

In which sectors are doctoral candidates interested to work after completing their doctorate? A look at Flanders in 2018

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DOCTORAL CANDIDATES AND THEIR INTERESTS

Pursuing a doctorate is a unique opportunity for anyone who is passionate about science and research. But how do doctoral candidates in Flanders perceive their doctorate to fit into their career? In what sectors are they interested to work after completing their doctorate? In 2013, ECOOM-Ghent University answered this question for the first time (ECOOM-Brief 8). At that time doctoral candidates in Flanders were a lot interested in jobs in the sectors university, higher education systems outside university, non-higher education, government and industry & private business. In this brief we give an update and look at the interests of doctoral candidates in Flanders regarding their future employment sector in 2018. More specifically, we ask ourselves the following questions:

1. *How interested are doctoral candidates in Flanders in the different sectors of possible employment?*
2. *Do these interests differ according to gender?*
3. *Do these interests differ according to doctoral phase?*
4. *Do these interests differ according to science cluster?*
5. *Do these interests differ according to nationality?*

ECOOM-brief 35 shows that international doctoral candidates have become an increasingly larger part of the newly enrolled doctoral candidates over the years. In 2018 no less than 42% of the total population of doctoral candidates in Flanders came from abroad (ECOOM-brief 17). Therefore, we also ask ourselves an additional question:

6. *Do international doctoral candidates have interest in a job in or outside Flanders?*

We answer these research questions using data from the *Survey of Junior Researchers (SJR)* 2018. This survey was organized 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 doctoral trajectory (N=3359). For more information on the survey, we refer to ECOOM-brief 17.

HOW INTERESTED ARE DOCTORAL CANDIDATES IN FLANDERS IN THE DIFFERENT SECTORS OF POSSIBLE EMPLOYMENT?

In the *Survey of Junior Researchers* 2018 we asked doctoral candidates in Flanders "To what extent are you interested in finding a job in the following sectors (organisations) in the future?". The response options were "not interested", "somewhat interested" and "a lot interested". For a visual presentation of the interest in the different sectors we refer to Figure 1 (the numbers show the amount of doctoral candidates that have answered the question using the three response options: $N_{\text{university}}=2978$, $N_{\text{industry \& private business}}=2969$, $N_{\text{higher education systems outside university}}=2947$, $N_{\text{government}}=2974$, $N_{\text{non-profit sector}}=2961$, $N_{\text{hospital}}=2931$, $N_{\text{non-higher education}}=2948$).

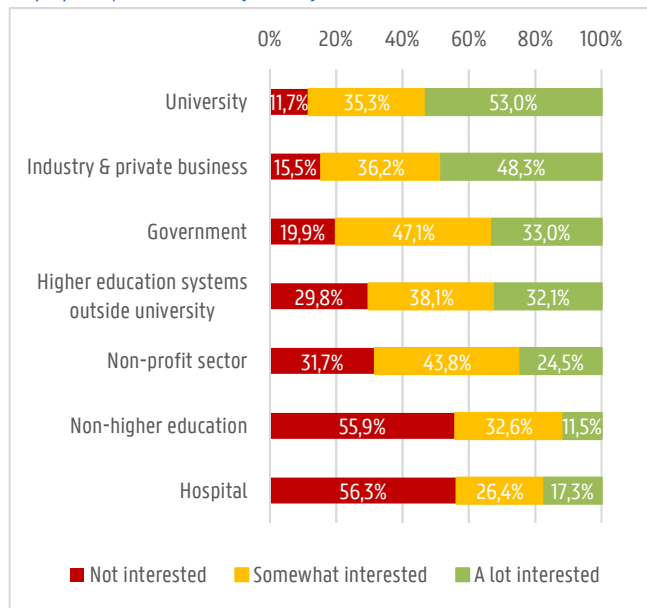
When we look at "not interested" we see the highest percentage of doctoral candidates for the hospital sector (56.3%). This is followed by the sectors non-higher education (55.9%), non-profit (31.7%), higher education systems outside university (29.8%), government (19.9%), industry & private business (15.5%) and university (11.7%).

Taking a look at "a lot interested" we note consecutively the sectors university (53%), industry & private business (48.3%), government (33%), higher education systems outside university (32.1%), non-profit (24.5%), hospital (17.3%) and non-higher education (11.5%). In other words, doctoral candidates in Flanders are mostly not interested in a job in the sectors hospital and non-higher education, while they

predominantly show a lot of interest in universities and the industry & private business as sectors of future employment.

In what follows, we examine doctoral candidates' interest in seven sectors of possible employment according to gender, doctoral phase, science cluster and nationality. We do this in two different ways: (1) by comparing the group of doctoral candidates with a lot of interest to those that are somewhat interested and not interested and (2) by comparing the group of doctoral candidates with interest (i.e., somewhat and a lot interested taken together) to those without interest. When discussing the results we first present the results of approach (1). Next we point out which results are different in approach (2).

Figure 1. Doctoral candidates and their interest in the different sectors of employment, Flanders 2018 (N=3359)



DO THESE INTERESTS DIFFER ACCORDING TO GENDER?

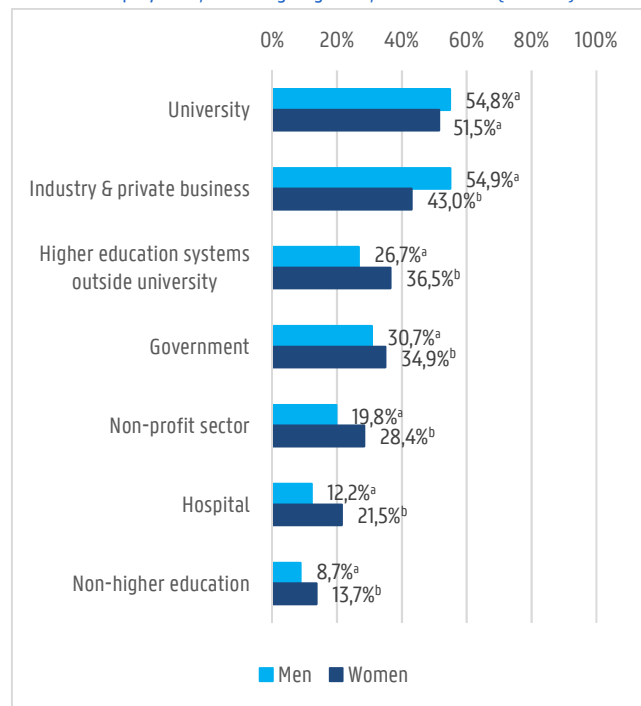
Figure 2 presents the percentage of male and female doctoral candidates in Flanders with a lot of interest in each of the sectors. The top 3 of very interesting sectors for female doctoral candidates consists of university, industry & private business and higher education systems outside university. For men, the top 3 is as follows: (1) industry & private business, (2) university and (3) government.

We find significant more female than male doctoral candidates who have a lot of interest in jobs in higher education systems outside university, government, the non-profit sector, the hospital, and non-higher education ($p < .05$). In contrast more men than women show a lot of interest in employment in the industry & private business sector ($p < .001$). No differences were observed between male and female doctoral candidates for the sector university ($p > .05$).

Going from our first approach (i.e., comparing doctoral candidates with a lot of interest to those with some and no interest) to our second approach (i.e., comparing doctoral candidates with some and a lot of interest to those without interest), the results only differ from the first

approach for the government sector. In the second approach, we no longer found a difference between male and female doctoral candidates for this sector ($p > .05$).

Figure 2. Percentage doctoral candidates with a lot of interest in the different sectors of employment, according to gender, Flanders 2018 (N=3359)



Note. Significance based on Chi²-test. For each sector the percentages with the same superscript letter do not differ from each other. For instance, for the sector university both the percentages of men and women have the superscript letter a. This means that the percentage of men with a lot of interest in the sector university is as large as that percentage among women. In contrast for the sector hospital the percentages of men and women have a different superscript: men have the superscript letter a, while women have the superscript letter b. This means that the two percentages differ significantly from each other. In this example it means that the percentage of women with a lot of interest in the hospital is larger than that percentage of men.

DO THESE INTERESTS DIFFER ACCORDING TO DOCTORAL PHASE?

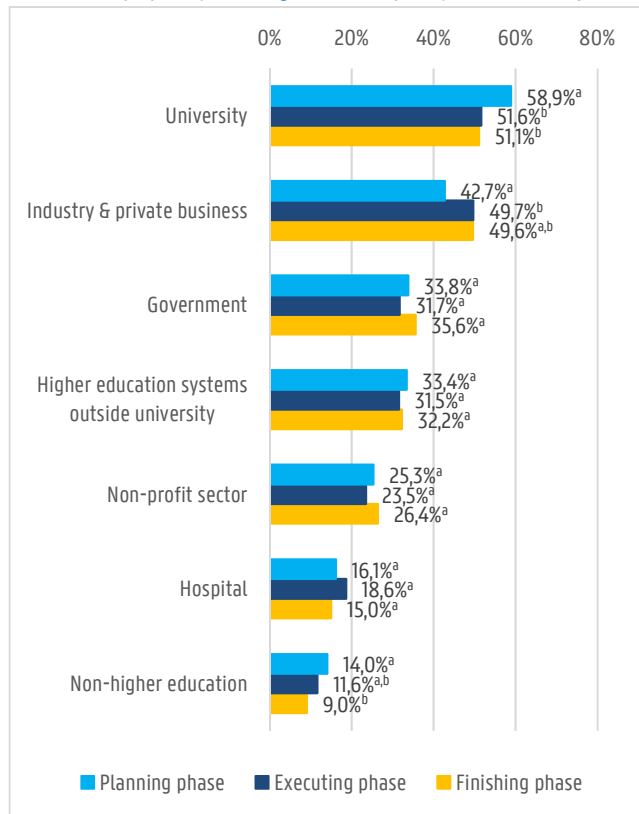
Would doctoral candidates who have just started their doctorate have different interests than those already working on their doctorate for some time or from those who are finishing their doctorate? Or are the interests among these three groups the same? We first look at the sectors for which doctoral candidates express a lot of interest (approach 1). Here we see that, irrespective of the *doctoral phase* the highest percentage is for the sector university, followed by the sectors industry & private business and government (see Figure 3).

Comparing the different phases, we found no differences in the percentages for the sectors government, higher education systems outside university, non-profit and hospital. For the other three sectors we did notice differences according to doctoral phase. The percentage of doctoral candidates with a lot of interest in employment at a university is higher in the planning phase than in the executing and finishing phase ($p < .01$). Additionally, the percentage of doctoral candidates with a lot of interest in the sector non-higher education is larger in the planning phase than in the finishing phase, while a smaller

percentage of doctoral candidates in the planning phase has a lot of interest in jobs in the industry & private business sector compared to doctoral candidates in the executing phase ($p < .01$).

When we compare doctoral candidates who are somewhat and a lot interested to those who have no interest in a sector (i.e., approach 2), the results are different for the following sectors: university, industry & private business and non-higher education. Remarkably, the percentage of doctoral candidates that shows interest in a job in the academic sector in the finishing phase is significantly lower than that percentage in the other phases. For the sectors industry & private business and non-higher education we no longer note differences in interest according to doctoral phase.

Figure 3. Percentage doctoral candidates with a lot of interest in the different sectors of employment, according to doctoral phase, Flanders 2018 (N=3359)

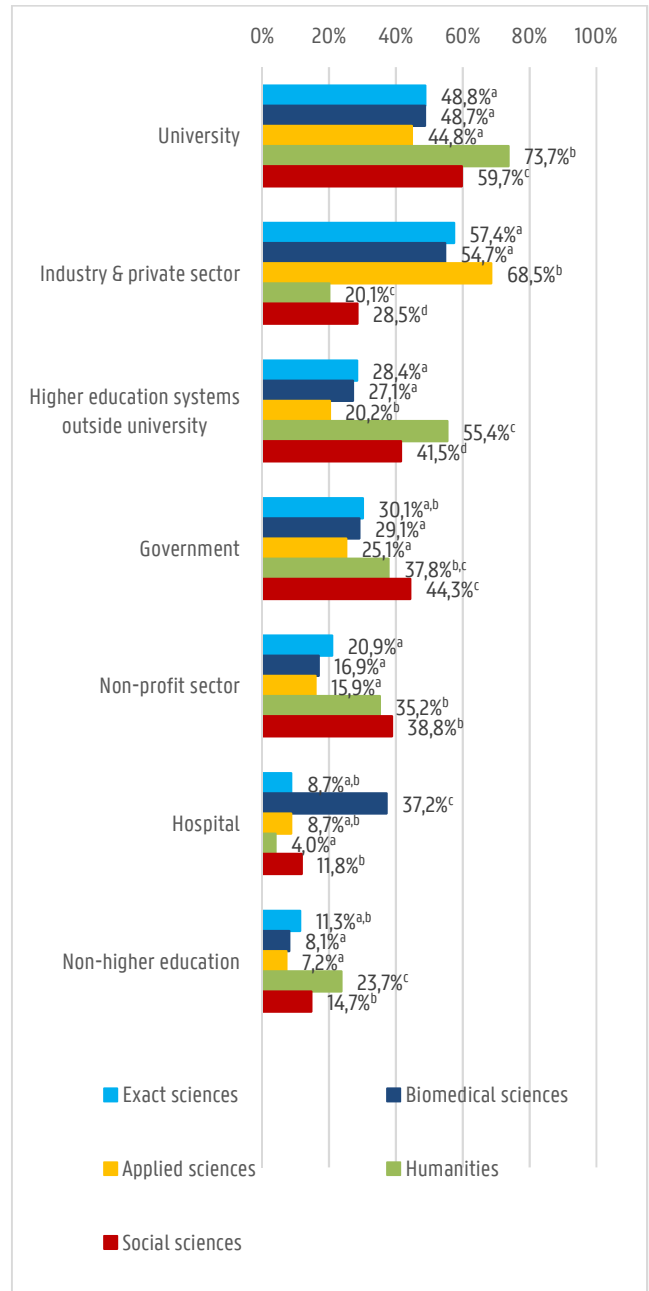


Note. Significance based on Chi²-test and post-hoc comparisons. For each sector the percentages with the same superscript letter do not significantly differ from each other.

DO THESE INTERESTS DIFFER ACCORDING TO SCIENCE CLUSTER?

Figure 4 presents the percentage of doctoral candidates in Flanders with a lot of interest in a sector according to science cluster (approach 1). The sectors university, industry & private business, higher education systems outside university and/or government are in the top 3 for humanities as well as social, exact and applied sciences. For biomedical sciences, the highest percentage of doctoral candidates with a lot of interest is for the industry & private business sector, followed by the university and hospital sector.

Figure 4. Percentage doctoral candidates with a lot of interest in the different sectors of employment, according to science cluster, Flanders 2018 (N=3359)



Note. Significance based on Chi²-test and post-hoc comparisons. For each sector the percentages with the same superscript letter do not significantly differ from each other.

Comparing doctoral candidates across the five science clusters, we mainly note differences between humanities and social sciences on the one hand and exact, biomedical and applied sciences on the other hand. For instance, in humanities and social sciences the percentage of doctoral candidates with a lot of interest in a job in the sectors university, higher education systems outside university and non-profit is larger than that percentage in the other three science clusters ($p < .001$). Also, less doctoral candidates in humanities and social sciences are a lot interested in finding a job in the sector industry & private business than doctoral candidates from the exact, biomedical and applied sciences ($p < .001$). We furthermore note differences between a number of specific science clusters and (almost) all other

clusters. More doctoral candidates in social sciences are for example a lot interested in a job in the sector government than doctoral candidates in exact, biomedical and applied sciences ($p < .001$). Additionally, more doctoral candidates in humanities show a lot of interest in non-higher education and university as sectors of future employment ($p < .001$). Also, the percentage of doctoral candidates in biomedical sciences who are a lot interested in a job at a hospital is higher than that percentage in all other science clusters ($p < .001$). Finally, in the applied sciences more doctoral candidates have a lot of interest in the sector industry & private business than in all other clusters ($p < .001$).

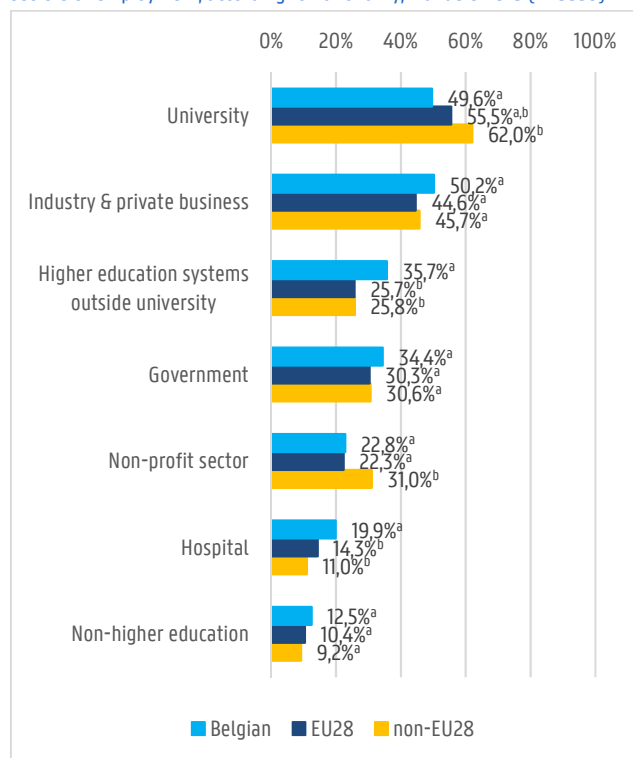
Going from our first approach (i.e., comparing doctoral candidates with a lot of interest to those with some and no interest) to our second approach (i.e., comparing doctoral candidates with some and a lot of interest to those without interest), the results are roughly the same, with only small differences. A first difference is that the interest in higher education systems outside university as sector of future employment does no longer differ between doctoral candidates in applied sciences on the one hand and in exact and biomedical sciences on the other hand. Secondly, there is also no longer a difference in the interest for the sector industry & private business between doctoral candidates in applied and exact sciences. Concerning non-higher education we note more doctoral candidates in exact sciences with interest than in applied sciences, while the percentage of doctoral candidates with interest in this sector of employment does no longer differ between biomedical and social sciences. Thirdly, for the sector hospital more doctoral candidates in exact and applied sciences are interested than doctoral candidates in humanities. Lastly, the same percentage of doctorate holders in humanities and social sciences are interested in a job at a university.

DO THESE INTERESTS DIFFER ACCORDING TO NATIONALITY?

Using approach 1, which isolates a lot of interest from some and no interest, we found that the industry & private business sector is the number one sector of interest for Belgian doctoral candidates. This is followed by the university and higher education systems outside university sector. For doctoral candidates from non-EU28 countries university is on rank 1, the industry & private business sector on rank 2 and the non-profit sector on rank 3. Next, the top 3 for EU28 doctoral candidates consists of the sectors university, industry & private business sector and government. When comparing the percentage of doctoral candidates with a lot of interest according to *nationality* (Figure 5), we see that more Belgian doctoral candidates than international doctoral candidates are a lot interested in a job in the sectors hospital and higher education systems outside university ($p < .01$). The percentage of doctoral candidates from outside the EU28 who express a lot of interest in the university and the non-profit sector is higher compared to the percentage of Belgian doctoral candidates with such interest ($p < .001$). Finally, we note a significant difference for the interest in the non-profit sector within the group of international doctoral candidates: the

percentage of doctoral candidates that is a lot interested in this sector is larger for doctoral candidates from outside the EU28 compared to doctoral candidates from the EU28 ($p > .01$).

Figure 5. Percentage doctoral candidates with a lot of interest in the different sectors of employment, according to nationality, Flanders 2018 (N=3359)



Note. Significance based on Chi²-test and post-hoc comparisons. For each sector the percentages with the same superscript letter do not significantly differ from each other.

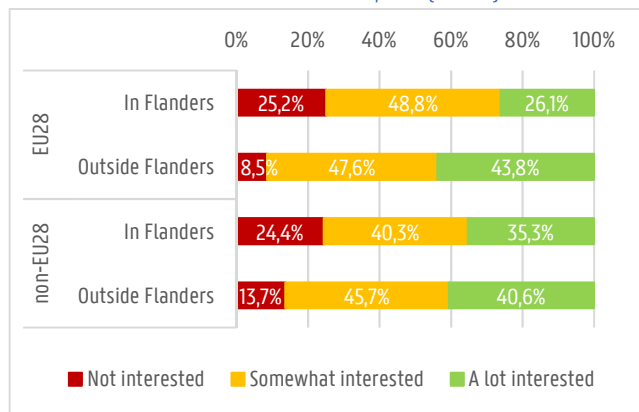
When we compare doctoral candidates who are somewhat and a lot interested to those who have no interest in a sector (i.e., approach 2), results differ for five out of seven sectors. For instance, among Belgian doctoral candidates the percentage showing interest in the sectors government and non-higher education is higher than among international doctoral candidates. However, the interest in a job in the sector higher education systems outside university is similar. Furthermore, more Belgian doctoral candidates show interest in the sector non-higher education than international doctoral candidates from the EU28. These two groups however show similar interest in the hospital as sector of future employment. Finally, we also note that within the group of international doctoral candidates, there is no longer a difference in terms of interest in the non-profit sector.

DO INTERNATIONAL DOCTORAL CANDIDATES HAVE INTEREST IN A JOB IN OR OUTSIDE FLANDERS?

Because little is known about the future plans of international doctoral candidates at Flemish universities, some additional questions were presented to this group. More specifically, we gauged for their interest in jobs in a non-academic field and at a university both in and outside Flanders.

First, we asked “After finishing your doctoral research, do you have an interest in working in a non-academic field in Flanders and outside Flanders?”. The answer options were again “not interested”, “somewhat interested” and “a lot interested”. Figure 6 reports our findings. We see that approximately 1 out of 4 international doctoral candidates does not have interest in a non-academic job *in Flanders*, while approximately 1 out of 4 international doctoral candidates from the EU28 and 1 out of 3 international doctoral candidates from outside the EU28 shows a lot of interest. Looking at the interest to work in a non-academic field *outside Flanders*, 2 out of 5 international doctoral candidates shows a lot of interest in such an employment, while approximately 1 out of 10 has no interest in it.

Figure 6. International doctoral candidates and their interest in employment in a non-academic field in and outside Flanders, 2018 (N=1031)

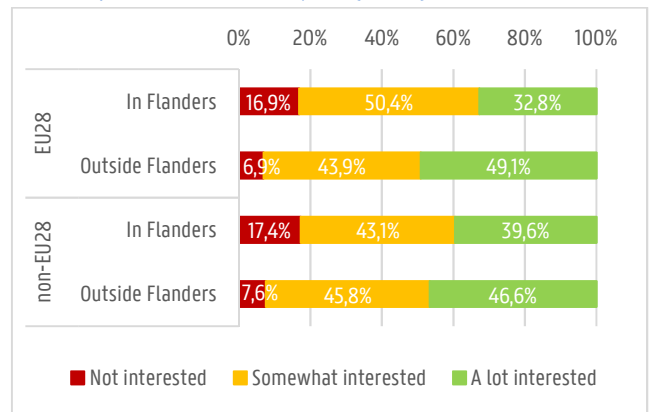


Note. N_{non-EU28}=586. N_{EU28}=445.

We did not only administer international doctoral candidates' interest in working in a non-academic field, but also in working for a university in Flanders and outside Flanders. Here the answer options were also “not interested”, “somewhat interested” and “a lot interested”. Figure 7 shows that approximately 17% of the international doctoral candidates at Flemish universities in 2018 had no interest in employment at a university *in Flanders*. Approximately 7% does not show interest in a job at a university *outside Flanders*. The pattern of “not interested” is hence similar for all international doctoral candidates, independent of whether they are from inside or outside the EU28. Taking a look at “a lot interested”, 46.6% of the non-EU28 doctoral candidates and 49.1% of the EU28 doctoral candidates mentioned to be very interested in a job at a university *outside Flanders*, while we note respectively 39.6% and 32.8% for such job *in Flanders*.

Does it matter for international doctoral candidates whether their future employment is in or outside Flanders? Are their differences between European and non-European doctoral candidates in this regard? The percentage of doctoral candidates with a lot of interest in a job at a university and in a non-academic field is significantly higher when it concerns a job outside Flanders ($p < .01$). These results apply to doctoral candidates from the EU28 as well as to non-EU28 doctoral candidates. Going from our first approach to our second approach, the same results are found.

Figure 7. International doctoral candidates and their interest in employment at a university in and outside Flanders, 2018 (N= 944)



Note. N_{non-EU28}=541. N_{EU28}=403. The questions about the interest of international doctoral candidates regarding employment at a university in and outside Flanders, were only presented to international doctoral candidates who mentioned to be somewhat or a lot interested in a job at a university. So, not all international doctoral candidates answered these questions.

DISCUSSION

Our findings demonstrate that in 2018 roughly 1 out of 2 doctoral candidates in Flanders showed a lot of interest in a job in a university environment after completing their doctorate. The same is found for the sector industry & private business. In addition to the university and the industry & private business sector, the sectors government and higher education systems outside university complete the top 3 of sectors doctoral candidates show a lot of interest in as sectors of future employment. Furthermore, we notice that doctoral candidates are most interested in the sectors university, industry & private business, higher education systems outside university and government irrespective of gender, doctoral phase, science cluster or nationality (two exceptions: doctoral candidates in biomedical sciences also show a lot of interest in the hospital sector and non-EU28 doctoral candidates in the non-profit sector). This does not imply that no differences exist between these groups in terms of the relative importance of each sector. For instance, more men than women showed a lot of interest in the industry & private business sector, while the opposite is true for the sectors higher education systems outside university and government. These results are in accordance with recent findings based on the Labor Force Survey from Statbel (2020) which show that more men work in industry & private business and more women in the public sector. Also, we found that the percentage of doctoral candidates with a lot of interest in a job at a university is lower in the executing and finishing phase of the doctorate than in the planning phase. Moreover, differences occur according to science cluster: more doctoral candidates in humanities and social sciences are interested in the sectors university and higher education systems outside university. We found a reversed pattern when we focus on the industry & private business sector. Also, more doctoral candidates in social sciences are a lot interested in a job in the sector government.

What about the interests of international doctoral candidates? Until today it was unclear what the interests of international doctoral candidates at Flemish universities are regarding the sector of their

future employment. The results of the current brief show that international doctoral candidates have more interest in a job outside Flanders than a job on the Flemish labor market. Concurrently 1 out of 4 doctoral candidates from the EU28 and 1 out of 3 doctoral candidates from the non-EU28 say they have a lot of interest in a non-academic job in Flanders. What about the attractiveness of the Flemish universities to work for after completing one's doctorate? The numbers indicate that 1 out of 3 EU28 doctoral candidates and 2 out of 5 non-EU28 doctoral candidates show a lot of interest to continue their academic trajectory in Flanders. The most recent statistics about the employment of international doctorate holders as postdoctoral researcher and professor at Flemish universities show that on February 1st, 2020, 47.7% of the postdoctoral researchers and 12.4% of the professors were not Belgian (VLIR staff statistics, 2020).

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