

PhD candidates and their satisfaction with non-academic career opportunities

Authors: Valérie Legrand¹, Anneleen Mortier¹, Katia Levecque¹, Lien Wille¹

¹ ECOOM–Ghent University, Department of Work, Organisation and Society

SATISFACTION WITH CAREER OPPORTUNITIES

Research shows that the vast majority of PhD candidates, in both Flanders and other regions, have the ambition to pursue an academic career (ECOOM-brief 8; Vitae, 2012). As the number of academic appointments is limited at Flemish universities, the Flemish government and the academic world are making efforts to facilitate the transition to the non-academic labour market (Flemish government, 2019). This is done in many different ways. For instance, there are initiatives that stimulate collaboration with business(es) during the doctorate, as is done in a Baekeland mandate. The Flemish universities also offer support to PhD candidates in starting their own business through the Tech Transfer offices, incubator programmes and specific entrepreneurial training programmes. Furthermore, efforts are being made to improve the image of non-academic careers among academics and non-academic employers' perceptions of PhD holders. All too often, non-academic employers hold an image of PhD holders that is coloured by stereotypes (ECOOM-brief 32).

Stereotypes can be broken by means of scientific research, and this has started to take shape recently. For instance, the PhD Career Survey has provided insights into the different academic and non-academic career paths of PhD holders who obtained their PhD at one of the Flemish universities. We refer the interested reader to the survey website (<https://www.phdcareersflanders.com/en/>) and the various ECOOM-briefs that discuss specific career aspects of PhD holders in more detail (see ECOOM-briefs 27, 28, 29 and 30).

Research into the career paths of PhD holders will increasingly enable PhD candidates to make well-founded career choices. It allows to form an accurate picture of the career opportunities once the PhD has been obtained. ECOOM-Research in Flanders shows that a positive perception of a PhD's value on the non-academic labour market is related to higher scores on various aspects of wellbeing among PhD candidates, such as

mental health, vitality, job satisfaction and retention (ECOOM-briefs 18, 19, 21 and 22).

Not all PhD candidates have a clear picture of the possibilities a PhD brings on the non-academic labour market. This often influences their estimation of the career opportunities outside the university and consequently their satisfaction with them. In what follows, we answer the following questions:

1. *How satisfied are PhD candidates with the career opportunities in the non-academic sector?*
2. *Does this satisfaction differ according to gender, nationality, science cluster and PhD phase?*
3. *Does this satisfaction differ according to the work and organisational context?*
4. *Is the satisfaction with the non-academic career opportunities among PhD candidates in Flanders comparable to that of other groups on the labour market?*

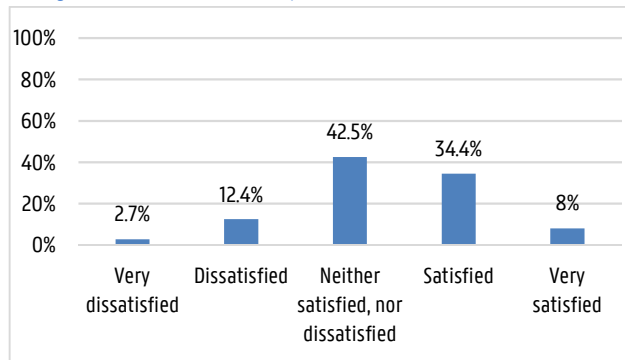
We answer these research questions using data from the *Survey of Junior Researchers 2018*. This survey was organised by ECOOM Ghent University and sent to all junior researchers at the five Flemish universities. For the current analyses, we limit ourselves to those junior researchers in a PhD trajectory ($N=3359$). For more information on the survey, we refer to ECOOM-brief 17.

HOW SATISFIED ARE PHD CANDIDATES WITH THE NON-ACADEMIC CAREER OPPORTUNITIES?

In the *Survey of Junior Researchers 2018* we asked PhD candidates in Flanders *"To what extent are you satisfied with the career opportunities in the non-academic sector?"*. Answers ranged from "very unsatisfied" (=1) to "very satisfied" (=5). Figure 1 shows that 42.4% of the PhD candidates are (very) satisfied with the career opportunities in the non-academic

sector. In contrast, 15.1% is (very) unsatisfied and 42.5% indicates that they are neither satisfied, nor dissatisfied.

Figure 1. Satisfaction with the career opportunities in the non-academic sector among PhD candidates in Flanders, 2018



DOES THE SATISFACTION WITH THE NON-ACADEMIC CAREER OPPORTUNITIES DIFFER ACCORDING TO GENDER, NATIONALITY, SCIENCE CLUSTER AND PHD PHASE?

In what follows, we consider PhD candidates as satisfied when they indicated to be satisfied or very satisfied with the career opportunities in the non-academic sector. Table 1 presents the share of PhD candidates who are (very) satisfied with the non-academic career opportunities according to gender, nationality, science cluster and PhD phase. If we only take gender into account, we see that the share of (very) satisfied female PhD candidates (39%) is significantly smaller than the share of (very) satisfied male PhD candidates (46.5%).

We also see significant differences in satisfaction based on nationality. Post-hoc comparisons with a stricter significance level ($p < .01$) show that more PhD candidates from Belgium are satisfied with the non-academic career opportunities in comparison to PhD candidates from other EU28 countries.

Furthermore, the satisfaction with the non-academic career opportunities appears to differ according to the science cluster. Among applied scientists, we find 58% to be (very) satisfied. In the exact sciences, this share is 58%. Among those who plan to obtain a PhD in the biomedical sciences, 43.8% says to be (very) satisfied and in the social sciences, this applies to 33.7%. The humanities close the series with a share of 20.5% (very) satisfied PhD candidates. Post-hoc comparisons ($p < .01$) show that the satisfaction differs significantly between all science clusters, with the exception of the share of (very) satisfied PhD candidates in the exact and biomedical sciences.

Finally, we see significant differences in satisfaction depending on the phase of the PhD trajectory: whereas 48.1% of the PhD candidates in the first phase indicates to be (very) satisfied with the career opportunities, only 41.5% of those in second phase say the same and in the finishing phase, this share consists of 39.1% of the PhD candidates. Post-hoc comparisons ($p < .01$) show that there are significantly more satisfied PhD candidates in the initiating phase than in the executing and finishing phase.

Table 1. Satisfaction with the non-academic career opportunities according to gender, nationality, science cluster and PhD phase among PhD candidates in Flanders, 2018

	(very) satisfied %	Sign (§)
Gender		***
Male	46.5	
Female	39.0	
Nationality		**
Belgian	44.4	
EU28	37.5	
Non-EU28	39.7	
Science cluster		***
Exact sciences	45.4	
Biomedical sciences	43.8	
Applied sciences	58.0	
Humanities	20.5	
Social sciences	33.7	
PhD phase		**
Initiating	48.1	
Executing	41.5	
Finishing	39.7	

(§) significance based on the Chi²-test
n.s.=not significant, *= $p < 0.05$, **= $p < 0.01$, ***= $p < 0.001$

DOES THE SATISFACTION WITH THE NON-ACADEMIC CAREER OPPORTUNITIES DIFFER ACCORDING TO THE WORK AND ORGANISATIONAL CONTEXT?

Table 2 shows how satisfaction with the career opportunities in the non-academic sector (again: satisfied or very satisfied) is influenced by the work context, organisational context and sociodemographic variables. The analysis results indicate that satisfaction is higher ($OR > 1$) (1) when there is a high level of job control (i.e. a high level of job variation and job autonomy), (2) in the applied sciences compared to the exact sciences, (3) when the supervisor has an inspirational leadership style and (4) when the PhD candidate has a positive perception of the value of the PhD outside the university.

Satisfaction with non-academic career opportunities is significantly lower ($OR < 1$) (1) within the humanities and social sciences compared to the exact sciences, (2) for PhD candidates who received a scholarship in comparison to PhD candidates employed as research assistants, (3) in the executing phase of the doctorate compared to the initiating phase and (4) when the PhD candidate is interested in an academic career.

We note no significant relations if we look at job demands, perceived chance of an academic career, university, closed team decision-making, family work conflict (i.e. when the family situation complicates the work role) and work family conflict (i.e. when the work situation complicates the family role).

Table 2. Predictors of satisfaction with the career opportunities in the non-academic sector among PhD candidates in Flanders, 2018 (N=2532: odds ratio (OR), 95% confidence interval (95% CI), significance level (S))

	OR	95% CI	Sign (S)
Constant	0.031		
Work context			
Job demands	0.978	(0.811-1.179)	n.s.
Job control	1.337	(1.096-1.631)	**
Science cluster			
Exact sciences (ref)	-	-	-
Biomedical sciences	0.974	(0.740-1.282)	n.s.
Applied sciences	1.387	(1.039-1.852)	*
Humanities	0.490	(0.322-0.745)	***
Social sciences	0.656	(0.489-0.881)	**
Type of appointment			
Research assistant (ref)	-	-	-
Scholarship	0.740	(0.570-0.960)	*
Research project	0.846	(0.650-1.101)	n.s.
No funding from university	1.139	(0.738-1.756)	n.s.
Other	0.819	(0.515-1.301)	n.s.
Unknown	0.711	(0.404-1.250)	n.s.
PhD phase			
Initiating (ref)	-	-	-
Executing	0.725	(0.572-0.918)	**
Finishing	0.761	(0.517-1.015)	n.s.
Leadership style: inspirational			
Much interest in academic career	0.665	(0.546-0.810)	***
Perception of a high chance of an academic career	1.007	(0.824-1.231)	n.s.
Positive perception of a career outside university	2.541	(2.229-2.897)	***
Organisational context			
University			
KU Leuven (ref)	-	-	-
Ghent University	1.095	(0.819-1.464)	n.s.
Antwerp University	0.870	(0.701-1.080)	n.s.
VUB	1.227	(0.806-1.869)	n.s.
Hasselt University	0.859	(0.660-1.119)	n.s.
Closed team decision-making	1.037	(0.934-1.151)	n.s.
Family work conflict	0.965	(0.858-1.085)	n.s.
Work family conflict	0.943	(0.840-1.058)	n.s.
Sociodemographics			
Female	0.835	(0.693-1.005)	n.s.
Age	0.987	(0.966-1.009)	n.s.
Partner	1.003	(0.823-1.224)	n.s.
Children	1.239	(0.921-1.665)	n.s.
Model fit satisfaction with the non-academic career opportunities:			
LR = 2983.539 df = 28 p<0.001 Nagelkerke R ² = 0.230			

Note: OR = odds ratio, 95% CI = 95% confidence interval. Ref. = reference category. Significances: * = p < .05, ** = p < .01, *** = p < .001, n.s. = niet significant

Moreover, we see no significant differences according to the sociodemographic characteristics gender, age and (not) having a partner and children. Just as in Table 1, we note no significant differences between PhD candidates in the biomedical sciences and their colleagues in the exact sciences.

The predictors in Table 2 result in a determination coefficient (Nagelkerke R²) of 0.23. This means that 23% of the variance in the level of satisfaction with the non-academic career opportunities in PhD candidates in Flanders is explained by the predictors in the model.

IS THE SATISFACTION WITH THE NON-ACADEMIC CAREER OPPORTUNITIES AMONG PHD CANDIDATES IN FLANDERS COMPARABLE TO...?

The question regarding the satisfaction of PhD candidates with the career opportunities in the non-academic sector has received little attention so far. This makes comparison (or benchmarking) difficult.

Looking at benchmark possibilities outside of Flanders, we find a similar study conducted by our northern neighbours. Waaijer and colleagues (2016) investigated whether gender differences exist in how PhD graduates view their career prospects in the Netherlands. Participants were asked to rate aspects of career prospects in the non-academic world on a 5-point scale, going from "very bad" to "very good". Similar to the results in the present brief, women appeared to have fewer positive perceptions about the career opportunities and availability of permanent job positions on the non-academic labour market. In addition, Waaijer and colleagues (2016) also examined the influence of the science cluster and the age of PhD holders on their perceptions of non-academic career prospects. Depending on the science cluster significant differences were found: perceptions were less positive in the biomedical sciences, social sciences and humanities than in the applied sciences (defined as *engineering and technology field*). Age did not appear to have any relation with the evaluation of the career prospects.

As for Flanders, our search in the literature for the career satisfaction of highly educated people in the non-academic sector did not yield any results. However, for Flanders, it is possible to compare PhD candidates' satisfaction with their satisfaction with the academic career opportunities. In a future ECOOM brief we will look into the same research questions as in the present brief, but focused on the satisfaction with the career opportunities in the academic sector. Upon publication of the results, we invite the reader to compare the levels of satisfaction with the academic and non-academic career opportunities among PhD candidates in Flanders.

DISCUSSION

When we ask PhD candidates in Flanders about their satisfaction with the career opportunities in the non-academic sector, roughly one in five is (very) dissatisfied, two in five have no outspoken opinion and two in five are (very) satisfied. It is possible that many PhD candidates are in the "neither satisfied, nor dissatisfied" category because they have no clear idea of the career possibilities and opportunities outside of academia. Furthermore, the fact that the vast majority of PhD candidates have academic aspirations will undoubtedly also play a role (ECOOM brief 8; Vitae, 2012). When academic aspirations fail to be translated into an academic career or when such aspirations are absent, the focus is often on taking up research activities outside the academic walls (ESF, 2017; Woolston, 2017). Research based on the *Career Tracking Survey of Doctorate Holders* (ESF, 2017) shows that approximately 80% of PhD holders end up in a job with research activities. We also find similar figures in the *PhD Career Survey* organised by ECOOM Ghent University in 2017.

Why the share of satisfied female PhD candidates is smaller than the share of satisfied male PhD candidates is open to speculation. Are they less informed about these career opportunities? Do they see less opportunities? Or does their lower satisfaction reflect a structurally less favourable position for women in the labour market, even if they have a PhD? In our survey, we did not ask for reasons why PhD candidates assess their career opportunities as favourable or unfavourable. As a result we cannot formulate empirical answers on this subject. When we include gender in a multiple regression model to estimate satisfaction with the non-academic career opportunities (see Table 2), gender appears to have no significant effect. This means that the gender differences we noted in Table 1 can be explained by the other determinants we included in the analysis in Table 2.

In both Table 1 and Table 2, we notice significant differences between science clusters. The largest satisfaction is found in the applied sciences, the smallest in the social sciences and humanities. Research based on the *Careers of Doctorate Holders survey 2010* shows that PhD holders in humanities find it more difficult to enter the non-academic labour market (Boosten et al., 2014). They belong to the group most likely to stay within universities after obtaining their PhD, be it in an academic position or not (ECOOM, 2019; Boosten et al., 2014). Only 8% of them end up in a non-academic research position (VRWI, 2016). ECOOM-research among PhD candidates indicated that the belief in the value of a PhD on the non-academic labour market was smallest within the humanities (ECOOM-brief 10). The strongest belief was found among PhD candidates in the applied sciences. Out of all science clusters, PhD holders within applied sciences also take up the most jobs in the non-academic sector (Boosten et al., 2014).

If we look at our findings in relation to nationality, we remember that the share of international PhD candidates who are satisfied with the career opportunities outside of academia is smaller in comparison to the share of satisfied Belgian PhD candidates. In one of the following ECOOM-Briefs we will elaborate on this matter. More specifically, we will focus on the question how they perceive their chances of an academic career, but also whether they are interested in a job in other sectors than the academic one. A crucial question we will ask is whether the job they are interested in and aspire is located in Flanders or elsewhere.

To conclude this brief, we found a larger satisfaction with the non-academic career opportunities in the initiating phase than in the executing and finishing phase of the PhD trajectory in Table 1. When controlling for other determinants of satisfaction with non-academic career opportunities, only the difference between the initiating phase and executing phase turns out to be significant.

REFERENCES

- Boosten, K., Vandevelde, K., Derycke, H., te Kaat, A. J., & Van Rossem, R. (2014). *Careers of doctorate holders survey 2010. R&D and innovation in Belgium research series* (Vol. 13). Brussels, Belgium: Belgian Science Policy Office.
- ECOOM (2019). *Vlaams indicatorenboek 2019. [Flemish indicator book 2019]*. Retrieved from <https://www.vlaamsindicatorenboek.be/>
- ECOOM-brief 8 – Levecque, K., Baute, S., & Anseel, F. (2013). Junior researchers in Flanders in 2013: on dreams and realities. ECOOM UGent.
- ECOOM-brief 10 – Vandevelde, K., & Boosten, K. (2014). What do doctorate holders in Belgium do? Key results from the OECD survey 2010. ECOOM UGent
- ECOOM-brief 17 – Levecque, K., Mortier, A., & Debacker, N. (2019). Life as it is: junior researchers at Flemish universities in 2018. ECOOM UGent.
- ECOOM-brief 18 – Levecque, K., Van Overbeke, K., De Beuckelaer, A., & Mortier, A. (2019). How satisfied are PhD candidates with their job? A focus on Flanders 2013-2018. ECOOM UGent.
- ECOOM-brief 19 – Levecque, K., Van de Velde, J. De Beuckelaer, A., & Mortier, A. (2019). How often do PhD candidates consider quitting their PhD? Findings for Flanders 2013-2018. ECOOM UGent.
- ECOOM-brief 21 – Levecque, K., Rigolle, F., De Beuckelaer, A., & Mortier, A. (2019). PhD candidates and vigour: on bursting with energy, feeling fit and being enthusiastic about work. ECOOM UGent.
- ECOOM-brief 22 – Levecque, K., De Beuckelaer, A., & Mortier, A. (2019). Mental health during the PhD adventure: findings for Flanders 2013 and 2018. ECOOM UGent.
- ECOOM-brief 27 – Mortier, A., Van Parijs, J., Levecque, K. (2020). The salary of PhD holders inside and outside academia: something to be satisfied with? ECOOM UGent.
- ECOOM-brief 28 – Legrand, V., Mortier, A., Levecque, K., Wille, L. (2020). There is more to life than money: the satisfaction of PhD holders with their fringe benefits. ECOOM UGent.
- ECOOM-brief 29 – Mortier, A., Van Parijs, J., Levecque, K., Wille, L. (2020). Combining work and free time: how satisfied are PhD holders with their work-life balance? ECOOM UGent.
- ECOOM-brief 30 – Mortier, A., Levecque, K., Wille, L. (2020). PhD holders and job contracts: is one better off in the non-academic sector? ECOOM UGent.
- ECOOM-brief 32 – Wille, L., Legrand, V., Mortier, A., Levecque, K. (2020). PhD holders through the eyes of non-academic employers: A state-of-the-art literature review. ECOOM UGent.
- European Science Foundation (2017). *Career Tracking Survey of Doctorate Holders*. Retrieved from https://www.esf.org/fileadmin/user_upload/esf/F-FINAL-Career_Tracking_Survey_2017__Project_Report.pdf
- Vitae (2012). *What do researchers want to do? The career intentions of doctoral researchers*. Retrieved from <https://www.vitae.ac.uk/vitae-publications/reports/wdrwtd-the-career-intentions-of-doctoral-graduates-feb12.pdf>

- Vlaamse Raad voor Wetenschap en Innovatie (2015). *Studiereeks 27. Doorstroom van doctoraathouders naar de arbeidsmarkt. [Study series 27. Transfer of PhD holders to the labour market]*. Retrieved from <https://www.vario.be/sites/default/files/documents/studiereeks27.pdf>
- Flemish government (2019). *Government of Flanders 2019 – 2024. Summary of the coalition agreement*. Retrieved from <https://www.vlaanderen.be/publicaties/government-of-flanders-2019-2024-summary-of-the-coalition-agreement>
- Waaier C., Sonneveld H., Buitendijk S., van Bochove C., & van der Weijden I. (2016). The Role of Gender in the Employment, Career Perception and Research Performance of Recent PhD Graduates from Dutch Universities. *PLoS ONE*, *11*(10): e0164784. <https://doi.org/10.1371/journal.pone.0164784>
- Woolston, C. (2017). Graduate survey: A love–hurt relationship. *Nature*, *550*, 549–552. <https://doi.org/10.1038/nj7677-549a>

Disclaimer: This ECOOM-brief reports findings of scientific research conducted by ECOOM Ghent University. Analyses and interpretations are the responsibility of the authors. They are not formal policy positions of the Flemish Government and Flemish authorities.