Putting higher education services' quality at work: The employability of Italian doctors of philosophy

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Abstract

Purpose of the paper: Doctoral degree programs (PhDs) are the highest level of education delivered by universities in most of world countries. Even though PhD courses provide students with high level competences, it has been argued that doctors of philosophy meet some barriers in getting a job outside of the university system. This paper sheds light on this issue, investigating the employability of a sample of people who achieved a doctoral degree in Italy.

Methodology: Secondary data was collected from the Italian Institute of Statistics' (ISTAT) study on the employability of doctors of philosophy in Italy. First, a descriptive statistical analysis illuminated the socio-demographic characteristics of doctoral degree holders who were successful in getting a job; second, a regression analysis allowed to identify the factors which influenced the employability of doctors of philosophy.

Main Findings: More than 7 in 10 doctors of philosophy (70.9%) were employed; about 5% of the sample revealed that they had a job and concomitantly benefitted from a research fellowship or a post-doc grant. Less than 10% of the interviewees declared that they were unemployed. Unemployment was especially common among those who achieved a PhD degree in humanities. Doctors of philosophy who maintained to be involved in research

activities during their PhD courses were more likely to get a job; whilst the quantity of educational activities delivered to students was not found to influence the interviewees' employability, the quality of learning experience performed as a significant trigger of students' ability to get a job.

Practical implications: Tailored interventions are needed to increase the employability of doctors of philosophy. *Inter alia*, the learners' active engagement in scientific research engenders excellence in the higher education context, paving the way for greater opportunities of employment.

Originality/value: The article relates the excellence of higher education to the employability of doctors of philosophy, envisioning several avenues for further developments

Type of paper: Research paper

Keywords
Higher education; Service quality; Employability; Doctoral degree courses; PhD

1. Introduction

1.1 Background

Doctoral degree courses represent the highest level of education delivered by universities in most of world countries. In general terms, a doctoral degree course could be understood as a process of "*…postgraduate training that includes both theory and research*" (Gannon, 2006, p. 1061). It is ultimately aimed at providing students with the ability to make an original and significant contribution to the advancement of scientific knowledge (Devos and Somerville, 2012). This understanding of doctoral degree courses puts emphasis on the academic nature of the learning process which is provided to doctors of philosophy (PhDs). However, scholars have emphasized that doctoral students might perform as an important bridge between universities and firms (Thune, 2009). In light of these considerations, a multifaceted perspective should be used to assess the outcomes of a doctoral degree course.

As argued by Park (2005), the PhD course can be conceptualized as either a process or a product. On the one hand, the PhD activities are intended to enhance the functional and critical ability of doctoral students to perform autonomous research, allowing them to enter the academic career (Kelly, 2016). On the other hand, the doctoral course is encapsulated into the final output of the activities that are accomplished by PhD candidates during the doctoral learning process, *i.e.* the doctoral thesis, which should provide a relevant, meaningful and original contribution to the scientific knowledge (Gill and Dolan, 2015). Both the interpretations emphasize the academic nature of doctoral courses; conversely, they overlook the contribution of PhD courses in increasing the students' professional competences and soft skills, which have been argued to play a relevant role in improving the doctoral degree holders' ability to effectively navigate the labour market (Alves and Azevedo, 2010).

In an attempt to fill this gap, the scientific literature is paying a growing attention to the behaviours and performances of doctors of philosophy in the labour market (see, among others, Enders, 2000; Boulos, 2016; Andalib et al., 2018). However, the contextualization of the doctoral learning processes to the potential outcomes of PhDs in the job market requires a shift in the traditional approach to training and education delivered to doctoral students (Mangematin, 2000). In light of these arguments, the identification of the factors which affect the employability of doctoral degree holders represent a fundamental step to inform the reconfiguration of PhD courses in a perspective of educational services' excellence.

1.2 Research aims and rationale

Cuthbert and Moll (2015, p. 33) recently maintained that a "*…crisis discourse*" is affecting the way doctoral education programs are designed and implemented. More specifically, this crisis originates from two concomitant causes: 1) the mismatch between the (relatively high) number of post-graduates produced by universities and the (relatively small) number of academic jobs available due to recent academic reforms inspired to spending review (Passaretta et al., 2019); and 2) the inadequate qualification of doctors of philosophy to perform job activities outside the boundaries of the academia (Jones and Warnock, 2015).

Scholars have proposed a variety of recipes to deal with the employability crisis of PhDs (Metcalfe and Gray, 2005). *Inter alia*, the enrichment of the contents of doctoral degree courses in order to provide PhD students with broad-based skills that could be used in a multitude of working contexts has been identified as the cornerstone of interventions intended to increase the doctoral degree holders' employability (Harland and Plangger, 2004; Molla and Cuthbert, 2015). Besides, the collaboration between universities and business partners to

jointly design doctoral degree programs that are fitting with the evolving challenges arousing in the competitive environment has been depicted as a trigger of increased PhDs' employability (Manathunga et al., 2009; Gustavsson et al., 2016). Lastly, yet importantly, the active involvement of doctoral students in tailored initiatives aimed at stimulating their enterprising spirit and to engage them in academic entrepreneurship initiatives can act as a springboard to boost the PhDs employability (Lean, 2012; Hodzic, 2016).

In spite of these considerations, to the best of the authors' knowledge, still little is known about the relationship between the attributes of educational services delivered to doctoral students and their employability. More specifically, it is not clear if and how the perceived quality of educational services influences the ability of doctoral graduates to get a job either in the academia or outside the university setting. This article aims to fill such a gap in the scientific knowledge, investigating the potential effects engendered by the perceived quality of educational services on the employability of a representative sample of Italian doctors of philosophy. Three research questions inspired this study:

> *R.Q. 1*: Does the PhDs' perceived quality of educational services affect their ability to get a job in the academia?
>
> *R.Q. 2*: Does the PhDs' perceived quality of educational services affect their ability to get a job outside the academia?
>
> *R.Q. 3*: Does the PhDs' unsatisfaction with the educational services imply greater risks of unemployment?

The paper is organized as follows. Section 2 provides an overview of the research strategy and design: first, it shows some information about the data and variables which were investigated for the purpose of this study; second, it describes the socio-demographic characteristics of the sample which was involved in this research. Section 3 reports the study findings: it is articulated in three sub-section, each of which deals with one of the research questions depicted above. Section 4 critically discusses the study findings, envisioning several avenues for further development. Section 5 summarizes the main conceptual and practical implications of this research, emphasizing its twofold contribution.

2. Research strategy and design

2.1 Data and Variables

Secondary data was collected from the study of the Italian National Institute of Statistics (ISTAT) about the employability of people who achieved a doctoral degree in the period between January, 2008 and December, 2010. ISTAT makes micro-data available in an open-access repository according to a *Creative Common Licence 3.0*: sticking to the terms of use set by ISTAT, we exclusively used data for statistical analysis and research purposes; also, we did not make any attempt to identify the units of analysis. The research strategy and design was autonomously developed by the authors; hence, the study findings should be exclusively ascribed to the authors, and not to ISTAT, which was not directly involved in this research.

A two-step process was designed to build the sample of PhDs who participated in the ISTAT study. First, all the Italian Universities were approached, in order to identify the population of doctoral students who completed their educational program in the timespan which was contemplated in the ISTAT study. Second, the PhDs were individually asked to took the survey. A Computer Assisted Web Interviewing (CAWI) technique was used to collect data. Interviews were performed in the period between February, 2014 and July, 2014. In sum, 22,469 people were contacted; the final sample consisted of 16,322 PhDs who accepted to participate in the study and thoroughly filled the survey.

Table 1. Main data and variables

Variable (ID)	*Description*	*Type of Variable*	*Scale*	*μ*	*σ*
Dependent Variables					
Employment Status (ES)	Respondents' working condition at the moment of the interview	Categorical	1: Working in academia 2: Working outside academia 3: Working both in and outside academia 4: Unemployed	2.04	0.72
Working in Academia (ES_Ac)	Recoding of ES to elicit people working in academia	Dichotomous	0: Not working in academia 1: Working in academia	0.16	0.37
Working outside Academia (ES_Na)	Recoding of ES to elicit people working outside academia	Dichotomous	0: Not working outside academia 1: Working outside academia	0.71	0.45
Working both in and outside Academia (ES_Mx)	Recoding of ES to elicit people working both in and outside academia	Dichotomous	0: Not having a work both in and outside academia 1: Having a work both in and outside academia	0.05	0.22
Unemployed (ES_Un)	Recoding of ES to elicit unemployed respondents	Dichotomous	0: Employed 1: Unemployed	0.08	0.26
Independent Variables					
Quality of teaching activities (S_TA)	Perceived quality of teaching activities delivered by the university	Numeric, discrete	Scale from 1 (lowest satisfaction) to 10 (highest satisfaction)	6.21	2.31
Quality of learning process (S_LA)	Perceived quality of learning activities mix delivered by the university	Numeric, discrete	Scale from 1 (lowest satisfaction) to 10 (highest satisfaction)	6.92	2.31
Quality of training for research (S_TR)	Perceived quality of training activities for applied research	Numeric, discrete	Scale from 1 (lowest satisfaction) to 10 (highest satisfaction)	6.59	2.44
Quality of structures and technologies (S_SR)	Perceived quality and quantity of available structures and technologies	Numeric, discrete	Scale from 1 (lowest satisfaction) to 10 (highest satisfaction)	6.29	2.29
Quality of relationships with	Perceived quality of interaction with tenured	Numeric, discrete	Scale from 1 (lowest satisfaction) to 10 (highest	6.85	2.41

academics (S_RA)	academic staff		satisfaction)		
Quality of teaching staff skills (S_TS)	Perceived quality of the teaching staff's skill mix	Numeric, discrete	Scale from 1 (lowest satisfaction) to 10 (highest satisfaction)	7.54	2.01
Quality of outcomes of doctoral course (S_OD)	Perceived quality of the outcomes of the doctoral course	Numeric, discrete	Scale from 1 (lowest satisfaction) to 10 (highest satisfaction)	6.91	2.01
Satisfaction with teaching activities (S_TA_D)	Recoding of S_TA to elicit respondents' satisfaction with teaching activities	Dichotomous	0: Unsatisfied 1: Satisfied	0.66	0.47
Satisfaction with learning process (S_LA_D)	Recoding of S_LA to elicit respondents' satisfaction with learning process	Dichotomous	0: Unsatisfied 1: Satisfied	0.61	0.49
Satisfaction with training for research (S_TR_D)	Recoding of S_TR to elicit respondents' satisfaction with training for applied research	Dichotomous	0: Unsatisfied 1: Satisfied	0.71	0.45
Satisfaction with structures and technologies (S_SR_D)	Recoding of S_SR to elicit respondents' satisfaction with structures and technologies	Dichotomous	0: Unsatisfied 1: Satisfied	0.69	0.46
Satisfaction with relationships with academics (S_RA_D)	Recoding of S_RA to elicit respondents' satisfaction with interactions with academic staff	Dichotomous	0: Unsatisfied 1: Satisfied	0.75	0.43
Satisfaction with teaching staff skills (S_TS_D)	Recoding of S_TS to elicit respondents' satisfaction with skill mix of teaching staff	Dichotomous	0: Unsatisfied 1: Satisfied	0.87	0.34
Satisfaction with outcomes of doctoral course (S_OD_D)	Recoding of S_OD to elicit respondents' satisfaction with outcomes of doctoral course	Dichotomous	0: Unsatisfied 1: Satisfied	0.80	0.41

Source: Authors' elaboration

Table 1 summarizes the main variables which were examined for the purpose of this research. We had two categories of variables. On the one hand, the dependent variables concerned the employment status of respondents; more specifically, PhD holders were asked to report if: 1) they get a job at the university; 2) they get a job outside the academia; 3) they merged their academic job with an employment contract outside the university; 4) they were unemployed. We recoded the original data into 4 dichotomous variables, with "0" indicating that the related employment status did not occur and "1" indicating that it occurred. The independent variables involved the perceived satisfaction of respondents with various attributes of educational services, including: 1) the quality of teaching activities; 2) the variety of learning activities; 3) the quality of training activities for applied research; 4) the quality and quantity of available structures and technologies; 5) the interaction with tenured academic staff of the university; 6) the skill-mix of the teaching staff; and 7) the outcomes of the doctoral course. Respondents were asked to rate their perceived satisfaction on a scale from "1" (lowest satisfaction) to "10" (highest satisfaction). We recoded these data into dichotomous variables, with "0" indicating unsatisfaction with the service attributes of the doctoral programme (*i.e.* perceived satisfaction rated "5" or less) and "1" indicating satisfaction with the service attributes of the doctoral programme (*i.e.* perceived satisfaction rated "6" or more).

2.2 Data analysis and statistical approach

We used a twofold approach to investigate available data. First, we performed a descriptive statistical analysis, which allowed us to obtain some insights about the socio-demographic attributes of doctoral degree holders who were effective in getting a job either in academia or outside it; moreover, it permitted us to collect some preliminary evidence about the characteristics of the doctoral courses which paved the way for greater opportunity of PhDs' employability. The descriptive statistical analysis was primarily implemented through contingency tables.

Second, the dependent and independent variables depicted above were run in a logistic regression model, which was aimed at examining the potential implications of perceived quality of educational services on the employability of people holding a doctoral degree. More specifically, we designed four logistic models, which contemplated the different conditions of employment reported by respondents: 1) working in academia; 2) working outside academia; 3) working both in and outside academia; and 4) unemployed. From this point of view, we were able to illuminate the implications of educational service offerings on PhDs employability, suggesting several management and organizational implications for the realization of quality excellence in Higher Education.

2.3 Sample

The sample consisted of 16,322 people who achieved a doctoral degree in the period between January, 2008 and December, 2010. Table 2 provides an overview of its socio-demographic characteristic. The respondents were fairly distributed in terms of gender, with women (52.2%) prevailing over men (47.8%). The majority of PhDs were Italian (97.6%), with only 388 (2.4%) people reporting a foreign citizenship; 235 of non-Italian respondents (1.4%) were non-European citizens. About 1 in 3 respondents were aged less than 30 years when they achieved their PhD (29.7%); less than half were aged between 30 and 34 years (47.1%), with the remaining part being aged 35 years and more (23.2%). A quarter of the

sample lived in Central Italy (25.3%); more than 1 in 3 people were established either in North-western (20.7%) or in North-eastern Italy (17.2%); more than a fifth of people holding a doctoral degree were located in Southern Italy (22.4%), with the remaining part living in main Italian Islands (9.1%).

Table 2. The socio-demographic characteristics of the sample

Variable	Total	
	No.	*%*
Gender		
Male	7,805	47.8
Female	8,517	52.2
Citizenship		
Italian	15,934	97.6
Foreign	388	2.4
of whom non-European	*235*	*1.4*
Age group at the achievement of the doctoral degree		
29 years or less	4,847	29.7
Between 30 and 34 years	7,694	47.1
35 years or more	3,781	23.2
Geographical area of residence		
North-western Italy	3,375	20.7
North-eastern Italy	2,805	17.2
Central Italy	4,134	25.3
Southern Italy	3,652	22.4
Main Italian Islands (Sicily and Sardinia)	1,482	9.1
Marital status		
Single	8,306	50.9
Married or engaged in an informal relationship	8,016	49.1
of whom with 1 or more children	*6,211*	*38.1*
Main scientific area of PhD course		
Mathematics and physics	2,161	13.2
Earth sciences	1,997	12.2
Medicine	3,491	21.4
Engineering	3,135	19.2
Humanities	2,882	17.7
Law	1,171	7.2
Economics and management	925	5.7
Social and political sciences	560	3.4
Employment condition		
Working in academia	2,689	16.5
Working outside academia	11,572	70.9
Working both in and outside academia	830	5.1
Unemployed	1,231	7.5

Source: Authors' elaboration

The sample was uniformly distributed in terms of respondents' marital status: in fact, about half of doctoral degree holders (49.1%) maintained to be married or to be engaged in a serious relationship: most of them had one or more children (38.1%); 8,306 doctoral degree holders (50.9%) stated to be single. About a fifth of the sample achieved a PhD in the area of medicine (21.4%); engineering (19.2%) and humanities (17.7%) accounted for more than a third of the doctoral degrees contemplated in this research. Mathematics and physics (13.2%) and engineering (12.2%) concerned more than 1 in 10 respondents respectively. Law (7.2%), economics and management (5.7%), and social and political sciences (3.4%) interested the remaining part of the sample. The majority of doctoral degree holders had a job outside the university (70.9%); about 1 in 6 people reported that they were trying to initiate an academic career (16.5%). Only 5% maintained to work both in and outside the academia. Lastly, yet importantly, more than 1,200 PhDs (7.5%) stated to be unemployed at the moment of the interview.

3. Findings

3.1 The service factors affecting the opportunity of PhDs to get a job in academia

As previously anticipated, about 1 in 6 PhDs declared that they were working in academia at the moment of the interview. In order to shed light on this issue, Table 3 reports a contingency table, which depicts the interplay between the socio-demographic attributes of PhDs and their propensity to get an academic job. People who earned a PhD in mathematics and physics (28%), in earth sciences (26.5%), and in medicine (20.1%) were more likely to pursue a university career. Conversely, those who achieved a doctoral degree in humanities (9.8%), social and political science (8.6%), and law (4.6%) were found to have less chances of getting a job in academia. Both the gender of doctoral degree holders and the geographical location of universities seemed to have a role in affecting the possibility of respondents to start an academic career. More specifically, women and people graduated in northern Italy had greater opportunity to work at university.

Table 3. Cross-tabulation between PhDs socio-demographic attributes and propensity to work in academia

Socio-demographic variables	Not having an academic job	Having an academic job	Total	% working in academia
Male PhDs	6,631	1,174	7,805	15.04%
Female PhDs	7,002	1,515	8,517	17.79%
PhDs graduated in North-Western Italy	2,729	664	3,393	19.57%
PhDs graduated in North-eastern Italy	2,718	615	3,333	18.45%
PhDs graduated in Central Italy	4,064	677	4,741	14.28%
PhDs graduated in Southern Italy	2,694	486	3,180	15.28%
PhDs graduated in main Italian Islands	1,428	247	1,675	14.75%
PhD in Mathematics and Physics	1,556	605	2,161	28.00%
PhD in Earth Sciences	1,468	529	1,997	26.49%
PhD in Medicine	2,788	703	3,491	20.14%
PhD in Engineering	2,770	365	3,135	11.64%
PhD in Humanities	2,599	283	2,882	9.82%

PhD in Law	1,117	54	1,171	4.61%
PhD in Management and Economics	823	102	925	11.03%
PhD in Social and Political Science	512	48	560	8.57%

Source: Authors' elaboration

Table 4 summarizes the results of the logistic regression model examining the implications of educational services' attributes on the doctoral degree holders' possibility to get a job in academia. On the one hand, several attributes of the educational service offering were found to positively and significantly affect the ability of PhDs to get an academic job: this was true with regards to: 1) the quality of training delivered by the university to enhance the applied research skills of respondents; 2) the quality and quantity of structures and technologies available to respondents during the PhD activities; 3) the relationships between tenured academics and PhDs; and 4) the final outcome of the doctoral course. On the other hand, a negative association between the respondents' satisfaction with the teaching activities and learning processes delivered by the university and their opportunity to get a job in academia was noticed.

Table 4. The service factors affecting the PhDs' ability to get a job in academia

Omnibus tests of Model Coefficients

X^2 = 315,303	df = 7	Sig. = 0.000

Variable	B	S.E.	Wald	Df	Sig.	Exp(B)
S_TA_D***	-0.351	0.07	24.89	1	0.000	0.704
S_LA_D***	-0.327	0.068	23.188	1	0.000	0.721
S_TR_D***	0.535	0.067	63.47	1	0.000	1.708
S_SR_D***	0.413	0.057	52.181	1	0.000	1.511
S_RA_D*	0.176	0.069	6.415	1	0.011	1.192
S_TS_D	-0.021	0.084	0.064	1	0.800	0.979
S_OD_D*	0.195	0.081	5.728	1	0.017	1.215
Constant	-2.17	0.069	977.64	1	0.000	0.114

*** *Significant at the 0.001 level*
* *Significant at the 0.05 level*

Source: Authors' elaboration

3.2 The service factors affecting the opportunity of PhDs to get a job outside academia

The socio-demographic attributes of people who were more likely to find a job outside academia did not mirror the characteristics of those who showed a greater likelihood to initiate an academic career. These data are synthesized in Table 5. Generally speaking, most of doctoral degree holders were working outside the academia at the moment of the interview; this was true for all the scientific areas contemplated in this study. Nevertheless, the propensity to find a job outside the university was higher for those who accomplished their doctoral studies in the fields of law (82.9%), management and economics (78.1%), and engineering (76.2%); alternatively, this circumstance was less common among those who achieved their PhD in earth sciences (60.5%) and mathematics and physics (61.7%). Interestingly, men (73.4%) were more likely to get a job outside academia as compared with women (68.6%).

Table 6 displays the service factors which were found to have a role in influencing the propensity of respondents to find a job outside academia. As expected, both the perceived

quality of the teaching activities and the self-assessed effectiveness of the learning process delivered by universities performed as positive and significant regressors of the doctoral degree holders' ability to navigate the job market and to get a job either in the public or in the private sectors. It is worth noting that the perceived satisfaction with the specific training for the improvement of individual applied research skills and the self-reported quality of available structures and technologies were found to be negative and statistically significant regressor of the PhDs propensity to have a job outside academia.

Table 5. Cross-tabulation between PhDs socio-demographic attributes and propensity to work outside academia

Socio-demographic variables	Not having a job outside academia	Having a job outside academia	Total	% working outside academia
Male PhDs	2,073	5,732	7,805	73.44%
Female PhDs	2,677	5,840	8,517	68.56%
PhDs graduated in North-Western Italy	1,085	2,308	3,393	68.02%
PhDs graduated in North-eastern Italy	980	2,353	3,333	70.60%
PhDs graduated in Central Italy	1,233	3,508	4,741	73.99%
PhDs graduated in Southern Italy	926	2,254	3,180	70.88%
PhDs graduated in main Italian Islands	526	1,149	1,675	68.60%
PhD in Mathematics and Physics	828	1,333	2,161	61.68%
PhD in Earth Sciences	789	1,208	1,997	60.49%
PhD in Medicine	1,071	2,420	3,491	69.32%
PhD in Engineering	745	2,390	3,135	76.24%
PhD in Humanities	764	2,118	2,882	73.49%
PhD in Law	200	971	1,171	82.92%
PhD in Management and Economics	203	722	925	78.05%
PhD in Social and Political Science	150	410	560	73.21%

Source: Authors' elaboration

Table 6. The service factors affecting the PhDs' ability to get a job outside academia

Omnibus tests of Model Coefficients

X^2 = 160,061	df = 7	Sig. = 0.000

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
S_TA_D***	.267	.058	21.485	1	.000	1.306
S_LA_D***	.216	.056	15.136	1	.000	1.241
S_TR_D***	-.333	.052	40.501	1	.000	.716
S_SR_D***	-.198	.045	19.670	1	.000	.821
S_RA_D	-.078	.054	2.100	1	.147	.925
S_TS_D	.108	.064	2.829	1	.093	1.115
S_OD_D	-.066	.063	1.069	1	.301	.936
Constant	.980	.050	383.114	1	.000	2.663

*** *Significant at the 0.001 level*

Source: Authors' elaboration

3.3 The potential triggers of PhDs' unemployment

Table 7 includes the cross-tabulations of doctoral degree holders' status of employment and their socio-demographic characteristics. Women (9.1%) were about twice as likely as men (5.9%) to be unemployed at the end of their doctoral education. Similarly, people living in main Italian Islands (11.5%) and Southern Italy (9.4%) were twice as likely as those living

in the western (5.9%) and the eastern (5.5%) part of Northern Italy to report unemployment at the moment of the interview. The scientific area of the doctoral course seemed to affect the likelihood of respondents' unemployment: in fact, people who achieved their doctoral degree in humanities (11.8%), social and political sciences (10.4%), earth sciences (8.5%), and law (8.4%) showed a higher propensity to state unemployment.

Table 8 summarizes the output of the logistic regression model investigating the implications of the educational services' attributes on the occurrence of unemployment among PhDs. We found that three service factors were negatively and significantly related to the respondents' unemployment: first, people who maintained to be satisfied with the overall outcome of their doctoral course were less likely to report unemployment; second, the satisfaction of PhDs with the relationships they established with the academic and teaching staff implied lower occurrence of unemployment; third, and lastly, the perceived quality of structures and technologies of the host university seemed to produce lower risks of unemployment.

Table 7. Cross-tabulation between PhDs socio-demographic attributes and unemployment status

Socio-demographic variables	Employed	Unemployed	Total	% unemployed
Male PhDs	7,347	458	7,805	5.87%
Female PhDs	7,744	773	8,517	9.08%
PhDs graduated in North-Western Italy	3,191	202	3,393	5.95%
PhDs graduated in North-eastern Italy	3,151	182	3,333	5.46%
PhDs graduated in Central Italy	4,386	355	4,741	7.49%
PhDs graduated in Southern Italy	2,880	300	3,180	9.43%
PhDs graduated in main Italian Islands	1,483	192	1,675	11.46%
PhD in Mathematics and Physics	2,029	132	2,161	6.11%
PhD in Earth Sciences	1,827	170	1,997	8.51%
PhD in Medicine	3,256	235	3,491	6.73%
PhD in Engineering	2,991	144	3,135	4.59%
PhD in Humanities	2,543	339	2,882	11.76%
PhD in Law	1,072	99	1,171	8.45%
PhD in Management and Economics	871	54	925	5.84%
PhD in Social and Political Science	502	58	560	10.36%

Source: Authors' elaboration

Table 8. The service factors affecting the PhDs' unemployment condition

Omnibus tests of Model Coefficients

X^2 = 160,061	df = 7	Sig. = 0.000

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
S_TA_D	.119	.100	1.395	1	.238	1.126
S_LA_D	.061	.097	.404	1	.525	1.063
S_TR_D	.146	.088	2.764	1	.096	1.157
S_SR_D***	-.239	.073	10.640	1	.001	.787
S_RA_D**	-.244	.087	7.801	1	.005	.784
S_TS_D	-.159	.098	2.637	1	.104	.853
S_OD_D***	-.478	.102	22.127	1	.000	.620
Constant	-1.896	.070	728.981	1	.000	.150

*** *Significant at the 0.001 level*
** *Significant at the 0.005 level*

Source: Authors' elaboration

4. Discussion

The study results should be read in light of the main limitations which affected this research. The sample was only composed of doctoral degree holders who achieved their PhD in Italy: therefore, it is not possible to claim the generalizability of the research findings at the international level. In addition, it is possible that the focus on people who earned their doctoral degree in Italy produced a bias on the study results. In line with the specific purpose of this study, only variables related to the educational service factors were run into the logistic regression analysis; even though this decision allowed us to shed light on the potential implications of educational services provided to PhDs on their occupational status, it negatively affected the consistency of the study results. Finally, yet importantly, we adopted a cross-sectional approach to perform this study, which permitted us to obtain an overview of the employment conditions of doctoral degree holders in Italy. Nevertheless, the lack of a longitudinal slant prevented the possibility to examine the evolution over time of the PhDs' occupational status; this is especially relevant for those who initiated an academic career, since they are more likely to have fixed-terms contract at the beginning of their working experience.

Scholars have variously argued that the imbalance between the supply and the demand of doctoral degree holders in the labour market generated increasing rates of unemployment, which might undermine the willingness of graduated people to undertake a doctoral course (Smaglik, 2014; Shin et al., 2018). From this point of view, greater attention should be paid to the design and management of doctoral degree courses, in an attempt to minimize the risks of unemployment for those who, after completing a PhD programme, are not successful in initiating an academic career. Indeed, echoing what has been found at the international level (Neumann and Tan, 2011; Larsson et al., 2014), only a small number of people who achieved their doctoral degree were able to find a job in academia. Otherwise, the majority of them get a job outside academia: this evidence mirrors both the declining motivations of people attending to doctoral courses to embark an academic career (Brailsford, 2010) and their shrinking interest to apply for a job in academia at the completion of their PhD (Roach and Sauermann, 2017).

Whilst those who get a job in academia were found to appreciate their relationship with the tenured academic staff and the availability of advanced structures and technologies to accomplish their research endeavours, the doctoral degree holders who were employed outside academia reported greater satisfaction with the quality of teaching activities provided to them during the doctoral course and with the effectiveness of the learning process designed by the host university. Drawing on this evidence, it could be maintained that doctoral degree courses should be partially reframed – from both an organizational and a management perspective – in an attempt to make more fitting the outcomes of educational activities provided to doctoral students with the evolving job demand of the labour market. Beyond training PhD students to perform applied research activities – which turn out to be exclusively marketable in the academic domain – universities should provide doctoral candidates with advanced hard and soft skills, allowing them to fully express their potential outside the academic context (Curaj et al., 2015; Aarnikoivu et al., 2019).

Embracing an organizational perspective, this is possible by establishing a bridge between the industry and the university, in an attempt to boost inter-organizational relationships and partnerships aimed at enriching the educational experience of PhD students (Manathunga et al., 2009; Aperia et al., 2015). Obviously, inter-organizational relationships between industry and academia should be established on a sound institutional framework emphasizing the benefits for both parties and putting at the centre of the interaction the specific education and development needs of doctoral candidates (Grimm, 2018).

Adopting a management standpoint, a comprehensive reconfiguration of the learning processes delivered to PhD students is required: alongside conventional teaching activities which are focused on scientific research, those who embark a doctoral journey should be prepared to address the evolving challenges arousing in the external environment, thus being able to wittingly address their career decisions (Cepiku, 2011). For this purpose, a change is needed in the skill mix of the teaching staff serving doctoral courses: on the one hand, a balanced mix of conceptual, research-oriented skills, and practical, job-focused competences are required, in order to provide PhD students which a wide access to the knowledge and abilities that they need to be successful in the wider job market; on the other hand, teachers should be encourages to engage students in a co-creating relationships, making them aware of their employability skills both in and outside academia (Mello et al., 2017).

It is interesting to note that people who maintained to be unsatisfied with the relationship they established with the tenured academic staff during the process of doctoral education were more likely to be unemployed as compared with their counterparts. In addition, it seemed that unemployment was more common among those who perceived a bad quality of technologies and structures available in their host university. These findings emphasize the importance of two ingredients which are essential in the recipe for excellence in higher education. First, the ability of the academic staff to establish friendly and comfortable relationships with doctoral students enhances the motivation of the latter during the whole PhD course, leading to better educational outcomes and, consequently, triggering greater opportunity of employment (Litalien and Guay, 2015). Second, the availability of advanced structures and technologies at university allows PhD students to acquire timely and transferable practical skills alongside the development of applied research competences, which enhance their effectiveness in seeking a job outside academia (Gail, 2007; Thune, 2010).

Tailored interventions should be designed and implemented in order to deal with inequalities in the access to employment of doctorate holders. In fact, even though women were more likely than men to embark in an academic career, they showed greater likelihood of unemployment: this could be the consequence of either overt or tacit forms of discrimination which underpin gender-based inequalities in and outside academia (Roos and Gatta, 2009; Winslow and Davis, 2016). Moreover, doctoral degree holders who achieved their PhD in Southern Italy and in main Italian Islands were less likely to initiate an academic career and more likely to be unemployed; this could indicate a spatial inequality that needs to be addressed with specific initiatives at both the policy making and at the operational levels (Iammarino and Marinelli, 2011).

5. Conclusions

The implications of this paper are twofold. From a conceptual angle, the article stresses the opportunity to frame the quality assessment of doctoral degree courses in light of the doctorate degree holders' employability. Indeed, the quality of doctoral education is ultimately encapsulated into the ability of PhDs to get a job either in academia or outside it, putting into practice the knowledge and the skills they acquired during their learning process. In line with this consideration, the improvement of higher educational services' quality in a perspective of excellence should take into account the implications of different services' attributes on the effectiveness of doctoral degree holders to meet the evolving job demand of the labour market. However, further developments are required to fully disentangle the service factors which are more relevant in affecting the PhDs employability.

From a practical perspective, the research findings revealed that unemployment is recurring among people with a doctorate. In fact, more than 1 in 15 PhDs living in Italy

reported to be unemployed at the moment of the interview. Since spending review policies and declining resources impair the ability of higher education institutions to recruit additional academic staff, further attention should be paid to the ability of doctoral degree holders to get a job outside academia, developing timely hard and soft skills to meet the evolving demand of the labour market. To overcome the inertia which stems from the traditional bureaucratic approach which characterizes the functioning of higher education institutions and to boost the process of change, universities should engage industry partners in a co-creating relationships: indeed, the enhancement of the industry-academia interface is expected to further improve the quality of educational services provided to doctoral students, paving the way for service excellence.

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