period examined.

The presentation of the results and finding of research, in both academic and non-academic settings, is one of the particular skills acquired in the training of doctoral students. This section describes the degree to which the doctorate holders who were interviewed had the opportunity to present their research at conferences and congresses at national and/or international level.

Presentation of research at conferences at national and/or international level

The majority of doctorate holders (86%) participated in national and international conferences while they were studying for and preparing their doctoral theses. The proportion was highest in Engineering and Architecture (94%), Experimental Sciences (93%), and lowest in the Humanities (75%).

The trend in the participation of doctorate holders at conferences is relatively constant for all disciplines except for Social Sciences, where their participation increased by 11% over the period from 2008-2014.

Figure 6.3.2. Presentation of research work at conferences at national and/or international level

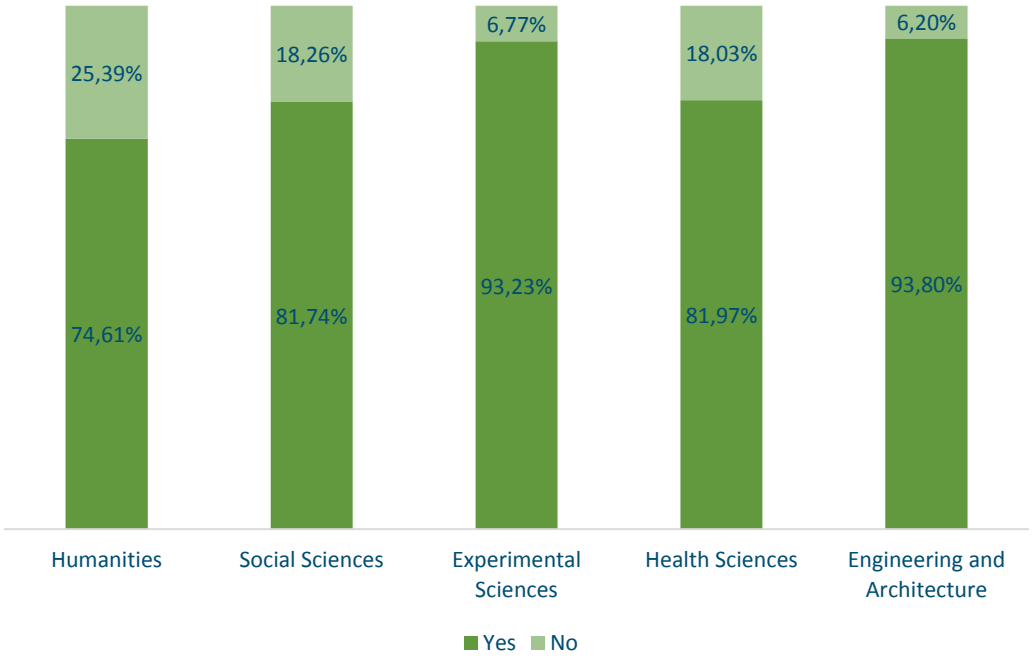
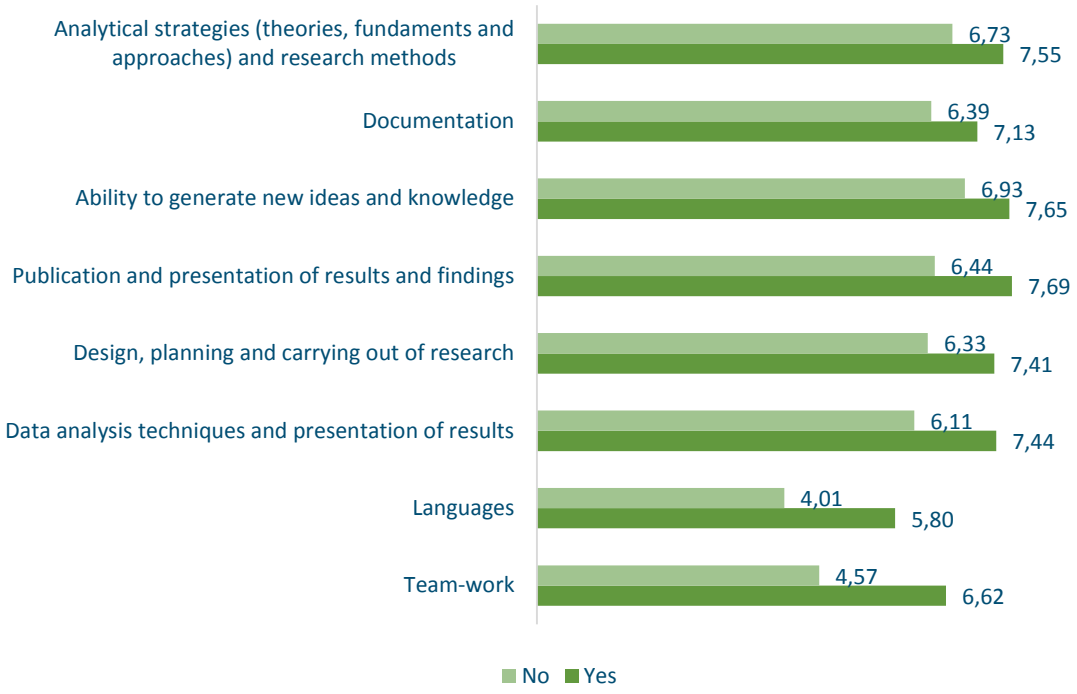


Table 6.3.1. Trend in the presentation of research work at conferences at national and/or international level according to discipline

	No	Yes	*n*	%
2014				
Humanities	25.39%	74.61%	193	100%
Social Sciences	18.26%	81.74%	241	100%
Experimental Sciences	6.77%	93.23%	517	100%
Health Sciences	18.03%	81.97%	233	100%
Engineering and Architecture	6.20%	93.80%	242	100%
Total 2014	**12.97%**	**87.03%**	**1,426**	**100%**
2011				
Humanities	25.29%	74.71%	174	100%
Social Sciences	31.71%	68.29%	164	100%
Experimental Sciences	3.90%	96.10%	436	100%
Health Sciences	19.56%	80.44%	225	100%
Engineering and Architecture	8.48%	91.52%	224	100%
Total 2011	**14.39%**	**85.61%**	**1,223**	**100%**
2008				
Humanities	25.38%	74.62%	130	100%
Social Sciences	29.56%	70.44%	159	100%
Experimental Sciences	8.50%	91.50%	306	100%
Health Sciences	14.15%	85.85%	205	100%
Engineering and Architecture	6.72%	93.28%	134	100%
Total 2008	**15.42%**	**84.58%**	**934**	**100%**

Figure 6.3.3. Level of skills development according to whether presentations of research work were made at conferences at national and/or international level according to discipline



Mobility

Half of those who were awarded their doctorate in 2009 and 2010 had experience of mobility during their studies. There was no change in the trend for this indicator. Experimental Sciences had the highest level of pre-doctoral mobility (56%) and Health Sciences the lowest (33%).

Post-doctoral mobility was a less common practise (31%), and was highest in Experimental Sciences and Humanities (39% and 36% respectively), and again lowest in Health Sciences (22%).

Pre-doctoral mobility

According to the European Commission (2011), mobility should be encouraged, either through conferences and both short and long-term research leave, and opportunities offered for international networking (joint research, co-tutoring, joint degrees, etc.). The data show that mobility abroad is important among doctoral students, and around 50% took mobility stays of this type in all of the years examined. This percentage is not growing, however, as there was no clear change in trend over the period examined (2008, 2011, 2014).

There were however differences according to disciplines, and in Health Sciences it was only 33% in 2014.

Table 6.3.2. Trend in pre-doctoral mobility according to discipline

	Yes, international	Yes, in Spain	No	*n*	%
2014					
Humanities	49.22%	5.18%	45.60%	193	100%
Social Sciences	43.98%	2.49%	53.53%	241	100%
Experimental Sciences	56.09%	4.26%	39.65%	517	100%
Health Sciences	32.76%	3.45%	63.79%	232	100%
Engineering and Architecture	58.51%	1.24%	40.25%	241	100%
Total 2014	**49.72%**	**3.44%**	**46.84%**	**1,424**	**100%**
2011					
Humanities	48.57%	3.43%	48.00%	175	100%
Social Sciences	33.94%	4.24%	61.82%	165	100%
Experimental Sciences	61.24%	7.11%	31.65%	436	100%
Health Sciences	34.67%	4.89%	60.44%	225	100%
Engineering and Architecture	57.59%	3.57%	38.84%	224	100%
Total 2011	**50.20%**	**5.14%**	**44.65%**	**1,225**	**100%**
2008					
Humanities	45.38%	5.38%	49.23%	130	100%
Social Sciences	35.85%	5.66%	58.49%	159	100%
Experimental Sciences	55.23%	4.25%	40.52%	306	100%
Health Sciences	32.20%	6.34%	61.46%	205	100%
Engineering and Architecture	55.22%	3.73%	41.04%	134	100%
Total 2008	**45.50%**	**5.03%**	**49.46%**	**934**	**100%**

With regard to the duration of pre-doctoral stays abroad, 42% were between 1 and 3 months and 34% between 3 and 6 months. The majority were either grant or scholarship-funded.

Table 6.3.3. Duration of pre-doctoral mobility stays according to discipline

	Less than one month	Between 1-3 months	Between 3-6 months	Over 6 months	*n*	%
Humanities	5.71%	39.05%	33.33%	21.90%	105	100%
Social Sciences	4.46%	38.39%	33.93%	23.21%	112	100%
Experimental Sciences	4.82%	48.23%	34.08%	12.86%	311	100%
Health Sciences	3.61%	39.76%	26.51%	30.12%	83	100%
Engineering and Architecture	2.78%	33.33%	38.19%	25.69%	144	100%
Total	**4.37%**	**41.72%**	**33.91%**	**20.00%**	**755**	**100%**

Table 6.3.4. Source of funding for pre-doctoral mobility stays according to discipline

	Self-funded	A grant of funding for the dept.'s research group	Scholarship/grant	*n*	%
Humanities	18.27%	5.77%	75.96%	104	100%
Social Sciences	20.72%	11.71%	67.57%	111	100%
Experimental Sciences	4.49%	11.86%	83.65%	312	100%
Health Sciences	26.83%	15.85%	57.32%	82	100%
Engineering and Architecture	12.59%	23.08%	64.34%	143	100%
Total	**12.77%**	**13.56%**	**73.67%**	**752**	**100%**

One of the stated objectives of the European Commission's Europe 2020 Strategy (EHEA Ministerial Conference, 2012) is to reach a 20% level of mobility at each level of university education. Included under mobility are periods spent abroad that correspond to at least 15 ECTS (undergraduate and Master's) or three months in any of the three levels of university education.

In the case of doctorate holders, this objective has been achieved, as half went on pre-doctoral mobility stays and 54% of these were for periods longer than three months.

Post-doctoral mobility

Around one-third of doctorate holders had an experience of mobility abroad, a percentage which ranged from 37% in Experimental Sciences to 19% in Health Sciences. There were no clear changes in the trend over time, except in Humanities, where there was an increase from 19% to 35% between 2008 and 2014.

Table 6.3.5. Trend in post-doctoral stays according to discipline

	Yes, abroad	Yes, in Spain	No	*n*	%
2014					
Humanities	35.26%	0.53%	64.21%	190	100%
Engineering and Architecture	26.47%	0.42%	73.11%	238	100%
Health Sciences	19.48%	2.60%	77.92%	231	100%
Experimental Sciences	37.10%	1.59%	61.31%	504	100%
Social Sciences	27.39%	1.74%	70.87%	230	100%
Total 2014	**30.51%**	**1.44%**	**68.05%**	**1,393**	**100%**
2011					
Humanities	30.41%	1.17%	68.42%	171	100%
Engineering and Architecture	33.02%	0.94%	66.04%	212	100%
Health Sciences	20.81%	0.90%	78.28%	221	100%
Experimental Sciences	39.27%	0.98%	59.76%	410	100%
Social Sciences	27.85%	1.90%	70.25%	158	100%
Total 2011	**31.83%**	**1.11%**	**67.06%**	**1,172**	**100%**
2008					
Humanities	19.23%	1.54%	79.23%	130	100%
Engineering and Architecture	30.60%	4.48%	64.93%	134	100%
Health Sciences	20.49%	4.39%	75.12%	205	100%
Experimental Sciences	33.99%	6.54%	59.48%	306	100%
Social Sciences	20.13%	5.03%	74.84%	159	100%
Total 2008	**26.12%**	**4.82%**	**69.06%**	**934**	**100%**

Language used for the thesis

The proportion of theses written in Spanish, Catalan and English was equally distributed.

There is clearly a trend for theses to be written in English.

The language used for the thesis was distributed as follows: 33% in Spanish, 30% in English and 27% in Catalan.

The language in which the thesis was written varied considerably according to discipline. 55% of theses in Health Sciences were written in Spanish, compared to just 21% in Engineering and Architecture. The proportion of theses written in Catalan ranged from 43% in Humanities to 13% in Engineering and Architecture.

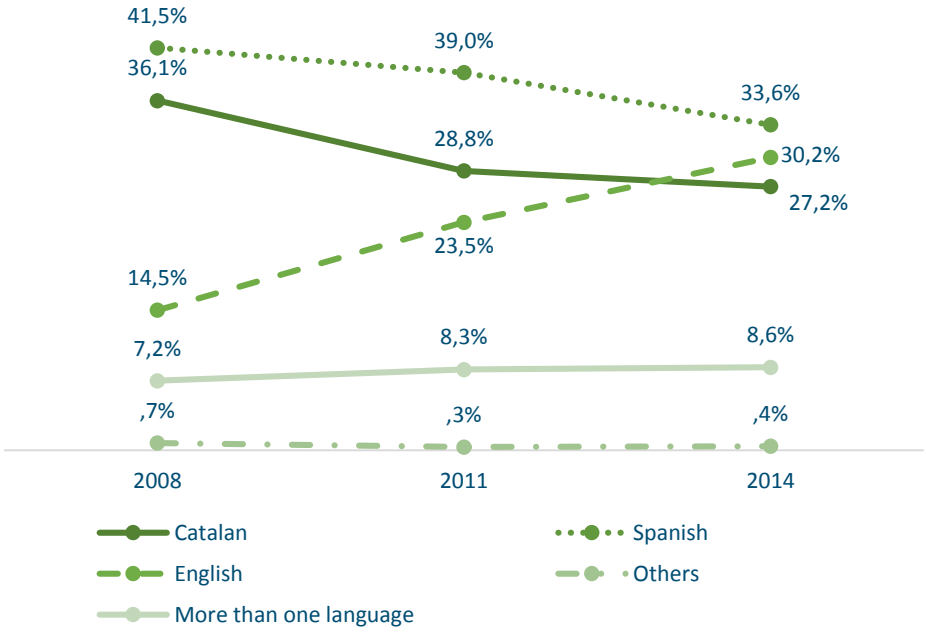
English was used predominantly in Engineering and Architecture (59%) and Experimental Sciences (40%), although it only accounted for 9% of theses in Humanities and 10% in Social Sciences.

Table 6.3.6. Language used for the thesis according to discipline

	English	Spanish	Catalan	Others	More than one language	*n*	%
2014							
Humanities	9.33%	34.72%	43.01%	3.11%	9.84%	174	100%
Social Sciences	10.37%	44.40%	38.59%	0.00%	6.64%	226	100%
Experimental Sciences	40.04%	24.18%	24.56%	0.00%	11.22%	220	100%
Health Sciences	16.31%	54.94%	23.18%	0.00%	5.58%	459	100%
Engineering and Architecture	59.09%	21.49%	12.81%	0.00%	6.61%	225	100%
Total 2014	**30.22%**	**33.59%**	**27.21%**	**0.42%**	**8.56%**	**1,304**	**100%**
2011							
Humanities	6.86%	41.14%	48.00%	0.57%	3.43%	169	100%
Social Sciences	5.45%	57.58%	35.15%	0.00%	1.82%	206	100%
Experimental Sciences	29.82%	27.29%	30.05%	0.69%	12.16%	202	100%
Health Sciences	9.82%	54.46%	25.89%	0.00%	9.82%	383	100%
Engineering and Architecture	51.34%	30.80%	9.82%	0.00%	8.04%	162	100%
Total 2011	**23.53%**	**38.97%**	**28.84%**	**0.33%**	**8.33%**	**1,122**	**100%**
2008							
Humanities	6.15%	34.62%	51.54%	3.08%	4.62%	124	100%
Social Sciences	2.52%	58.49%	35.85%	0.63%	2.52%	129	100%
Experimental Sciences	21.57%	28.10%	40.20%	0.33%	9.80%	183	100%
Health Sciences	4.39%	53.66%	31.22%	0.00%	10.73%	276	100%
Engineering and Architecture	35.82%	40.30%	19.40%	0.75%	3.73%	155	100%
Total 2008	**14.45%**	**41.54%**	**36.08%**	**0.75%**	**7.17%**	**867**	**100%**

There is a clearly growing trend in the proportion of theses being written in English (an overall increase of 16%). Conversely, there was a decrease in the proportion of theses written in Catalan and Spanish.

Figure 6.3.4. Trend in the language used for the thesis



European doctorates (European PhDs)

Although only a minority of doctoral graduates are holders of a European doctorate, it can be seen that there is a positive trend in the development of this type of doctoral programme, which increased from 10% in 2008 to 23% in 2014.

The award of a European Doctorate means that the thesis was undertaken, at least partially, in another country and that it was written in another European language.

This type of degree is more frequent in Engineering and Architecture (32%) compared to Health Sciences, where there is a lower level of mobility due to professional reasons, and where this type of degree is less frequent (14%). There is a clear trend towards an increase in this type of degree, which increased from 10% in 2008 to 23% in 2014.

Table 6.3.7. Proportion of European doctoral degrees according to discipline

	No	Yes	*n*	%
2014				
Humanities	72.54%	27.46%	193	100%
Social Sciences	82.57%	17.43%	241	100%
Experimental Sciences	75.97%	24.03%	516	100%
Health Sciences	85.84%	14.16%	233	100%
Engineering and Architecture	67.77%	32.23%	242	100%
Total 2014	**76.84%**	**23.16%**	**1,425**	**100%**
2011				
Humanities	83.43%	16.57%	175	100%
Social Sciences	87.27%	12.73%	165	100%
Experimental Sciences	77.29%	22.71%	436	100%
Health Sciences	89.33%	10.67%	225	100%
Engineering and Architecture	75.45%	24.55%	224	100%
Total 2011	**81.39%**	**18.61%**	**1,225**	**100%**
2008				
Humanities	90.00%	10.00%	130	100%
Social Sciences	96.86%	3.14%	159	100%
Experimental Sciences	86.60%	13.40%	306	100%
Health Sciences	90.73%	9.27%	205	100%
Engineering and Architecture	87.31%	12.69%	134	100%
Total 2008	**89.83%**	**10.17%**	**934**	**100%**

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ANNEX A1. TECHNICAL SPECIFICATIONS

Company that carried out the fieldwork	**IKERFEL**
Population	Spanish and non-Spanish holders of doctoral degrees awarded in 2009 and 2010 by public universities in Catalonia and the Open University of Catalonia (UOC). **Population of Spanish doctorate holders: 2,078** **Population of non-Spanish doctorate holders: 969**
Methodology	For Spanish doctorate holders: telephone survey. For non-Spanish doctorate holders: on-line survey.
Sample	The necessary sample was calculated on the basis of a sampling error per degree and university of less than 8%. In practice, this meant the entire population of doctorate holders had to be contacted by telephone, as there were only a few subjects where the population was higher than 40 doctorate holders. **Achieved sample – telephone survey: 1,426** **Achieved sample – online survey: 92**
Period	**Telephone survey:** 22 January - 18 March 2014. **Online survey:** 7 March - 9 April 2014
Telephone schedule	From 8.30 a.m. to 10.30 p.m., although usually from 9.15 a.m. to 9.30 p.m. Calls were also made during the weekend.
Back office	The codes for all branches of economic activity were checked using open code. Occupations are coded with two digits (Spanish Classification of Occupations/CNO codes) on the basis of the open description of each occupation.
Average call time	The average duration of each call was 11.07 minutes for graduates who were working, 11.31 minutes for graduates who did not have a job at the time of the survey, but who had worked since completing their studies, and 10.20 minutes for graduates who had not worked at all since obtaining their doctorate.

Table A1.1 Types of call

	n	%
Landline/regular phone	308	21.60%
International call	126	8.84%
Mobile/cell	992	69.57%
Total	**1,426**	**100.00%**

Table A1.2 Interviews

	n	%
Interviews	1,426	68.62%
Negatives responses	44	2.12%
Deferred, incomplete	16	0.77%
Wrong numbers	187	9.00%
No reply/answer phone	258	12.42%
Dropped out of the survey	2	0.10%
Not used because of a full quota	3	0.14%
Abroad or overseas	64	3.08%
Others	78	3.75%
Total	**2,078**	**100.00%**

ANNEX A2. SURVEY

DOCTORAL PROGRAMME
.....
AFFILIATED CENTRE/INSTITUTE
.....

			Year degree awarded: 2009 or 2010
ACADEMIC DETAILS			
1. Degree with which you gained admission to the doctorate (qualifying degree)			For pre-Bologna: → codes from table 1, + use free text for others → Master's: use free text Degrees from foreign universities: → use free text
2. Year that you were awarded the qualifying degree			
3. University in which you studied the qualifying degree			For pre-Bologna: → codes from table 2, + use free text for others Foreign universities: → use free text
4. Year that you started your doctorate studies			
5. Type of thesis	(1) Monograph	Only for " Monograph" 6. Other publications aside from the doctoral thesis itself	(1) One article (2) More than one article (3) A book / chapters (4) No
	(2) Collection of articles → Go to 7		
7. Language that your thesis was written in			(1) Catalan (2) Spanish (3) English (4) Other (5) More than one language (in the case of a European doctorate/PhD thesis)
			(1)
8. Have you been awarded a European Doctorate diploma?			(1) Yes (2) No
9. Work on the doctoral thesis			(1) Mainly independent (2) Mainly within either a research or mixed group

10. Did your thesis involve work that was either experimental, in the laboratory or empirical (questionnaires, interviews, etc.), or the use of statistical techniques?	(1) Yes (2) No (3) Others (please specify)

CURRENT JOB SITUATION AND WORK EXPERIENCE	
11.1. Are you working at the present time?	(1) Yes → Go on to 12 (2) No → Go on to 11.2
11.2. Employment since obtaining your doctorate	(1) Yes → Please refer to your last job. Please do not answer the section on JOB SATISFACTION (40-44) (2) No → Go on to SOURCE OF INCOME DURING DOCTORAL STUDIES and SATISFACTION WITH STUDIES (16-26), MOBILITY (45-47), ASSESSMENT OF TRAINING (58-71), SOCIO-ECONOMIC STATUS (72) and IF UNEMPLOYED (73-76)
12. The place where you have spent most time on the job	(1) At university (2) In a research centre or institute Go on to 16. Please do not answer BRANCH OF ECONOMIC ACTIVITY (30) (3) In private enterprise or another institution / Others Go on to 15
Only if you work at university (if you answered 12.1) 13. Public or private	(1) Public Go on to 16 and do not answer BRANCH OF ECONOMIC ACTIVITY (30), DUTIES (31), TYPE OF CONTRACT (32 and 33), DURATION OF CONTRACT (34), SECTOR (36) or NUMBER OF EMPLOYEES (38) (2) Private Go on to 16 and please do not answer BRANCH OF ECONOMIC ACTIVITY (30), SECTOR (36) or NUMBER OF EMPLOYEES (38). Please answer TYPE OF CONTRACT and DURATION OF CONTRACT (in the case of "Temporary")
Only if you are working at a public university (if you answered 12.1 and 13.1) 14. Category	(1) Tenure-track junior lecturer (*lector*) / assistant lecturer (*ajudant doctor*) (2) Collaborating (*col·laborador*) (3) Tenured senior lecturer (*agregat*) or professor (polytechnic, university college, etc.) (4) Adjunct staff (temporary/part-time - *professor associat*) (5) Only a researcher (with a scholarship or on a research project) (6) Others (post-doctoral scholarship, etc.) / Don't know
Only if you are working in private enterprise or another institution (if you answered 12-3) 15. What kind of job do you have/have you had? (use free text, one digit classification from the National Classification of Occupations. Classification 2 is for University and Research Centre)	
16. Main source of income during doctoral studies	(1) A scholarship (2) Teaching or research work at university (including temporary/part-time teaching staff and research contracts) (3) A job in a sector connected with your pre-doctoral studies (4) A job unrelated to your pre-doctoral studies (5) Didn't work: full-time study/only sporadic jobs

SATISFACTION WITH DOCTORAL STUDIES	
Rate (from 1 to 7, where 1 is very negative and 7 is very positive) the following aspects regarding doctoral studies	
17. The content and quality of training/classes/seminars/activities	.....
18. The relevance of the training/classes/seminars for the thesis	.....
19. Quality of the organisation and delivery of training classes/seminars (compliance with the timetable, place, etc.)	.....
20. The quality of tutoring **during the period of classes/seminars** (with course teachers) (for pre-Bologna programmes)	.....
21. The quality of supervision **during the time spent working on the thesis** (relationship with the thesis director/s)	.....
22. The quality of the department/unit/institution's resources and their availability for carrying out research	.....
23. Doctoral studies in overall terms	.....
24. If you were to start over again, would you choose the same doctoral studies?	(1) Yes (2) No
25. During your doctoral studies, did you have opportunities to actively participate in either national and/or international conferences/events? (presentation of papers, posters, etc.)	(1) Yes (2) No
26. During your doctoral studies, did you present your research in internal seminars in the department/unit/institute?	(1) Yes (2) No

CURRENT/LAST JOB	
In relation to your (main) **CURRENT JOB** or your **LAST JOB**:	
27. What year did you start to work there? ..... (*only two digits for the corresponding year*)	
28. What was required for this job? A requirement was... (1) To have a PhD/doctorate (2) Your specific degree (pre-Bologna 5-year Honours degree/5-year Engineering/3-year undergraduate degree-*diplomatura*/3-year Engineering) (3) Any degree (4) No university degree was required	
29. In relation to your current or last job, is/was your job specific to your doctoral studies and training?	(1) Yes → Go on to 30 (2) No
29.1. In relation to your current or last job, do you think it is/was necessary to be a graduate? Please do not answer this question if a doctorate is/was required ("Yes" to 29)	(1) Yes (2) No
30. What is/was the economic activity of the company where you work/worked? ..... Please do not answer this question if you work in a university or research institute (either 12.1 or 12-2)	
31. What duties does/did the job involve? Please do not answer if you work in a public university (13.1) (1) Leadership/Management (2) Commercial or logistics (3) Teaching (4) R+D	

(5) Medical and social assistance | (6) Art and design | (7)Technical duties | (8) Other skilled duties (administrative)

(9) Non-skilled duties (auxiliary)

32. What sort of contract do/did you have? Please do not answer if working at a public university (13.1)

(1) Long-term

(2) Self-employed 33. If "Self-employed", working: →

(3) Temporary — (1) Freelance

(4) Internship — (2) For an employer

(5) Without contract

34. How long was the contract for? (Only "Temporary" in 32)

(1) Less than 6 months | (2) Between 6 months and one year | (3) More than one year

35. Do you work full-time? (35-40 hours/week?) — (1) Yes / (2) No (part-time, other)

36. Company sector: Please do not answer if you work at a public or private university — (1) Public | (2) Private

37. How much do you/did you earn a year (gross)?

(1) Less than €9,000 | (2) Between €9,000 and €12,000 | (3) Between €12,000 and €15,000

(4) Between €15,000 and €18,000 | (5) Between €18,000 and €24,000 | (6 Between €24,000 and €30,000

(7) Between €30,000 and €40,000 | (8) Between €40,000 and €50,000 | (9) Over €50,000

38. How many people does the company employ? Please do not answer if you work at a public or private university (12.1)

(1) Less than 10 | (2) Between 11 and 50 | (3) Between 51 and 100

(4) Between 101 and 250 | (5) Between 251 and 500 | (6) Over 500

39. Where do/did you work (province, abroad)?

(1) Barcelona | (2)Tarragona | (3) Girona | (4) Lleida

(5) Other regional autonomous communities | (6) Europe → 39.1. In which country do/did you work?

(7) Other → 39.2. In which continent do/did you work? 39.3. In what country?

SATISFACTION WITH YOUR CURRENT JOB

Rate your satisfaction (from 1 to 7, where 1 is highly dissatisfied and 7 is highly satisfied): (please do not answer if you are not currently working or if you have no job contract)

40. Job content .....

41. Prospects for promotion and personal development .....

42. Salary	.....
43. The usefulness in your job of knowledge/skills acquired in your doctoral studies/training (education-job match)	.....
44. The job in general	.....

MOBILITY

45. Did you have any experience of mobility **during your doctoral studies**?

(1) No	Go on to 47	
(2) Yes, in Catalonia/Spain	Go on to 47	
(3) Yes, abroad	46. Where?	
	(1) Europe →	46.1 Which country?
	(2) Rest of the world →	46.2. Which continent? (see pull-down menu) 46.3. In what country do/did you work? (see pull-down menu)
	46.4 How long did your research leave/stay last?	(1) Less than a month (2) Between 1-3 months (3) Between 3-6 months (4) More than 6 months
	46.5 What was the main source of funding for your research leave/stay?	(1) A scholarship/grant (2) A grant or funding for the dept.'s research group (3) Self-funded

47. Have you had any experience of **post-doctoral mobility**?

(1) No	Go on to 49	
(2) Yes, national	Go on to 49	
(3) Yes, abroad	48. Where?	
	(1) Europe →	46.1 Which country?
	(2) Rest of the world →	46.2. Which continent ? (see pull-down menu) 46.3. In what country do/did you work? (see pull-down menu)

THE IMPACT OF YOUR DOCTORAL STUDIES ON YOUR CURRENT JOB

49. Did you work during or in the last two years of your doctoral studies? (1) Yes (2) No

(Except for those who have not worked since being awarded their doctorate and who ticked 11.1.2 and 11.2.2)

Only for those who ticked 49.1

50. Have you changed your job or institution since being awarded your PhD/doctoral degree? (1) Yes (2) No

51. Have you been promoted at work since being awarded your PhD/doctoral degree? (1) Yes (2) No

52. Regarding your job during your doctoral studies, has there been any improvement in: 52.1. The type of contract: (1) Yes (2) No 52.2. Salary : 1) Yes (2) No 52.3. The number of working hours (per week)? 1) Yes (2) No	
Rate (from 1 to 7, where 1 is very little and 7 is a lot/very much) the improvement in professional terms as a result of your doctoral studies	
53. Taking on new duties or responsibilities different to those that you previously had	.....
54. Coordinating work groups and dealing with related problems (stemming from the lack of skills or experience, resistance to change, etc.)	
Only for those working in private enterprise: (12.3)	
55. Taking on high profile duties, tasks or projects in the company	
56. Developing new projects or products, new lines of action	
57. Taking a key role in decision-making with a potential direct impact on the business	

ASSESSMENT OF YOUR DOCTORAL TRAINING	
Assess the degree to which you developed the following skills during your doctoral studies. Rate **(from 1 to 7, where 1 is very low and 7 is a very high)** the level of your skills training at university:	
58. Documentation management	.....
59. Acquisition of strategies for the analysis of theories, fundaments and approaches, and research methods	.....
60. Data and output analysis techniques	.....
61. Publication and dissemination of research findings	.....
62. Writing and publication of scientific articles	
63. Design, planning and carrying out of research	.....
64. Capacity to generate new knowledge	.....
65. Ability to work in an independent and self-directed way	.....
66. Networking (establishing and maintaining networks of professional contacts)	.....
67. Understand the importance and the potential impact of research on society	.....
68. Successful funding and management of resources for research	.....
69. *Only for those working in the university (12.1).* Teaching skills (Teaching and providing support for university students to learn)	.....
70. Languages	.....
71. Team work	.....

SOCIO-ECONOMIC STATUS		
72. What was the highest level of education completed by your parents?		
(1) Both completed primary school/no studies	(2) One of the two completed secondary education	(3) Both of them completed secondary education

(4) One of them completed higher education

(5) Both of them completed higher education

IF UNEMPLOYED (Only "No" to 11.1)

73. Are you currently looking for work?

(1) Yes → Go on to 75

(2) No

74. If your answer was NO, what are your reasons?

(1) To continue studying/ public service exams-competitions

(2) Maternity/family → 74.1 If your answer was Maternity/family, do you intend to look for work in the future?

(1) Yes → End of survey

(2) No → End of survey

(3) Other

Only give answers to 75-77 if you are currently looking for work ("Yes" to 73)

75. How long have you been looking for work?

(1) Less than 6 months

(2) Between 6 months and 1 year

(3) Between 1 and 2 years

(4) More than 2 years

76. What have you done to look for work? (You can select more than one option)

(1) Personal contacts or family

(2) Personal initiative (sending out c.v.; applying for interviews; etc.)

(3) Advertisements in the Internet/press

(4) Public service exams/competition

(5) *Servei Català de Col·locació* (Catalan careers employment service)

(6) Setting up one's own company or office

(7) University services (job centre, employment bureau, etc.)

(8) Others

(9) I am not looking for work

Only if you have answered "no" to the previous 8 options

77. Since being awarded your PhD/doctoral degree, how many jobs have you rejected as being inadequate? .....

End of survey

ANNEX A3. EDITORIAL TEAM

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