

# Is the unknown unloved? And the known loved? On how companies with R&D perceive the added value of PhD holders.

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Over the years, the Flemish government has invested significantly in research, development and innovation (R&D&I), which has translated, among other things, into an ever-growing number of PhD holders. The vast majority of these PhD holders sooner or later present themselves on the non-academic labor market (ECOOM & Observatory of Research and Scientific Careers-F.R.S.-FNRS, 2023; VLIR personnel statistics). The big question that arises with these developments is that of so-called *return-on-investment* (ROI). ROI can be looked at from different perspectives: PhD students, PhD holders, the government, academic and non-academic employers, and the general public.

## THE ADDED VALUE OF A PHD ACCORDING TO PHD STUDENTS, PHD HOLDERS AND KEY STAKEHOLDERS ON THE LABOR MARKET IN FLANDERS

Until today, scientific research on how these different stakeholders perceive the added value of a PhD is still scarce. However, exploratory studies by ECOOM-Ghent University have recently lifted a glimpse of the veil.

For example, in the 2018 *Survey of Junior Researchers*, 2 out of 3 **PhD students** in Flanders informed us that they perceive a PhD in their field as an added value to future employers outside the university. Nonetheless, a large group of PhD students and junior researchers (1 out of 4) had no idea whether or not a PhD in their field provides an added value on the non-academic labor market. For more details, we refer the interested reader to ECOOM-brief 41.

In 2017, the *PhD career survey* asked the perspective of **PhD holders** who obtained a PhD at one of the Flemish universities. At that moment, 2 out of 3 PhD holders who were active in the non-academic labor market indicated they had experienced a PhD as an added value when moving from the university to a job outside the university. For more details and other findings on the work situation of PhD holders inside and outside academia, we refer to <https://www.phdcareersflanders.com/en/>. Earlier research among PhD holders by Boosten et al. (2014) found that 1 year after obtaining their

PhD at a Belgian university, 4 in 10 PhD holders perceived a strong relationship between the content of their PhD and the content of their current job. About 7 in 10 Belgian PhD holders with a non-academic job perceived his/her PhD as an added value for the current employer.

Finally, we refer to a study conducted by ECOOM-Ghent University in 2016: exploratory interviews with key stakeholders in Flanders on the question, "What is the value of a PhD outside the university?". In this study, views were collected from **key stakeholders in the profit sector, the non-profit sector, education and government institutions, social partners and politicians**. The interested reader can find their points of view in Stassen et al. (2016).

## THE ADDED VALUE OF PHD HOLDERS TO A COMPANY ACCORDING TO THE SURVEY OF EMPLOYERS

If we shift the focus from PhD students, PhD holders and key stakeholders in the Flemish labor market to companies with R&D activity, which additional insights do we gain? From the relevant interviews we conducted in 2016 (Stassen et al. 2016) and the literature review on employers' perceptions on PhD holders we conducted in 2020 (ECOOM-brief 32), it appears that companies mainly see an added value in the research skills, information processing capabilities and innovation capacity of PhD holders. In contrast, they doubt PhD holders' sense of reality, commercial skills and adaptability. A 2010 study by Smit on the activities of PhD holders in the corporate sector showed that R&D&I managers perceive a PhD as an added value, but this was not the case with HR managers. In the current ECOOM-brief, we tap into the views of companies with R&D activity in Flanders using data from the *Survey of Employers* conducted in 2022. For a detailed description of this survey, characteristics of the participating companies, as well as insights into their representativeness in Flanders, we refer to ECOOM-brief 48. In what follows we look at the perception of the 226 participating companies regarding the added value of a PhD. More specifically, we presented the following statement: "Our company believes that PhD holders provide an added value to the company". The response options

ranged from “totally disagree” (1) to “totally agree” (5). This question was skipped by 1 of the 226 participating companies. In what follows, we zoom in on four specific research questions:

1. *To what extent do companies with R&D activity in Flanders believe that PhD holders provide an added value to their company?*
2. *Does the perceived added value of PhD holders differ depending on company size, lifespan and sector of the company, or position of the person representing the company in the Survey of Employers?*
3. *Does the perceived added value of PhD holders to the company differ by type and nature of R&D activity and type and nature of innovation in the company?*
4. *Does the perceived added value of PhD holders differ depending on whether the company has experience with PhD holders? Or according to whether the person representing the company in the Survey of Employers obtained a PhD him- or herself?*

### TO WHAT EXTENT DO COMPANIES WITH R&D ACTIVITY IN FLANDERS BELIEVE THAT PHD HOLDERS PROVIDE AN ADDED VALUE TO THEIR COMPANY?

Figure 1. Perceived added value of PhD holders in companies with R&D activity in Flanders, 2022 (Survey of Employers, N= 225)

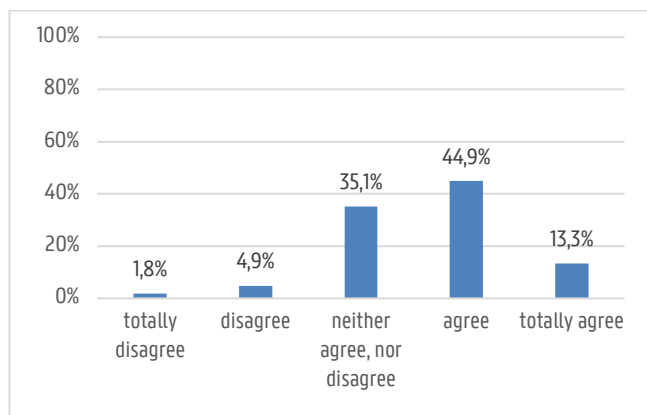


Figure 1 shows that about 7 in 100 companies with R&D activity do not see any added value of PhD holders to their company, while 35% of companies indicate “neither agree nor disagree.” This makes us note that about 58% of participants in the *Survey of Employers* perceive PhD holders as an added value to their company (45% agree and 13% totally agree). For further analyses, we will merge the categories “totally disagree” and “disagree.” The same will be done with the “agree” and “totally agree” categories.

### DOES THE PERCEIVED ADDED VALUE OF PHD HOLDERS DIFFER DEPENDING ON COMPANY SIZE, LIFESPAN AND SECTOR OF THE COMPANY, OR POSITION OF THE PERSON REPRESENTING THE COMPANY IN THE SURVEY OF EMPLOYERS?

Compared to smaller companies, do larger companies believe PhD holders provide more added value to their company? Do companies that have been offering products or services for a longer time believe PhD holders provide more added value than young companies such as start-ups? Do perceptions about the added value of PhD holders differ by sector? Is the perceived added value of PhD holders to a company higher in case a R&D manager answers our survey questions compared to a CEO, HR manager, someone in Finance, or someone in another position in the company?

Based on the *Survey of Employers*, the answer regarding size and lifespan of the company is “no”: in Table 1, no significant relationship is found between these company characteristics and perceptions of the added value of PhD holders for the company. Looking at sector of the company, we do see significant differences in perceived added value of PhD holders. In Table 1, the reader will notice two different approaches to the sector to which a company belongs. The first approach takes “intensity in R&D” as its starting point and follows the “category 3” classification as proposed for R&D contexts by BELSPO (<https://meri.belspo.be/>). Table 1 shows us that in all sectors except those with “high medium R&D intensity” similar percentages for the answer option “(totally) agree” are to be found. Because of the very small number of companies in sectors with “medium R&D intensity,” we advise the reader to interpret the statistics for this category with great caution. Looking at the “high medium R&D intensity” sectors, 45.6% of respondents “(totally) agree” and 46.8% do not agree nor disagree. We also note that 7.6% of companies in high-medium R&D intensity sectors see no added value of PhD holders. This latter percentage is comparable to the percentage in the low or low-medium R&D intensity sectors. Our second approach to sector follows the highest level of NACEBEL coding, namely the sections (<https://statbel.fgov.be/nl>). The companies that participated in the *Survey of Employers* allow to compare 4 categories: “industry”, “professional, scientific and technical activities”, “information and communication” and a category “other”. This latter sector groups companies in our survey that belong to “agriculture, forestry and fishing,” “electricity, gas, steam and air conditioning supply”, “water supply; sewerage; waste management and remediation activities,” “construction,” “wholesale and retail trade,” “transportation and storage,” “financial and insurance activities,” “real estate activities,” “administrative and support service activities,” “education,” and “human health and social work activities.” The statistics in Table 1 show significant differences between the four distinct sectors. In the “professional, scientific and technical activities” sector, 3 out of 4 companies indicate that PhD holders have an added value to the company, while no company in this section indicates that PhD holders

do not have any added value. Looking at companies belonging to "industry", about 1 in 2 report that PhD holders have an added value, while slightly more than 1 in 3 indicate "neither agree nor disagree". The most neutral perception is found in the "information and communication" sector: here, half of the companies indicate that they "neither agree nor disagree."

Table 1. Perceived added value of PhD holders in companies with R&D activity in Flanders, by size, lifespan and sector of the company and position of the company representative, 2022 (N=225)

	(Totally) disagree	Neither agree, nor disagree	(Totally) agree
<b>Company size (# of employees)</b>			
Micro (<10) (N=60)	3.3%	30.0%	66.7%
Small (10-49) (N=92)	8.7%	40.2%	51.1%
Medium (50-249) (N=51)	7.8%	37.3%	54.9%
Large (>=250) (N=22)	4.5%	22.7%	72.7%
<b>Company lifespan</b>			
0-10 years (N=60)	5.0%	36.7%	58.3%
11-20 years (N= 62)	4.8%	35.5%	59.7%
21 years and more (N=103)	8.7%	34.0%	57.3%
<b>Sector according to R&amp;D Intensity (category 3 BELSPO) *</b>			
High (N= 36)	0.0%	33.3%	66.7%
High medium (N= 79)	7.6%	46.8%	45.6%
Medium (N= 8)	25.0%	12.5%	62.5%
Low medium (N= 61)	6.6%	27.9%	65.6%
Low (N=42)	7.3%	29.3%	63.4%
<b>Sector according to NACEBEL **</b>			
Industry (N= 75)	10.7%	36.0%	53.3%
Professional, scientific and technical activities (N= 64)	0.0%	25.0%	75.0%
Information & communication (N= 46)	8.7%	52.2%	39.1%
Other (N= 41)	7.5%	30.0%	62.5%
<b>Position company representative</b>			
CEO (N=97)	7.2%	35.1%	57.7%
Finance (N=19)	5.3%	42.1%	52.6%
HR (N=57)	8.8%	35.1%	56.1%
R&D&I (N=20)	5.0%	40.0%	55.0%
Other (N=32)	3.1%	28.1%	68.8%

Note: Significance based on Chi<sup>2</sup>-test. \*= $p < 0.05$  \*\*= $p < 0.01$  \*\*\*= $p < 0.001$

Finally, we also zoom in on the position of the person answering the questions in the *Survey of Employers* on behalf of his/her company. We distinguish 5 profiles based on their job titles: "CEO", "finance", "HR", "R&D&I" and "other". This last category collects specific positions that were reported by a low number of survey respondents, such as "IT", "office manager", "project manager", "director technology quality & environment", "director strategic partnerships" or "plant manager". Table 1 shows that there is no significant difference in perceived added

value depending on the position of the respondent who answered our survey questions.

### DOES THE PERCEIVED ADDED VALUE OF PHD HOLDERS TO THE COMPANY DIFFER BY TYPE AND NATURE OF R&D ACTIVITY AND TYPE AND NATURE OF INNOVATION IN THE COMPANY?

In Table 2 we obtain an answer to the question whether the type and nature of R&D activities and the type and nature of innovation in the company, is significantly related to the perceived added value of PhD holders to a company. For "type," we distinguish between "only internal" and "internal and external". For "nature," we zoom in on internal activities and distinguish between "permanent" and "occasional". In *the Survey of Employers* there were 5 companies that indicated that there is no innovation happening, or it was unclear to the company representative whether or not innovation was taking place. We exclude these 5 companies in Table 2.

Looking at the R&D activities that take place in the surveyed companies, Table 2 shows us that there is no significant difference between companies with only internal R&D activity and companies with both internal and external R&D activity with regard to their perception of the added value of PhD holders to their company. There is a significant role for the nature of the R&D activity: in companies with permanent R&D, the perceived added value of PhD holders to the company is significantly larger than in companies with occasional R&D. Respectively, we find 59.1% and 51.4% for "(totally) agree". Remarkably, a significant number of companies, respectively 35.8% and 31.4%, remain in the middle of the response scale when asked about perceived added value of PhD holders to their company. Among companies with occasional R&D activity, we find that 17.1% of them perceive PhD holders not to have any added value.

And what about companies investing in innovation? Table 2 shows that the perceived added value of PhD holders to their company does not significantly differ depending on the type of innovation, nor on the nature of the innovation activities. In other words, the perception does not differ depending on whether the company sets up only internal innovation processes or combines internal innovation with external innovation activities. It also does not differ depending on whether the company organizes permanent innovation activities or makes those investments purely on an occasional basis.

Table 2. Perceived added value of PhD holders in companies with R&D activity in Flanders, by type and nature of R&D and type and nature of innovation, 2022 (N=225)

	(Totally) disagree	Neither agree, nor disagree	(Totally) agree
<b>R&amp;D</b>			
Only internal (N= 140)	7.9%	37.9%	54.3%
Internal and external (N=85)	4.7%	30.6%	64.7%
<b>Nature of internal R&amp;D*</b>			
Permanent (N= 190)	4.7%	35.8%	59.5%
Occasional (N= 35)	17.1%	31.4%	51.4%
<b>Innovation</b>			
Only internal (N= 179)	6.1%	36.9%	57.0%
Internal and external (N=41)	7.3%	29.3%	63.4%
<b>Nature of internal innovation</b>			
Permanent (N= 187)	5.3%	34.8%	59.9%
Occasional (N= 33)	12.1%	39.4%	48.5%

Note. Significance based on Chi<sup>2</sup>-test. \* = p < 0.05 \*\* = p < 0.01 \*\*\* = p < 0.001

DOES THE PERCEIVED ADDED VALUE OF PHD HOLDERS DIFFER DEPENDING ON WHETHER THE COMPANY HAS EXPERIENCE WITH PHD HOLDERS? OR ACCORDING TO WHETHER THE PERSON REPRESENTING THE COMPANY IN THE SURVEY OF EMPLOYERS OBTAINED A PHD HIM- OR HERSELF?

Finally, we focus on whether or not the company has experience with PhD holders in their production or the services they offer. For this, Table 3 offers clear insights: there is a positive relationship between experience with PhD holders and the perception that PhD holders have an added value to the company. We measured experience in three ways. One: we asked whether the company had ever collaborated with one or more PhD holders who were employed by another employer. Two: we asked about employment of PhD holders by the company itself, both now and in the past. And three: we asked the person answering the *Survey of Employers* whether they themselves obtained a PhD. Our findings are reported in Table 3.

In Table 3 we see that companies that have already collaborated with PhD holders in the past rated the added value of PhD holders significantly higher. For these companies, we find 66.7% indicating "(totally) agree". Those who have not yet collaborated with PhD holders are more moderate in their responses, with 9.0% saying "(totally) disagree", 43.6% choosing "neither agree nor disagree", and 47.4% indicating "(totally) agree".

Employment of PhD holders by the company itself is also linked to the perception of PhD holders as an added value to the company. Companies that employ PhD holders at the time of the *Survey of Employers* are the most positive: the figures vary from 3 out of 4 to 4 out of 5 depending on whether they have employed PhD holders in the past or not. In companies that do not currently employ PhD holders but

have done so in the past, the perception of the added value of PhD holders is less pronouncedly positive: just under 6 in 10 of these companies find themselves in "neither agree nor disagree", almost 35% indicate "(totally) agree", and just under 10% choose "(totally) disagree". Of the companies that have never employed PhD holders, 2 in 5 report that PhD holders have an added value to their company, while 11.7% see no added value. The rest takes a middle position.

Table 3. Perceived added value of PhD holders in companies with R&D activity in Flanders, depending on whether the company has experience with PhD holders, or the company representative obtained a PhD him-or herself, 2022 (N=225)

	(Totally) disagree	Neither agree, nor disagree	(Totally) agree
<b>Ever collaborated with PhD holders *</b>			
Yes (N= 120)	4.2%	29.2%	66.7%
No (N=78)	9.0%	43.6%	47.4%
<b>Employment of PhD holders ***</b>			
Never (N= 60)	11.7%	46.7%	41.7%
Past only (N= 26)	7.7%	57.7%	34.6%
Present only (N= 11)	9.1%	9.1%	81.8%
Past and present (N= 108)	0.9%	25.0%	74.1%
<b>Company representative obtained a PhD? ***</b>			
Yes (N=34)	0.0%	11.8%	88.2%
No (N=189)	7.4%	39.2%	53.4%

Note. Significance based on Chi<sup>2</sup>-test. \* = p < 0.05 \*\* = p < 0.01 \*\*\* = p < 0.001

And what about the question if the perceived added value of PhD holders differs according to whether or not the company representative in the *Survey of Employers* obtained a PhD him- or herself? Table 3 is abundantly clear: 9 out of 10 respondents who have a PhD themselves (totally) agree with the statement that the company believes that PhD holders provide added value, while respondents without a PhD are divided in their perception: half of them see added value, while 4 out of 10 indicate "neither agree nor disagree". For 7.4% we note (totally) disagree.

DISCUSSION

Which factors influence the way companies perceive PhD holders? Does unknown make unloved? And known loved? Guided by these crucial questions, ECOOM-Ghent University organized the *Survey of Employers* among companies with R&D activity in Flanders in 2022. In total, we received answers to our questions on PhD holders from 226 companies. In ECOOM-brief 48 we focused on the data collection, characteristics of the participating companies and their representativeness for the Flemish R&D landscape.

In the present brief, the focus is on the responses of the participating companies to a specific statement we presented, namely, "Our company believes that PhD holders provide an added value to the company". Response options ranged from "totally disagree", "disagree", "neither

agree nor disagree”, “agree” to “totally agree”. Although this statement appears straightforward at first glance, we invite the reader to approach the results with the necessary caution. While the statement clearly inquires about “what the company thinks,” we cannot rule out the possibility that the person who answered our survey questions presents his/her own personal view rather than the view of the company. Nor can we know whether the person who purports to represent the company's view knows how to do so accurately. What we do know from our analyses is that the vast majority of individuals who answered the questions in *the Survey of Employers* have some form of familiarity with “a PhD”. Namely, we can see that 34 of them have a PhD themselves (see Table 3), while 179 of the 192 people who do not have a PhD themselves do know one or more PhD holders. In follow-up questions, 71% of them appear to know one or more PhD holders through both private and professional contexts. The others know one or more PhD holders only through the private context or only through the professional context.

Looking at the patterns in our analyses, there are already 4 major takeaways regarding the perceived added value of PhD holders in the Flemish R&D landscape.

First, it is striking that almost 3 out of 5 companies indicate that PhD holders provide an added value to their company, while 1 out of 5 companies do not see any added value. At the same time, 1 in 3 companies notes that they “neither agree nor disagree” with the statement that PhD holders provide an added value to the company. The question that arises with this 1 in 3 is the underlying rationale for this response. Is the “neither agree nor disagree” an accurate reflection of what is happening in the day to day life in the company? Or is it grounded in ignorance of what PhD holders can (potentially) bring to the table from their specific areas of expertise and training? Or are there still other motivations that made the company representative tick the middle of the response scale? Additional research is needed to answer these questions.

A second major takeaway from our analyses is the following: according to the *Survey of Employers* there is no significant difference in perceived added value of PhD holders depending on company size, lifespan of the company, and position of the company representative. However, there are significant differences by sector. Following BELSPO's category 3 coding, we especially notice that companies in sectors with high medium R&D intensity have a less positive perception of PhD holders than companies with high R&D intensity or low medium or low R&D intensity. Additional research based on larger samples is needed before in-depth and reliable insights can be drawn from this. If we follow the NACEBEL coding, we see that PhD holders are rated most favorably in the sector of “professional, scientific and technical activities” and least favorably in “information and communication”. Once again, the need for larger samples arises to develop more insight into the link between sector and perceived added value of PhD holders to their company.

Third takeaway: there is no significant difference in perceived added value of PhD holders according to type of R&D activity, and type and nature of innovation. We do see that companies with permanent R&D

are significantly more positive towards PhD holders than companies with only occasional R&D. For the latter group, we even find the least favorable perception of PhD holders: 17.1% of companies with occasional R&D see no added value (at all) of PhD holders to the company.

Finally, our analyses also clearly show that current or past experiences with PhD holders in the company are associated with a significantly more positive perception of the added value of PhD holders to the company. This is in line with studies in the United Kingdom. These studies found that non-academic employers exhibit more positive and less negative stereotypes about PhD holders when they have more experience with recruiting and employing PhD holders (Diamond et al., 2014; Morgavi et al., 2007; Rubio & Hooley, 2010). In addition to collaborating and employing, we also find that those who obtained a PhD themselves were more likely to record a more positive perception of the added value of PhD holders to the company. Does unknown make unloved? And known loved? The findings in ECOOM-brief 49 already suggest initial answers.

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