
Researchers at Belgian universities
What drives them?
Which obstacles do they encounter?

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FOREWORD

How do researchers at Belgian universities view their role in society? What drives them? Which obstacles do they encounter? What factors determine the quality of their research? How do they handle ethics, questions of diversity and gender, Open Access and public engagement?

The King Baudouin Foundation ran an online survey in 2017 among academic researchers. 1720 of them responded: men, women; at the start of their career, in the middle or at the end; spread out over all Belgian universities, from north and south; from all scientific fields; and with a mix of statutes, full-time or part-time, with a contract of undetermined duration or a fixed-term contract.

Their research subjects are often very different, even though they all work at a Belgian university. Some focus on the origination of the universe and the earth, others on the history of China, Belgium or the EU. Others are still looking diligently for medicines to treat cancer or Alzheimer; map socio-organisational processes in secondary schools; or analyse how we can align offer and demand on the electricity market. Academic researchers clearly do not form a homogenous group at all. Moreover, apart from research, most of them also fulfil other functions: teaching, performing services to society, participating in several councils and committees to keep running their department, faculty or university.

They don't do it for the money, a flashy career, the honour, fame and glory or for a good pension. They are driven by curiosity, the desire to produce new knowledge, or the aspiration to respond to existing and future societal needs. However, in their everyday work they are confronted with pressure and paradoxes: it is not easy to meet the expectations placed on them by the academic system and society.

This publication starts with an analysis of the factors that motivate researchers and the aspects on which they feel constrained. It also addresses how researchers see themselves in society, the elements that influence the quality of their research, how they deal with ethics, issues of diversity and gender, Open Access, public engagement, and so forth.

Each time, we discuss the findings for the whole group and then we look at some striking differences between subgroups. Although the context is different, few differences appear throughout the whole survey between researchers at the Dutch-speaking and French-speaking universities.

Citations are selected from the answers to open questions for illustrative purposes.

This is the first large-scale survey in Belgium among academic researchers that addresses these different themes. Of course, this study only provides a snapshot of the situation in times marked by transition within the academic scene. With this research, the King Baudouin Foundation primarily wants to stimulate the reflection on the future of research at Belgian universities and wants to contribute to build bridges between science and society.

The King Baudouin Foundation thanks all Belgian universities and the FNRS and FWO for their contribution to the survey and its dissemination and analysis.

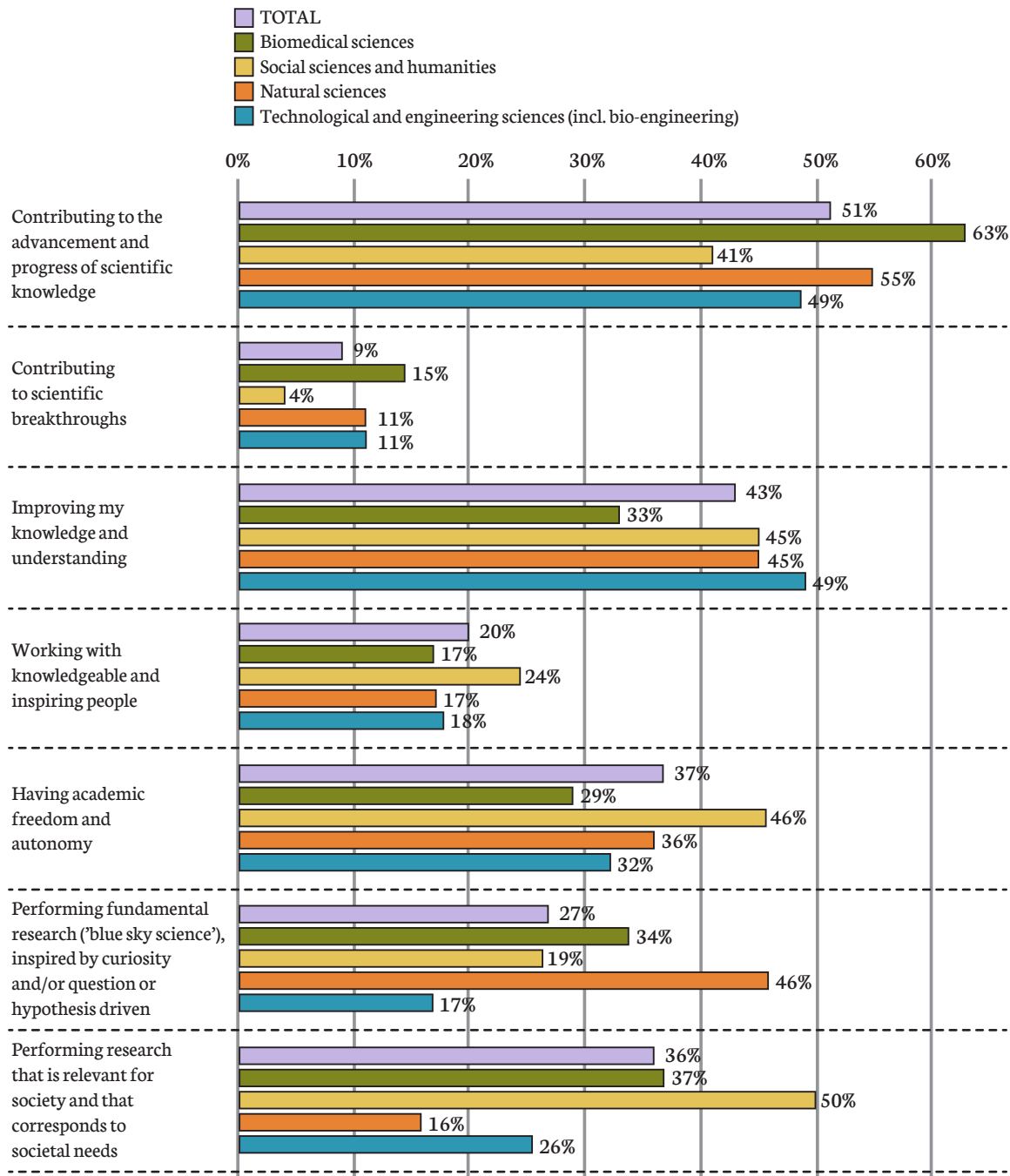
Executive summary

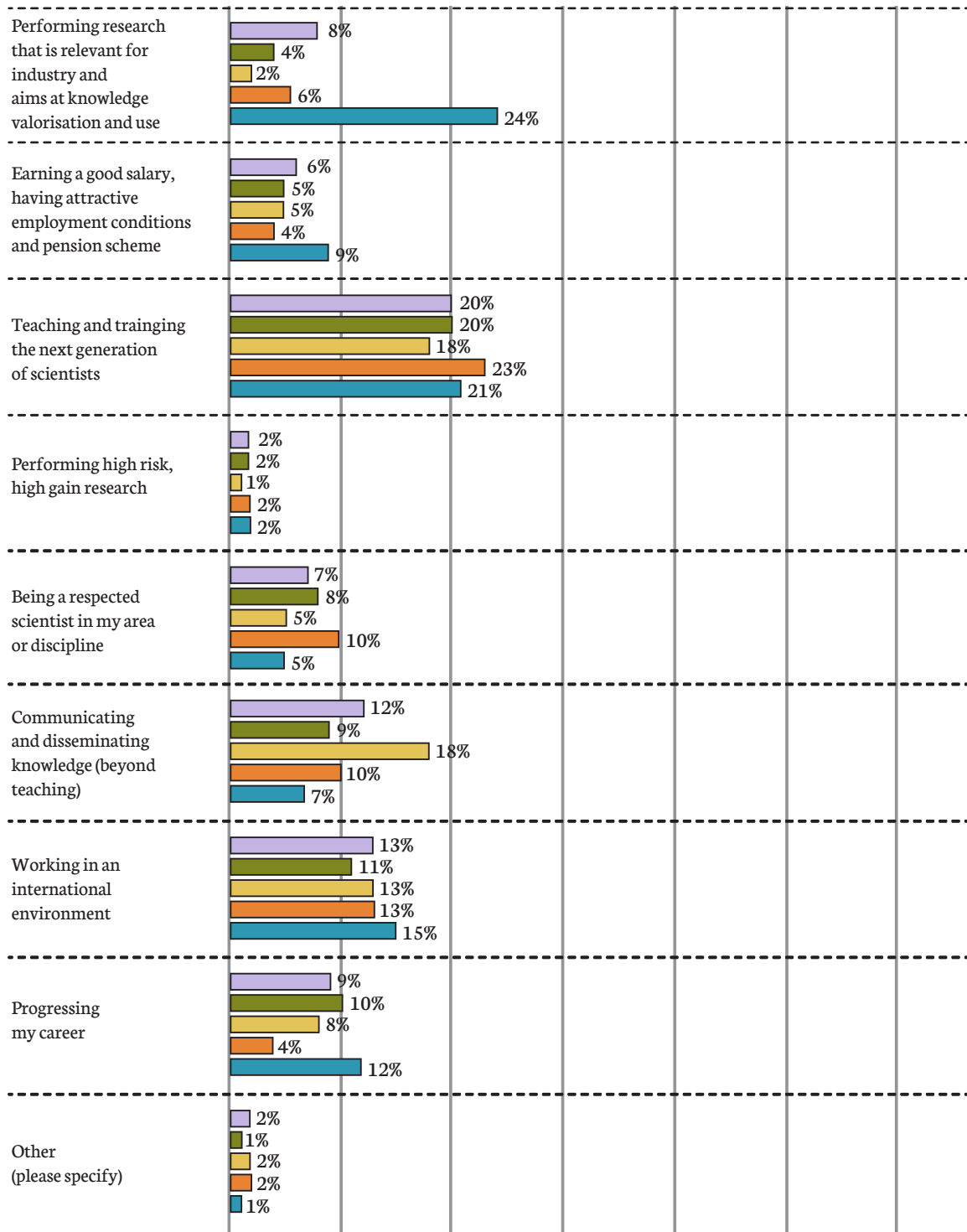
1. WHAT DRIVES RESEARCHERS?

1.1. Curiosity

Researchers at Belgian universities are not doing it for the money, a flashy career, the honour, fame and glory, or a good retirement pension. No, driven by curiosity as they are, they mostly want to contribute to progressing scientific knowledge in general, and their own expertise and insights in particular. They want to understand, know and explain the world in which they live.

What motivates you most in your work as a scientist? (Total and per discipline)





Or they want to perform research that is relevant for society and that responds to societal needs. The respondents also appreciate cooperating with competent and inspiring colleagues, and the international environment in which they can work. They enjoy passing on their knowledge to the next generation and to society. Research that is relevant for industry or that aims at valorisation is not a priority for most respondents.

At the same time, they underline the importance of autonomy and academic freedom, but in their everyday work, it is not easy to meet the expectations placed on

them by the academic system and society. They struggle with numerous dilemmas and paradoxes:

- Many of them focus on research that meets the needs of society. At the same time, however, many of them mentioned that adequate attention and resources must be devoted to ‘blue sky’ or fundamental research.
- While they feel hampered by competition among them for funding, researchers in the survey are willing to collaborate with other researchers.
- They would like to publish their research in Open Access journals, but it is important for their careers and funding to publish in high-impact journals.
- Researchers strongly value interaction with stakeholders and society, but they don’t want it to be at the expense of scientific autonomy and integrity.
- By no means all of them find the perfect balance between their academic duties: research, teaching and providing a service to society.

Researchers at Belgian universities: who are they?

- 1720 researchers completed the online questionnaire, 1315 of them answered all questions. This represents about 6.5% of the researchers who work at a French-speaking university and 3.5% at a Dutch-speaking university.
- There is a balance in the sample between men and women (52.6% men, 47.4% women) and north and south (54% is affiliated with a French-speaking and 46% with a Dutch-speaking university.)
- Four out of ten respondents are in social sciences or humanities (36.7%); the others are proportionately spread over the natural (18.7%), biomedical (22.2%), and technological and engineering sciences (including bio-engineering) (22.4%).
- Nearly one in two is a doctoral researcher (45.4%), one in five is postdoctoral researcher (19.1%), one in three belongs to the group of ‘established’ researchers (9,2% is ‘lecturer/assistant professor’; 23.6% is ‘associate professor/professor’).
- This repartition over functions is also reflected in the age of the respondents: 62.2% is younger than 35, 20.6% is between 36 and 45, 17.2% is older than 46. Even 13 emeriti (> 65 years of age) participated in the survey.
- Nearly six out of ten hold a fixed term contract, mainly full-time. One in three works with a full-time contract of undetermined duration.
- Four in ten are paid directly by their university, three in ten are paid by the ‘Fonds de la Recherche Scientifique’ (FNRS), and each time about one in ten by the ‘Fonds Wetenschappelijk Onderzoek’ (FWO)¹, an external funding body through a contract with the university, or a different source (a.o. EU (ERC, Marie Curie, Erasmus Mundus), Belspo, IWT, VLAIO, Télévie, Innoviris, etc.).
- One in two calls him-/herself ‘principal investigator’, i.e. a researcher who is in charge of his or her own research project.

¹ Differences between FNRS and FWO representation in the respondents are due to different relaying processes within French speaking universities and within Flemish universities, designed to obtain a sufficiently large and diverse sample.

1.2. Autonomy

The concepts of autonomy and academic freedom are a theme running right through the whole survey, together with the conviction that scientific research should be of high quality, reproducible, objective, carried out with integrity and reliable. For 84.7% of the respondents, scientific quality is seen as the most important criterion of all in evaluating and funding research projects.

For more than half of the respondents autonomy is very important in their everyday working life. 'I decide on my own research' is with 51.3% the number one answer to the question of who or what determines the choice of their research, followed by a 27.9% indicating that this research must be embedded in a research strategy of the research unit, group, department or university. This was followed at some distance by 'societal challenges' (7.6%) and 'public funders of research in Belgium' (6.2%).

“Researchers have to deal with the problems and challenges in society. Nevertheless, they must be given the freedom to research any solution that they consider to be worth addressing.” (Male Ph.D student, technological and applied sciences).

2. QUALITY AND INTEGRITY

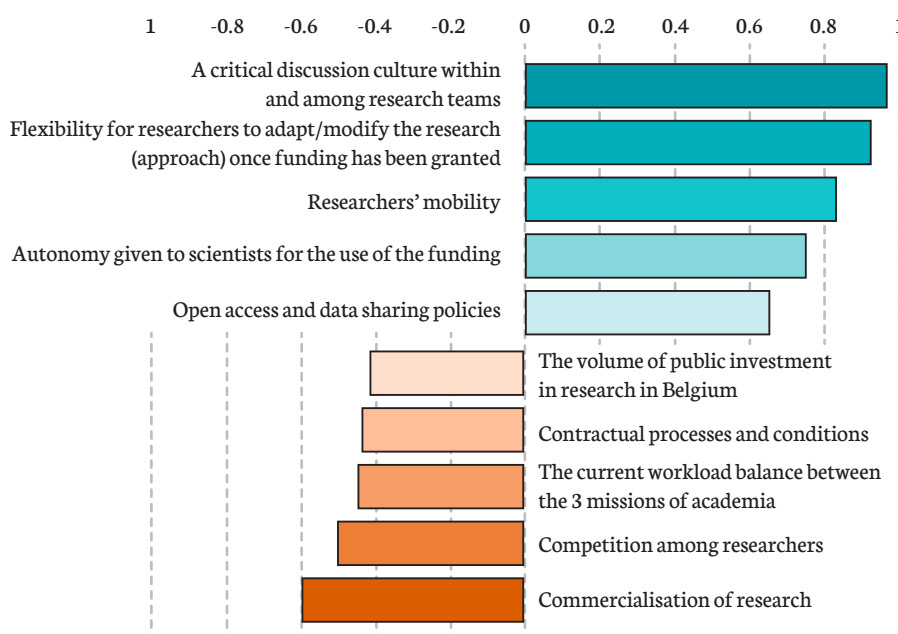
2.1. The gap between aspiration and reality

For 94.0% of the researchers, academic freedom contributes towards quality. At the same time, however, researchers feel squeezed between their own aims and the demands placed on them by the academic system and society. 87.3% fears that increasing pressure may lead to ‘compromises on research integrity and standards.’

This fear is expressed through a number of different responses:

- 54% do not have enough time to carry out research;
- 39.7% have difficulty finding a sustainable balance between their three academic missions of teaching, research and providing services to society;
- 45.8% have difficulty with the way in which research proposals for funding are assessed; 36.3% with the way in which they are appraised themselves;
- Only 23.6% considers governmental investments in research to be enough for having a positive impact on the quality of their research;
- 54.33% consider that competition between researchers has a negative impact on the quality of research. Female researchers in particular mention this more often as an uncomfortable area.
- Only 13.87% think the commercialisation of research has a positive effect on its quality.

What contributes to the quality of your research? Top 5 of most positive and most negative factors.



Factors in the research environment that contribute to the quality of the research (from 'very positive' (+2) to 'very negative' (-2)).

2.2. The middle rank under pressure

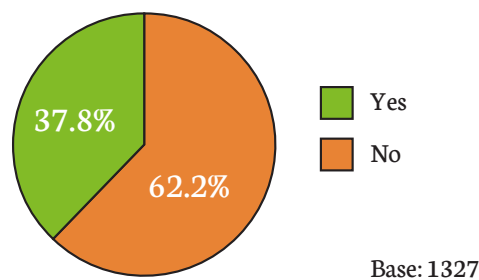
Mostly the leagues of the post-doctoral researchers and the lecturers/assistant professors, say the ‘younger middle rank’, perceive the workload as mostly negative. In particular, the continuous search for research financing and the low success rate of project submission (even for research proposal with outstanding evaluation) is viewed as problematic.

“I see the biggest challenges to research quality (especially as an early career researcher) being the competition for limited funding resources, and the corresponding lack of time that is spent on in-depth and meaningful research. Researchers, especially in the early stages of their career, spend a lot of time preparing project proposals, because they need to bring in funding to keep their jobs. If they are successful, the project(s) awarded usually run on a too-short timeframe, a too-small budget and with too many deliverables expected. Balancing this work with the work of teaching, administration, supervision, academic services etc., means that researchers are often working incredible amounts of overtime to complete a project and do not necessarily have the time once the project has been completed to valorise the results for more academic output (journal articles, e.g.) (Woman, Post-Doctoral researcher, Social sciences and humanities).”

2.3. Critical, international and collaborative

On the other hand, there are also external factors that have a positive impact on the quality of research. Examples include the critical discussion culture within and among research teams, according to 73.6% of the respondents, or researchers' (international) mobility (68.4%). Academic researchers also value their contacts and collaboration with expert, inspiring colleagues and the opportunity to work in an international environment, even though for 34.7% there are too few incentives to encourage multidisciplinary and collaborative research.

Are you aware of a Research Integrity Policy or a Research Integrity Commission at your institution? (Q23)



2.4. Unknown quality policy

The researchers question the contribution of structural measures to the quality and integrity of academic research. Though on average over all respondents 62.2% of the researchers are not aware that there is a policy on integrity in their own university, there are significant differences in awareness levels between the individual institutions.

Who are they? – some remarkable findings

- *The norm is full-time*

Up to nine out of ten respondents are working full-time. It seems that working part-time is not or hardly compatible with a job as researcher at a Belgian university.

- *Glass ceiling*

Although this survey is not exactly representative of the total research community, it shows clearly that women are still a minority at the top. Among the doctoral students, they are the majority (for each female researcher, there is 0.85 man). A balance appears at the level of post-doctoral researchers (1 vs 1.04), while women are the minority of assistant professors (1 against 1.52) and the professors (1 against 1.84 men).

This is reflected in the contractual conditions: 42% of the male respondents holds a full-time contract of underdetermined duration, against 28% of the women.

- *STEM and gender*

Women are severely underrepresented in technologica, engineering and natural sciences, the so-called STEM disciplines. In these field, we only find one woman for every 2.13 men. In the social sciences and humities, women are in the majority (1 vs. 0.60), as in the biomedical sciences (1 vs. 0.74).

3. RESPONSIBLE RESEARCH AND INNOVATION

For a few years now the European Commission has been promoting a ‘Responsible Research and Innovation’ (RRI) programme. The major topics relevant for RRI are open access, public and stakeholder involvement, science education, diversity and gender, and ethics. A total of 41% of the respondents say that they are not very familiar with this RRI programme and 49% have never even heard of it. On the other hand, a majority (57.9%) consider the principles of RRI to be relevant to their own research.

3.1. Responding to societal needs

Responding to existing or future societal needs is clearly an issue that divides the respondents. Indeed, whereas 35.2% considers that research must *always* respond to societal needs, 59.0% does not share that point of view. And while 44.8% believes that research that anticipates future societal challenges should be given priority status for financing, 46.6% does not agree. Research that is relevant to society scores more highly among women (44.1%) and researchers who work part time, (56.0%) than it does among men (27.6%) and those who work full-time (35%). Societal relevance is without any doubt one of the survey items yielding the most markedly contrasting viewpoints.

Some researchers indicate why they find it problematic to put (too) much emphasis on societal relevance and to respond to existing and future societal needs. They believe it promotes a tendency to short-term thinking, it constrains researchers’ creativity, or entails the risk that the wrong priorities are pursued.

“Research that anticipates future societal challenges should be given priority for financing.’ is true but useless in a pragmatic sense: how would one be able to properly predict future societal challenges?! Those that are clear are the challenges of today, not of the future! (female, Lecturer/ Assistant Professor, Natural sciences)

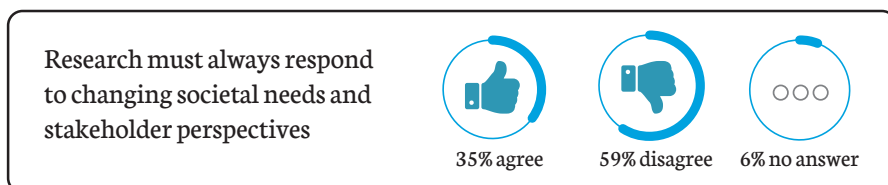
“Research corresponding to societal needs and what the world is currently interested in is a good thing. However, none of the above should be mandatory. Research freedom is what has always enabled great discoveries. Funding only “trending topics” that focus on current societal issues makes the world half blind. You never know what issues the world will run into next.” (male, (Associate) Professor, Biomedical sciences)

3.2. Stakeholders

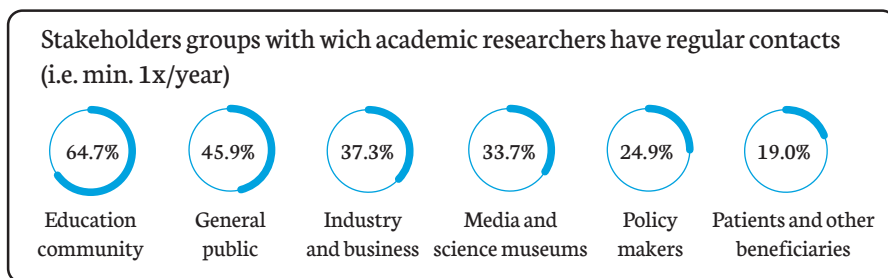
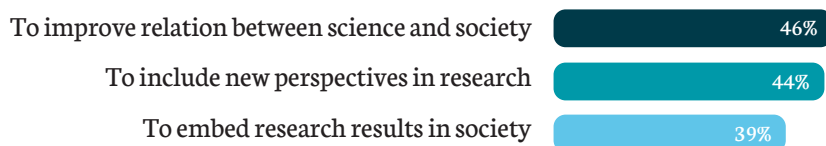
In respondents’ view, the desire for autonomy and academic freedom does not lead to an ‘ivory tower’ mentality though. They absolutely do not want to isolate themselves from the reality and society. On the contrary, more than nine in ten recognise the need and the relevance to have, in the context of their own research, contact with other groups and stakeholders in society. Only 8.2% of the respondents say it is not useful to have contacts with stakeholders for their research. These contacts provide them with new perspectives and different expertise, and allow their research to be more firmly embedded within society. Among those in the social sciences and humanities, there is still another important aspect: the empowerment of stakeholders and to give them a voice in science.

The researchers are discerning and selective, however, about which stakeholders they are willing to involve and how. Several stakeholders already have a (too) strong influence on the research, according to some. Others point out that where it comes to the research process, this is a matter for experts, in casu themselves. Moreover, they do not want their research freedom to be constrained by stakeholders.

There are significant differences between disciplines (see detailed report).



9 out of 10 researchers find it useful to have contacts with stakeholders:



3.3. Open Access

The principle of publishing in Open Access journals is strongly supported. Researchers do, however, have serious concerns about the existing system of Open Access journals. The cost of publishing an article in them can be high and often these costs are passed on to the author. What is more, many Open Access publications have a low impact factor. Nevertheless, 70.8% of the respondents have never paid to publish in Open Access.

Open Access: the gap between desire and reality

The Open Access movement aims at making topical scientific information and research results freely available for peer researchers as well as for the general public. This model is an alternative for the classic publication model in which researchers-authors publish their findings in scientific journals for which the reader pays a subscription fee. Usually the author also transfers the rights to the publisher.

Nowadays, most electronic open access journals are supported by well-known publishing houses. They select the publications and organise the review process with referees.

Although the idea of Open Access is widely supported, most researchers consider that it has severe shortcomings. Not only is there the cost, some respondents also point out that

publishing in Open Access journals (which often have a lower impact factor) damages their career and promotion chances.

“Most Open Access journals charge for publications. At present, it is difficult to get funding for that (only in European projects it is compulsory). On the other hand, the university pays a large amount of money to buy ‘closed’ access journals... One open access publication can be as expensive as the salary of a PhD student for one month, thus I prefer students over Open Access” (Man, (Associate) Professor, Technological and engineering sciences)

3.4. Diversity and gender

Diversity and especially gender related questions, are a sensitive topic in the academic world. The respondents do not take the issue of gender into account very much in their research. A minority of two in ten indicate that they do integrate gender-related questions into their research. Two in ten do not take it into account. Six in ten see the topic as not relevant to their research.

Also a majority of female researchers (54%) indicate that gender issues are not relevant for their research. Even in the social sciences and humanities, which are per definition dealing with humans and social relations, 41% of the respondents share this opinion.

Moreover, a majority finds that diversity and gender should not be a priority criterion for financing research. Only 11.5% agrees with the statement that ‘research that directly or indirectly addresses human beings but that does not integrate sex and gender analysis, should not be funded’. This is despite the fact that the integration of the gender dimension is explicitly put forward as a criterion in the European ‘Research and Innovation’ policy.

3.5. Confidence of society

45.9% are regularly in contact with the general public, 33.7% with the media. A third of them (35.0%) believe that the confidence of the public in scientific research has remained the same in the past 10 years, 18.0% consider that it has risen and 21.8% consider that it has fallen.

The researchers are more sceptical when it comes to the public authorities: four in ten believe that the interest of public authorities in scientific research has declined, while only one fifth think that the interest has grown.

Survey among researchers
at Belgian universities
Analysis of survey data

1. METHODOLOGY

1.1. Survey preparations and methodology

Preparations for this survey began in February 2016 with the development of a draft questionnaire, which subsequently has been discussed and revised in multiple consultation rounds with the Belgian universities until agreement was reached on all questions and their formulations. The approach for sampling and sending out the invitations to participate in the survey was also discussed and agreed with the Belgian universities.

The online survey itself was launched on 20 February 2017 and remained open during seven weeks, until 10 April 2017. In this time, 1736 respondents in total answered, of which 1315 completed the survey till its end.

The questionnaire consisted of 32 questions, of which all but the last two were set as ‘mandatory’ (i.e. respondents could not proceed in the survey without answering all questions). The last two questions were open; one of them invited the respondents to freely express ideas about needs for change in the Belgium research environment, and the other offered the possibility to leave an e-mail address if they wished to be personally informed about the research results.

1.2. Survey responses

While 1736 respondents set out to answer the survey, 16 of them were filtered out through the first question which asked for confirmation that the respondents’ profile corresponded to the survey target group: all persons who perform full-time or part-time research tasks in a Belgian university and have a Belgian university affiliation. Eliminating these 16, there remain **1720 valid responses to survey**.

1.3. Notes on the report

- The questions to which reference is made are indicated in tables and graphs as ‘Qx’, whereby x refers to the question number in the questionnaire.
- The ‘base’ figure indicated in the charts refers to the number of respondents that answered the question.
- When percentages in tables do not add up to 100%, this is due to rounding effects.

2. RESPONDENT PROFILE

2.1. Gender and age of respondents

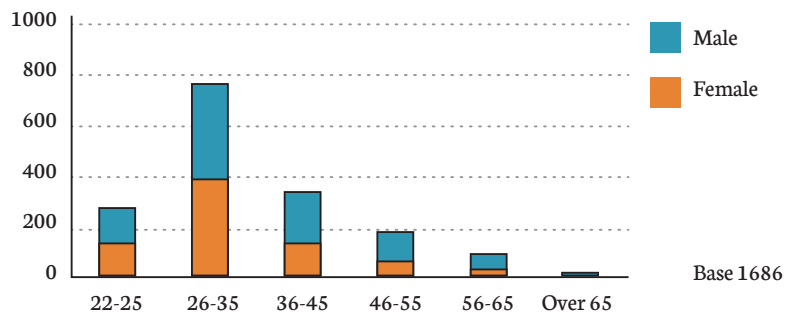
The sample of respondents who answered the survey is gender-balanced, with 53% of male and 47% female respondents.

What is your gender? (Q7)		
Answer Options	Response Percent	Response Count
Male	52.6%	887
Female	47.4%	799
answered question		1686
skipped question		34

In terms of **age**, the sample appears overall quite young, with the majority (62%) being below age 35. This is also the tipping point in terms of gender: as from this age, the share of male respondents is bigger than that of women, as shown in the chart below.

How old are you? (Q8)				
Answer Options	What is your gender? (Q7)		Response Percent	Response Count
	Male	Female		
22-25	124	152	16.4%	276
26-35	375	397	45.8%	772
36-45	200	148	20.6%	348
46-55	113	69	10.8%	182
56-65	65	30	5.6%	95
Over 65	10	3	0.8%	13
answered question				1686
skipped question				34

How old are you? (Q8)



2.2. Affiliation

The table below shows the distribution of the respondents over the different **Belgian universities to which the respondents are affiliated** (Q2). In case respondents worked in more than one university, they were asked to select the institution for which they worked most of the time.

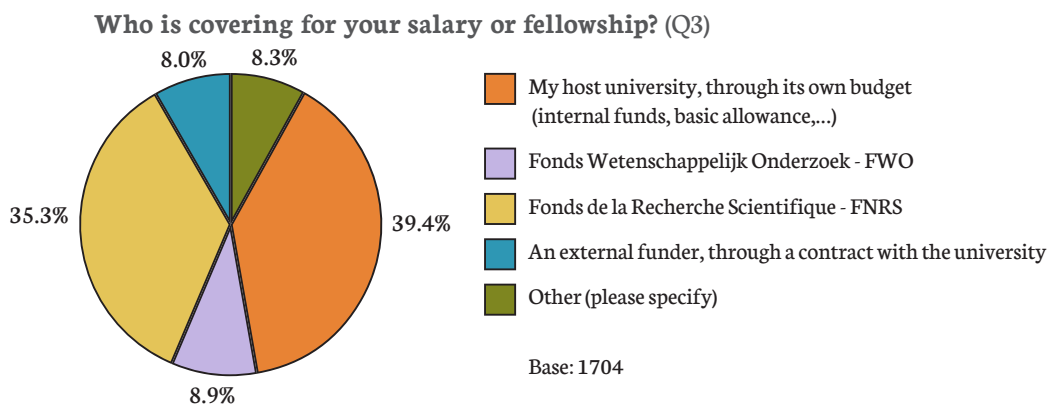
As can be seen in this overview, five institutions account for more than 10% of the sample each: Universiteit Gent, Vrije Universiteit Brussel, Université Libre de Bruxelles, Université de Liège and Université Catholique de Louvain. Considering the linguistic profile of the universities, the sample is well balanced with 46% of the respondents being affiliated at a Flemish university and 54% at French-speaking university.

At which university do you work? (Q2)		
Answer	Response Percent	Response Count
Katholieke Universiteit Leuven (KU Leuven)	9.3%	160
Universiteit Antwerpen (UAntwerpen)	4.1%	71
Universiteit Gent (UGent)	14.0%	241
Universiteit Hasselt (UHasselt)	4.4%	75
Vrije Universiteit Brussel (VUB)	14.2%	244
Université Libre de Bruxelles (ULB)	12.7%	218
Université de Liège (ULg)	17.2%	296
Université catholique de Louvain (UCL)	13.1%	224
Université de Mons (UMONS)	3.8%	65
Université de Namur (UNamur)	5.4%	92
Université Saint-Louis (USL-B)	1.8%	31
	answered question	1717
	skipped question	3

2.3. Who is covering for your salary or fellowship?

For nearly four out of ten respondents, their **salary is covered by** their host university through its own budget. This share varies however significantly across the universities, from 13% at Université catholique de Louvain up to 81% at Universiteit Hasselt. About one third of the sample (35%) is paid through the Fonds de la Recherche Scientifique (FNRS), against 9% being paid through the Flemish Fonds Wetenschappelijk Onderzoek (FWO). This difference can be explained by the fact that the FNRS itself sent out invitations to participate in the survey, while this was not done by FWO due to different relaying processes.

Who is covering for your salary or fellowship? (Q3)		
Answer Options	Response Percent	Response Count
My host university, through its own budget (internal funds, basic allowance, ...)	39.4%	671
Fonds Wetenschappelijk Onderzoek - FWO	8.9%	152
Fonds de la Recherche Scientifique - FNRS	35.3%	602
An external funder, through a contract with the university	8.0%	137
Other (please specify)	8.3%	142
	answered question	1704
	skipped question	16



Twenty of the 142 respondents (8%) who answered to be paid through 'other' funders specified that their salary is covered by various (two or even more) sources, while some distinguished between 'salary' and 'project money'. 'Other' sources mentioned included, among others: various EU sources, among which ERC, Marie Curie, Erasmus Mundus (21); Belspo (11); IWT (6); VLAIO (6); Télévie (5); Innoviris (3).

2.4. On what basis are you employed in this institution?

The **contractual basis** on which the vast majority of the sample (89%) is employed is full-time, whereby most of the respondents (54%) have a full-time, fixed term position.

On what basis are you employed in this institution? (Q4)		
Answer Options	Response Percent	Response Count
Full-time permanent	35.2%	596
Part-time permanent	3.0%	50
Full-time fixed-term contract	53.9%	913
Part-time fixed-term contract	4.6%	78
Other (please specify)	3.4%	57
answered question		1694
skipped question		26

Significantly more men than women are employed on the basis of the most secure contracts: permanent, full-time contracts (42% of male, versus 28% of the female respondents). Also, more of the female than of the male respondents work with a full-time fixed-term contract (61% versus 48%). There is no significant gender difference when considering the part-time contracts.

On what basis are you employed in this institution? (Q4)						
Answer Options	What is your gender? (Q7)				Response Percent	Response Count
	Male		Female			
	N°	%	N°	%		
Full-time permanent	372	41.9%	222	27.8%	35.2%	594
Part-time permanent	24	2.7%	23	2.9%	2.8%	47
Full-time fixed-term contract	422	47.6%	490	61.3%	54.1%	912
Part-time fixed-term contract	35	3.9%	41	5.1%	4.5%	76
Other (please specify)	34	3.8%	23	2.9%	3.4%	57
answered questions						1686

Of the 57 respondents saying they work under ‘another type of contract’, 14 specified they are PhD students, 9 mentioned they have tenure track positions and 5 said they are retired. Some also mentioned to combine several part-time positions with different contracts.

2.5. Job title and role in the research team

In terms of the (most closely matching) **job title** of the respondents, nearly half of the sample indicates to be a PhD student (45%). Almost one quarter (24%) is (associate) professor. Again, these figures hide some gender differences that are in line with common patterns in the EU: the share of women is higher at the lower levels and significantly lower when it comes to (assistant or associate) professor level.

Which of the following most closely matches your job title? (Q5)						
Answer options	Male		Female		Response Percent	Response Count
	N°	%	N°	%		
PhD Candidate	352	39.7%	415	5.9%	45.4%	768
Post-Doctoral Researcher	165	18.6%	158	19.8%	19.1%	323
Researcher without PHD	19	2.1%	24	3.0%	2.6%	44
Lecturer/ Assistant Professor	94	10.6%	62	7.8%	9.2%	156
(Associate) Professor	257	29.0%	140	17.5%	23.6%	399
<i>answered question</i>						1690
<i>skipped question</i>						30

While 48% of the respondents indicated that their **role in the research team** is that of Principal Investigator, 53% answered to be a member of the research team. Considering respondents’ gender, more men than women (53% against 42%) report to be Principal Investigator.

Which of the following most closely matches your role in the research team? (Q6)						
Answer options	Male		Female		Response Percent	Response Count
	N°	%	N°	%		
Principal Investigator	467	52.6%	334	41.8%	47.5%	801
Member of research team	420	47.4%	465	58.2%	52.5%	885
<i>answered question</i>						1686
<i>skipped question</i>						34

2.6. Main area of science or discipline

The sample is well-balanced in terms of representation of the **areas of science or disciplinary areas** (Q9). The category of ‘social sciences and humanities’ counts most respondents (37% of the sample), followed by ‘technological and engineering sciences (including bio-engineering)’ and ‘biomedical sciences’ (each counting for 22%).

What is the main area of science or discipline that you work in? (Q9)						
Answer options	Male		Female		Response Percent	Response Count
	N°	%	N°	%		
Biomedical sciences	159	17.9%	215	26.9%	22.2%	374
Social sciences and humanities	257	29.0%	361	45.2%	36.7%	618
Natural sciences	215	24.3%	100	12.5%	18.7%	315
Technological and engineering sciences (incl. bio-engineering)	255	28.8%	122	15.3%	22.4%	377
<i>answered question</i>						1684
<i>skipped question</i>						36

3. RESEARCH FINDINGS

3.1. What motivates you most in your work as a scientist?

From a given list, the respondents were invited to select the *three most important aspects that motivate them in their work as a scientist* (Q10). The table below lists the different items, indicating the share of respondents that selected them.

‘Contributing to the advancement and progress of scientific knowledge’ is markedly the most important motivating factor, being selected by half of the respondents. On the second place comes ‘improving my knowledge and understanding’ (ticked by 43%), followed by ‘having academic freedom and autonomy’ (selected by 37%). ‘Performing research that is relevant for society and that corresponds to societal needs’ comes on the fourth place (36%), being selected significantly more often by women than by men (44% against 28%). ‘Performing fundamental research (‘blue sky science’), inspired by curiosity and/or question or hypothesis driven’ was selected by slightly more than one in four respondents (27% of the total sample), but markedly more often by men (31%) than by women (23%).

What motivates you most in your work as a scientist? (Indicate the three most important aspects) (Q10)				
Answer Options	Response Percent	Response Count	Response Percent	
			M	F
Contributing to the advancement and progress of scientific knowledge	50.5%	834	49.8%	51.2%
Contributing to scientific breakthroughs	9.4%	155	11.2%	7.4%
Improving my knowledge and understanding	43.4%	718	41.8%	45.3%
Working with knowledgeable and inspiring people	19.7%	326	18.4%	21.2%
Having academic freedom and autonomy	37.1%	614	38.2%	36.0%
Performing fundamental research (‘blue sky science’), inspired by curiosity and/or question or hypothesis driven	27.0%	446	30.7%	22.8%
Performing research that is relevant for society and that corresponds to societal needs	35.5%	586	27.6%	44.1%
Performing research that is relevant for industry and aims at knowledge valorisation and use	8.0%	133	9.4%	6.5%
Earning a good salary, having attractive employment conditions and pension scheme	5.6%	93	7.1%	4.0%
Teaching and training the next generation of scientists	19.9%	329	21.1%	18.6%
Performing high risk, high gain research	1.8%	30	2.5%	1.0%
Being a respected scientist in my area or discipline	6.8%	113	9.0%	4.5%
Communicating and disseminating knowledge (beyond teaching)	12.1%	200	10.7%	13.7%
Working in an international environment	12.9%	214	12.1%	13.9%
Progressing my career	8.5%	140	8.8%	8.2%
Other (please specify)	1.7%	28	1.6%	1.8%
			answered question	
			1653	
			skipped question	
			67	

Twenty-eight researchers added a variety of ‘other’ elements they find motivating in their work as a scientist. Among these were contributing to environmental protection, the combination of clinical work and research, multi-disciplinarity, self-development, personal satisfaction (research as a hobby), travelling, academic writing, making a difference for vulnerable populations, ...

Differences can be noted depending on the disciplinary area of the researchers. Both the elements that motivate researchers as the number of times they were ticked (expressed as the percentage of the total group from the respective disciplinary fields represented in the sample) varies. Below are the top three motivations for each disciplinary field.

For biomedical researchers:

1. Contributing to the advancement and progress of scientific knowledge (63%)
2. Performing research that is relevant for society and that corresponds to societal needs (37%)
3. Performing fundamental research ('blue sky science'), inspired by curiosity and/or question or hypothesis driven (34%)

For social sciences and humanities:

1. Performing research that is relevant for society and that corresponds to societal needs (50%)
2. Having academic freedom and autonomy (46%)
3. Improving my knowledge and understanding (45%)

For natural sciences:

1. Contributing to the advancement and progress of scientific knowledge (55%)
2. Performing fundamental research ('blue sky science'), inspired by curiosity and/or question or hypothesis driven (46%)
3. Improving my knowledge and understanding (45%)

For technological and engineering sciences (including bio-engineering):

1. Contributing to the advancement and progress of scientific knowledge (49%)
2. Improving my knowledge and understanding (49%)
3. Having academic freedom and autonomy (32%)

Also looking at the contractual relations between the researchers and their institution, differences come to the fore in what motivates them most in their work. Below are the top three motivations for each group.

Full-time permanent employed researchers are most motivated by:

1. Contributing to the advancement and progress of scientific knowledge (52%)
2. Having academic freedom and autonomy (42%)
3. Performing fundamental research ('blue sky science'), inspired by curiosity and/or question or hypothesis driven (34%)

Part-time permanent researchers are most motivated by:

1. Performing research that is relevant for society and that corresponds to societal needs (56%)
2. Contributing to the advancement and progress of scientific knowledge (49%)
3. Teaching and training the next generation of scientists (38%)

Full-time fixed-term contracted researchers are most motivated by:

1. Improving my knowledge and understanding (53%)
2. Contributing to the advancement and progress of scientific knowledge (51%)
3. Performing research that is relevant for society and that corresponds to societal needs (35%)

Part-time fixed-term contracted researchers are most motivated by:

1. Performing research that is relevant for society and that corresponds to societal needs (53%)
2. Improving my knowledge and understanding (42%)
3. Contributing to the advancement and progress of scientific knowledge (35%)
4. Having academic freedom and autonomy (35%)

3.2. Contacts with stakeholders

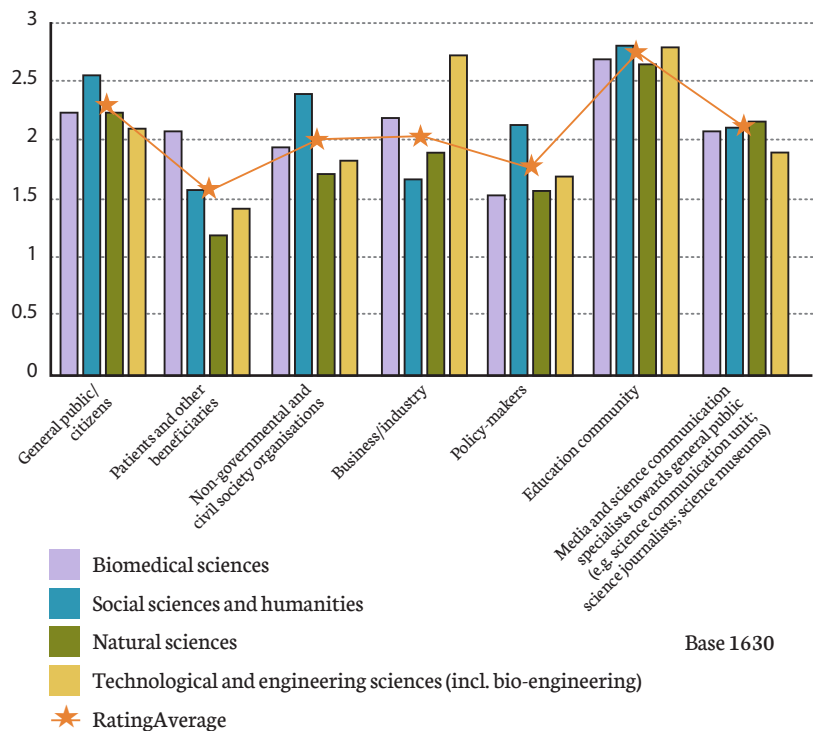
Respondents were asked **how often they have contacts with various stakeholder groups** within the context of their research activities (Q11). Across the sample, researchers most frequently have contacts with the ‘education community’ and the ‘general public / citizens’. Only for one stakeholder group, the education community, the majority of the responding researchers (65%) answered either ‘regularly’ (i.e. minimum once per year) or ‘constantly’ (i.e. minimum once every month).

For all other stakeholder groups, it appears that the majority of the researchers either exceptionally or never have contacts with them. For certain stakeholder groups, the share of researchers who never have contacts with them is particularly high: 67% report never to have contacts with ‘patients and other beneficiaries’, and 49% never have contacts with policy makers. For ‘patients and other beneficiaries’, the explanation of this result is likely to be found in the fact that not all researchers consider this group relevant for their research; however, while the word ‘patients’ refers to medical sciences, ‘beneficiaries’ widens the scope to the research end users. More than one third of the responding researchers have at least regularly contacts with ‘business / industry’ (37%), ‘non-governmental and civil society organisations’ (36%), and ‘media and science communication specialists towards general public (e.g. science communication unit; science journalists; science museums)’ (34%).

Within the context of your research activities, how often do you (yourself) have contacts with the following stakeholders? (Q11)					
Answer Options	Never	Exceptionally (less than 1x/ year)	Regularly (min. 1x/ year)	Constantly (min. 1x/ month)	Weighted Average
General public/citizens	23.07% 376	30.98% 505	35.46% 578	10.49% 171	2.33
Patients and other beneficiaries	66.99% 1.092	14.05% 229	10.98% 179	7.98% 130	1.60
Non-governmental and civil society organisations	40.12% 654	24.11% 393	26.93% 439	8.83% 144	2.04
Business / industry	40.61% 662	22.09% 360	27.06% 441	10.25% 167	2.07
Policy makers	49.33% 804	25.77% 420	19.69% 321	5.21% 85	1.81
Education community	16.63% 271	18.65% 304	36.87% 601	27.85% 454	2.76
Media and science communication specialists towards general public (e.g. science communication unit; science journalists; science museums)	30.98% 505	35.28% 575	29.39% 479	4.36% 71	2.07
answered question					1630
skipped question					90

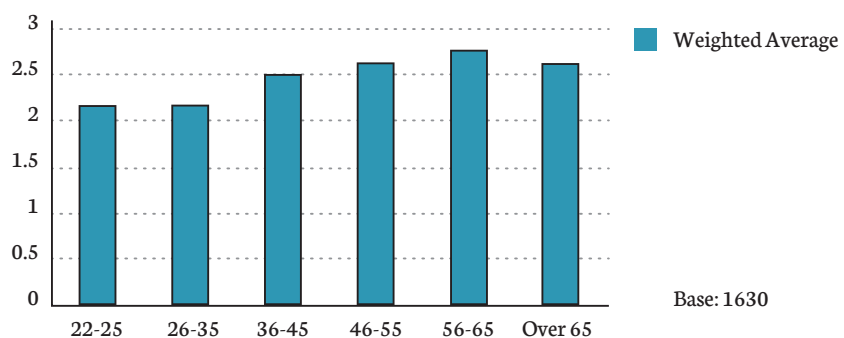
In terms of disciplines, the below graph shows how frequently the researchers from the various disciplines have contacts with the respective stakeholder groups. As can be seen in this graph, the researchers from Social Sciences and Humanities have more frequent contacts than the other disciplines for several stakeholder groups (general public/citizens, non-governmental and civil society organisations, policy-makers and the education community). Those from biomedical sciences have comparatively the most frequent contacts with patients and other beneficiaries. Researchers from technological and engineering sciences with stakeholders from business / industry, and those from natural sciences with media and science communication specialists.

Within the context of your research activities, how often do you (yourself) have contacts with the following stakeholders? (Q11)

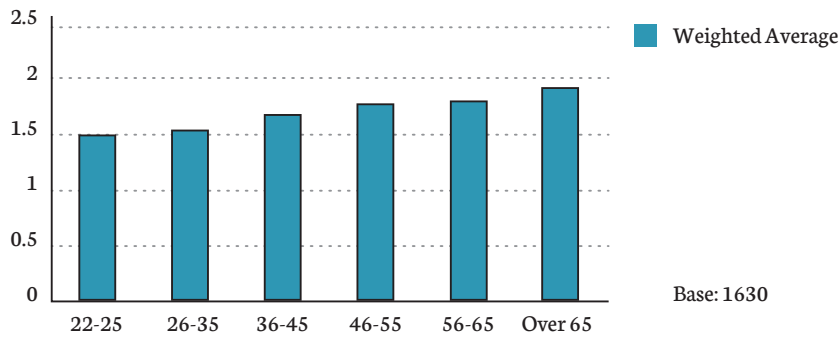


Considering respondents' age, it appears that having contacts with stakeholders increases with the age of the researchers (not considering the oldest group of 65 plus). This trend applies (with some minor variations) for all stakeholder groups, as illustrated by the charts below.

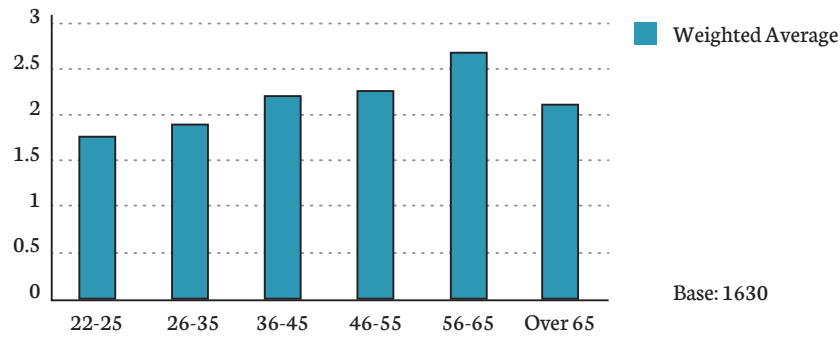
General public/citizens (Q11)



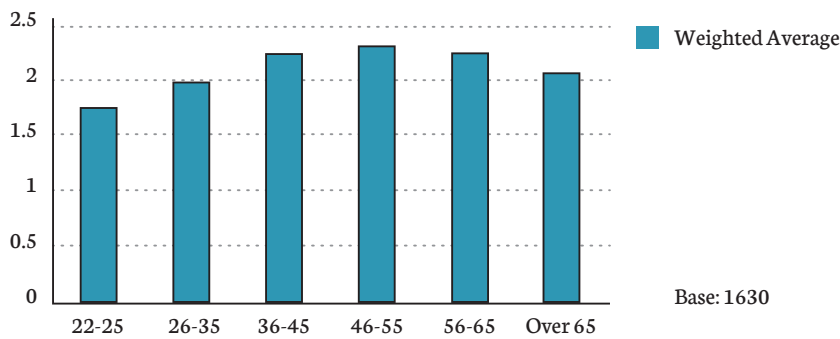
Patients and other beneficiaries (Q11)



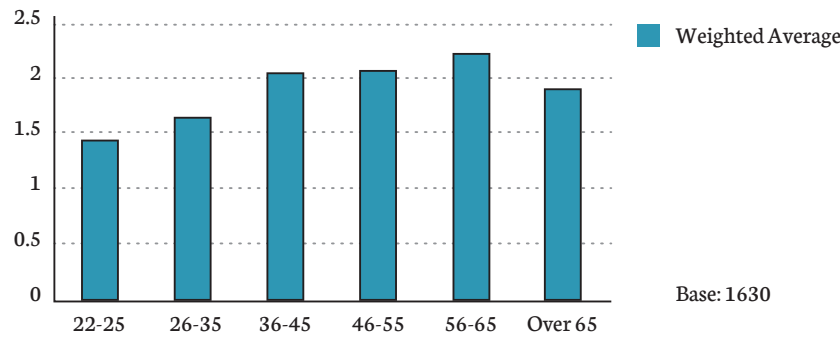
Non-governmental and civil society organisations (Q11)



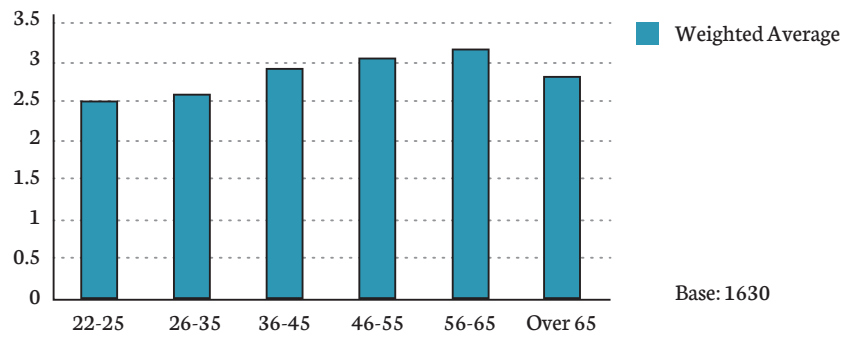
Business / industry (Q11)



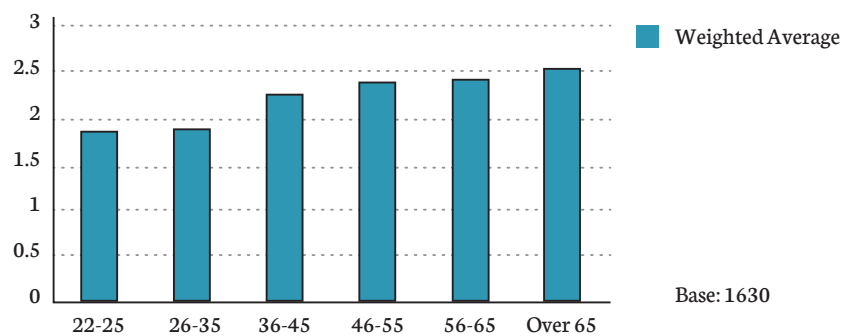
Policy-makers (Q11)



Education community (Q11)



Media and science communication specialists towards general public (e.g. science communication unit; science journalists; science museums) (Q11)



A next question asked the respondents **why they consider it useful to have contacts with relevant stakeholders**, offering a series of answer possibilities from which up to three could be selected (Q12). The table below shows the results, ranking the reasons to have contacts with relevant stakeholders according to how frequently they were selected.

The top three reasons indicated by more than one third of the responding researchers are:

1. to improve relations between science and society (selected by 46%)
2. to include new perspectives in research (44%)
3. to embed research results in society (39%)

About one quarter find contacts with relevant stakeholders useful for the following reasons:

- to include different sources of expertise (29%)
- to help identify unmet needs (28%)
- to help identify what matters to end users (26%)
- to forge new partnerships (25%)

Eight percent of the responding researchers find that having contacts with stakeholders is not useful for their research. Notably, this relatively low share contrasts somehow with the above finding that a majority of the researchers only seldom have contacts with stakeholders.

Within the context of your research, why do you consider it useful to have contacts with relevant stakeholders? (You can indicate the 3 most relevant) (Q12)		
Answer Options	Response Percent	Response Count
To improve relations between science and society	45.7%	726
To include new perspectives in research	44.1%	701
To embed research results in society	38.9%	618
To include different sources of expertise	28.5%	453
To help identify unmet needs	28.1%	446
To help identify what matters to end users	26.2%	416
To forge new partnerships	24.6%	391
To align stakeholders' needs and expectations with what science and innovation can do	19.1%	303
To empower stakeholders and to give them a voice in science	9.2%	147
It is not useful for my research to have contacts with stakeholders	8.2%	130
Other (please specify)	2.0%	32
	<i>answered question</i>	<i>1590</i>
	<i>skipped question</i>	<i>130</i>

Looking at the disciplinary background of the respondents, the share of those who consider that contacts with stakeholders is not useful for their research is highest among those from the natural sciences. For those from social sciences and humanities, two important drivers for having contacts with stakeholders are 'to empower stakeholders and to give them a voice', followed by 'to embed research results in society'. Compared to the other disciplines, the shares of those from the technological and engineering sciences is highest for 'the alignment of stakeholders' needs and expectations with what science and innovation can do', followed by 'to help identify what matters to end users'. Researchers from the biomedical sciences see many reasons for having stakeholder contacts, resulting in relatively limited variation across the various reasons that were indicated.

In the table below, the share of respondents from each of the disciplinary areas who ticked the respective motivations for having contacts with stakeholders is indicated (each row totals 100%). At the bottom of the table, the respective shares of these disciplines in the total sample are given for comparison.

Within the context of your research, why do you consider it useful to have contacts with relevant stakeholders? (You can indicate the 3 most relevant) (Q12)				
Answer Options	What is the main area of science or discipline that you work in? (single answer) (Q9)			
	Biomedical sciences	Social sciences and humanities	Natural sciences	Technological and engineering sciences (incl. bio-engineering)
To help identify unmet needs	24.44% 109	37.00% 165	9.87% 44	28.70% 128
To help identify what matters to end users	20.91% 87	35.34% 147	13.22% 55	30.53% 127
To improve relations between science and society	22.59% 164	36.36% 264	23.83% 173	17.22% 125
To include new perspectives in research	24.25% 170	35.52% 249	16.69% 117	23.54% 165
To empower stakeholders and to give them a voice in science	19.73% 29	63.27% 93	6.80% 10	10.20% 15
To align stakeholders' needs and expectations with what science and innovation can do	21.12% 64	28.38% 86	19.14% 58	31.35% 95
To include different sources of expertise	22.08% 100	39.74% 180	15.45% 70	22.74% 103
To embed research results in society	19.74% 122	46.12% 285	17.96% 111	16.18% 100
To forge new partnerships	25.83% 101	26.09% 102	17.90% 70	30.18% 118
It is not useful for my research to have contacts with stakeholders	15.38% 20	30.00% 39	34.62% 45	20.00% 26
Other (please specify)	18.75% 6	40.63% 13	25.00% 8	15.63% 5
Share in the sample (N=1684)	22.2%	36.7%	18.7%	22.4%
answered question			1590	
skipped question			94	

The table on the next page shows the share of respondents from each age group who ticked the respective motivations for having contacts with stakeholders (each row totals 100%). At the bottom of the table, the respective shares of the age groups in the total sample are given for comparison.

'To include new perspectives in research' was proportionally ticked most often by the youngest age group: up to half of those aged 22-25 (49%) indicated this reason for having contacts with stakeholders. The second most important reason for this age group is 'to improve relations between science and society' (also ticked by 49% of this group). The youngest are the group amongst which the highest rate is found of those who ticked that

‘it is not useful for my research to have contacts with stakeholders’ (11%). ‘To embed research results in society’ is less important for the younger, and more important for the older age groups. ‘To include different sources of expertise’ is proportionately least important for the group aged 56-65, which can be considered as the ‘established’ researchers.

Within the context of your research, why do you consider it useful to have contacts with relevant stakeholders? (You can indicate the 3 most relevant) (Q12)						
Answer Options	How old are you? (Q8)					
	22-25	26-35	36-45	46-55	56-65	Over 65
To help identify unmet needs	15.47% 69	45.74% 204	23.32% 104	10.99% 49	4.48% 20	0.00% 0
To help identify what matters to end users	14.66% 61	47.60% 198	20.67% 86	10.82% 45	5.29% 22	0.96% 4
To improve relations between science and society	17.63% 128	43.66% 317	22.31% 162	10.33% 75	5.51% 40	0.55% 4
To include new perspectives in research	18.40% 129	45.93% 322	20.97% 147	9.56% 67	4.56% 32	0.57% 4
To empower stakeholders and to give them a voice in science	9.52% 14	51.70% 76	23.81% 35	10.88% 16	2.72% 4	1.36% 2
To align stakeholders’ needs and expectations with what science and innovation can do	14.85% 45	44.88% 136	22.44% 68	11.55% 35	5.94% 18	0.33% 1
To include different sources of expertise	19.43% 88	47.68% 216	17.88% 81	10.15% 46	4.19% 19	0.66% 3
To embed research results in society	13.43% 83	44.66% 276	21.68% 134	13.27% 82	6.31% 39	0.65% 4
To forge new partnerships	16.88% 66	46.29% 181	21.48% 84	9.46% 37	5.37% 21	0.51% 2
It is not useful for my research to have contacts with stakeholders	23.08% 30	49.23% 64	13.85% 18	4.62% 6	6.92% 9	2.31% 3
Other (please specify)	9.38% 3	34.38% 11	15.63% 5	18.75% 6	18.75% 6	3.13% 1
Share in the sample (N=1684)	15.5% 261	43.1% 725	19.6% 330	10.3% 173	5.3% 89	0.7% 12
answered question						1590
skipped question						94

Considering respondents’ gender, significantly more women than men (respectively 56% against 44%) consider stakeholder contacts useful ‘to empower stakeholders and to give them a voice in science’, while more men than women (61% versus 39%) consider stakeholder contacts not useful for their research.

Within the context of your research, why do you consider it useful to have contacts with relevant stakeholders? (You can indicate the 3 most relevant) (Q12)		
Answer Options	What is your gender (Q7)	
	Male	Female
To help identify unmet needs	48.65% 217	51.35% 229
To help identify what matters to end users	49.04% 204	50.96% 212

To improve relations between science and society	53.31% 387	46.69% 339
To include new perspectives in research	52.64% 369	47.36% 332
To empower stakeholders and to give them a voice in science	43.54% 64	56.46% 83
To align stakeholders' needs and expectations with what science and innovation can do	52.81% 160	47.19% 143
To include different sources of expertise	48.34% 219	51.66% 234
To embed research results in society	51.13% 316	48.87% 302
To forge new partnerships	57.80% 226	42.20% 165
It is not useful for my research to have contacts with stakeholders	60.77% 79	39.23% 51
Other (please specify)	59.38% 19	40.63% 13
<i>Share of those who answered question</i>	<i>52.32%</i> 832	<i>47.67%</i> 758
<i>answered question</i>		<i>1590</i>
<i>skipped question</i>		<i>94</i>

32 Respondents either provided a comment (e.g. that 'none' apply, that it is not possible to choose 3, that the question is not relevant), or added other reasons why they consider it useful to have contacts with relevant stakeholders within the context of their research. Four said contacts with stakeholders are useful to increase the chances to get funded. Others mentioned, among others: to collect data or samples; to popularise science; as a form of accountability towards the taxpayer.

3.3. Normative elements related to the research practice

The researchers were asked to what extent they agreed with **nine normative statements related to the research practice**. These are shown in the table below, in which the statements are ranked according to the level of agreement expressed by the researchers (high to low), based on the weighted average.

Three normative items stand out for the widely-shared agreement expressed by the responding researchers:

1. Research must be self-critical and reflect on underlying values and norms
2. Access to research data must be fully open
3. Researchers must make their research results accessible to a broad public through Open Access

Where it comes to 'researchers must be able to conduct high risk, high gain research', the opinions are a bit more divided and 10% do not express themselves in this regard. Also, a gender difference is noted in the shares of those who state to totally agree: 45% of the men against 27% of the women.

On three items, the majority of the respondents (totally) disagrees:

- Research must always respond to changing societal needs and stakeholder perspectives (disagreed upon by 59%). A significant gender difference can be

noted here in those who (totally) agree: 42% of the female respondents, against 29% of the male.

- Research funding organisations and reviewers should only consider researchers' publications in Open Access journals (58%)
- Stakeholders must be involved in the research process (including the design and/ or the execution of your research) (54%)

Please indicate to what extent you agree with the following normative statements, keeping in mind your own research field(s). (Q13)							
Answer Options	Totally disagree	Tend to disagree	Tend to agree	Totally agree	Not relevant for my research	No opinion	Weighted average ²
Research must be self-critical and reflect on underlying values and norms	0.65% 10	2.16% 33	28.50% 436	64.38% 985	1.11% 17	3.20% 49	3.64
Access to research data must be fully open	1.24% 19	7.32% 112	39.80% 609	50.07% 766	0.59% 9	0.98% 15	3.41
Researchers must make their research results accessible to a broad public through Open Access	1.18% 18	6.86% 105	40.92% 626	49.54% 758	0.20% 3	1.31% 20	3.41
Researchers must be able to conduct high risk, high gain research	3.79% 58	9.54% 146	34.25% 524	36.67% 561	6.14% 94	9.61% 147	3.23
Researchers must make their research results widely accessible to a broad public through dissemination in popular science magazines, social media, newspapers, television, ...	3.27% 50	13.27% 203	50.00% 765	29.48% 451	1.57% 24	2.42% 37	3.10
Researchers should adapt their research to changing conditions, circumstances and priorities	7.06% 108	23.79% 364	41.90% 641	21.24% 325	1.37% 21	4.64% 71	2.82
Research must always respond to changing societal needs and stakeholder perspectives	18.56% 284	40.39% 618	26.73% 409	8.43% 129	3.07% 47	2.81% 43	2.27
Stakeholders must be involved in the research process (including the design and/or the execution of your research)	19.22% 294	35.03% 536	29.48% 451	6.47% 99	4.64% 71	5.16% 79	2.26
Research funding organisations and reviewers should only consider researchers' publications in Open Access journals	26.73% 409	30.85% 472	25.03% 383	9.15% 140	0.59% 9	7.65% 117	2.18
<i>answered question</i>							1530
<i>skipped question</i>							190

For the above question, 132 respondents provided additional comments and/or clarifications to their answers, addressing a variety of (often overlapping) topics. Of the comments, 43% relate to the topic of 'Open Access', 26% address the issue of 'stakeholders', 25% deal with society and/or societal needs and 23% with fundamental and/or high risk research. A variety of other issues were addressed by just a couple of respondents.

The statement on 'Open Access' clearly touches upon a topical issue of concern to the researchers, who have pronounced views and positions in relation to what is experienced as a pressure on researchers (only), while the whole 'system' needs to be (re-)considered. The question thus yielded a series of very explicit comments, as illustrated below.

² Calculated on the basis of the total number that answered the question (1530) minus the ones who responded either that the item is not relevant for their research or that they have no opinion.

Many of the comments nuance the answers provided, putting the sometimes 'radical' answers in perspective. Indeed, some researchers comment they found the statements formulated in such absolute terms (too normatively), they responded in 'total disagreement', while recognising that some situations need different responses. Notably, researchers point out the different positions of fundamental and applied research, and the fact that the statements require different answers depending on whether fundamental or applied research is considered.

The quotes below are examples that illustrate the comments provided.

• As to 'Open Access':

"A debate on Open Access is necessary. I don't agree that researchers must make their research available in Open Access if this means that they have to pay for it from their budgets. In that sense, it is up to policy makers to either increase funding budgets to cover the cost of Open Access, either to take Open Access (peer reviewed) entries into consideration when evaluating funding, careers, etc." (male, Lecturer/ Assistant Professor, Social sciences and humanities)

"Research funded by the public money should be public, so Open Access should be the norm. But so far it is either very expensive or in less respected journals." (male, PhD candidate, Technological and engineering sciences (incl. bio-engineering))

"While I support and aim for open access, in my specific discipline (political science), there is a great 'pressure' to publish in high impact journals that either do not provide open access, or only do so at an astronomical fee. So, although I indicated that I tend to agree that researchers should publish their research in open access formats, there is an implicit 'punishment' for researchers that do this exclusively (i.e. universities do not rate the publications as highly, job opportunities are closed to the researcher, funding agencies do not rate the publications and exclude the proposals on this ground). Therefore, I believe that the onus is on the entire research system (universities, publishers, funding bodies) and not just on the researcher to enable open access without detriment to an individual researcher's career." (female, Post-Doctoral Researcher, Social sciences and humanities)

"Most open access journals charge for publications. At present, it is difficult to get funding for that (only in European projects it is compulsory). On the other hand, the university pays a large amount of money to buy 'closed' access journals... One open access publication can be as expensive as the salary of a PhD student for one month, thus I prefer students over open access" (man, (Associate) Professor, Technological and engineering sciences (incl. bio-engineering))

• On the issue of 'stakeholders':

"My answers depend on different types of stakeholders we consider: I think some stakeholders already have a big influence on research and it's not always for the good (industries etc.), and some other stakeholders have no influence on it and are often forgotten (inhabitants, small associations etc.). Scientists must be strong against powerful institutions and private sector which have financial interest on knowledge production, but must be aware of what happens in the society, especially concerning inequalities. (Civil society doesn't mean firms - like I can often hear)." (woman, PhD candidate, Social sciences and humanities)

“Stakeholders should (must) be involved in identifying needs. But not in the research process, because it's expert's job. It would be like asking patients to be involved in how to do surgery, or drivers in how to design an engine.” (man, Lecturer/ Assistant Professor, natural sciences)

“Involving stakeholders at all steps of the research procedure will affect negatively the possibility to do fundamental research.” (man, Post-Doctoral Researcher, Biomedical sciences)

• Society and/or societal needs:

“Not everything can be predicted and basic science needs time to achieve breakthroughs. Not every idea is economic from the start and thus needs other experts that pick up the research or follow up research to improve science further. A lot of things including the internet would not exist if we would only work on the more short term changes and stakeholders perspective. Hence a good mix of current priorities and blue sky research also on none "hot" topics is what keeps our innovation and progress high.” (female, (Associate) Professor, natural sciences)

“Researchers should address the current problems or challenges in the society. However, they should still be guaranteed the freedom to explore any solution they see fit. It is not a good idea that politicians or the public opinion decide what paths researchers can or cannot explore. It is the job of the scientist to discover the truth, or report findings which he believes to be true, even when politicians or the general public do not like to hear these results. For example, mobility/traffic studies are needed as they address a challenge in our society, however politicians should not influence the conclusions of such a study.” (man, PhD candidate, Technological and engineering sciences (incl. bio-engineering))

“When it comes to Industry funding the contracts are so binding that basically everything is controlled by the sponsor.” (male, Post-Doctoral Researcher, Biomedical sciences)

• Fundamental and/or high risk research:

“A high number of very important scientific methods have found their origin in fundamental research that had nothing to do with the applications they are used for today. Forcing a scientist to work on a topic that the stakeholders think is important is like forcing an artist to deliver an 'obligatory' piece of art. Limiting creativity means everybody loses.” (male, (Associate) Professor, Biomedical sciences)

“Apart from research with direct relevance to society and stakeholders, research 'for the research', very basic and fundamental, potentially holding the seeds for further, applicable research (no one thought of or was asking for) should still be possible and supported. Universities are the only institutions where such research can be conducted, and there should be enough room for it (not that it has to take a majority of the resources!).” (female, Post-Doctoral Researcher, Social sciences and humanities)

• On the freedom and autonomy of scientists:

“Involvement of stakeholders in research is a good thing. Researchers performing research corresponding to societal needs and what the world is currently interested in is a good thing. However, none of the above should be mandatory. Research freedom is what has always enabled great discoveries. Funding only "trending topics" that focus on current societal issues makes the world half blind. You never know what issues the world will run into next.” (male, (Associate) Professor, Biomedical sciences)

“Scientists know where to concentrate their efforts to be competitive and productive; they just ask that the society has some confidence in them.” (female, (Associate) Professor, Natural sciences)

3.4. Factors that may affect the quality of research and the evaluation of research (proposals)

For a series of 13 statements about **factors that (may) affect the quality of research and the evaluation of research (proposals)**, the respondents were invited to indicate their level of agreement with each statement, keeping in mind their own research field(s). (Q14) These are shown in the table below, in which the statements are ranked according to the level of agreement expressed by the researchers (high to low), based on the weighted average (which was calculated excluding those respondents that had no opinion or that answered the item is not relevant for their research).

Please indicate to what extent you agree with the following opinions, keeping in mind your own research field(s). (Q14)							
Answer Options	Totally disagree	Tend to disagree	Tend to agree	Totally agree	Not relevant for my research	No opinion	Weighted average ³
Academic freedom contributes to the quality of research	0.57% 8	3.32% 47	34.79% 492	59.19% 837	0.28% 4	1.84% 26	3.56
Responsible Research and Innovation improves research quality	0.85% 12	4.95% 70	40.74% 576	33.95% 480	2.69% 38	16.83% 238	3.34
Pressure on researchers may lead to compromises on research integrity and standards	2.12% 30	7.21% 102	42.57% 602	44.77% 633	0.99% 14	2.33% 33	3.34
The scientific quality should be the main criterion for evaluating research (proposals)	2.05% 29	10.33% 146	39.11% 553	45.62% 645	0.07% 1	2.83% 40	3.32
Underlying values, norms and ethical principles (including privacy issues) must be an evaluation criterion	4.24% 60	14.29% 202	48.16% 681	18.60% 263	6.08% 86	8.63% 122	2.95
Research should not necessarily have a societal impact	8.13% 115	22.28% 315	39.18% 554	27.65% 391	0.78% 11	1.98% 28	2.89
The contribution to innovative applications must be an evaluation criterion	8.84% 125	24.54% 347	45.69% 646	11.32% 160	3.82% 54	5.80% 82	2.66
Fundamental research should be given priority for financing	8.77% 124	31.05% 439	34.72% 491	13.51% 191	2.12% 30	9.83% 139	2.60
The degree of benefits for society (economically or socially) must be an evaluation criterion	11.74% 166	28.29% 400	43.14% 610	10.47% 148	1.91% 27	4.46% 63	2.56
Stakeholder involvement stands in the way of academic freedom	7.00% 99	34.87% 493	33.24% 470	7.85% 111	5.30% 75	11.74% 166	2.51
Research that anticipates future societal challenges should be given priority for financing	11.95% 169	34.72% 491	37.20% 526	7.64% 108	2.19% 31	6.29% 89	2.44
Research that does not embrace diversity in disciplines and perspectives should not be funded	29.77% 421	43.00% 608	15.42% 218	3.11% 44	2.19% 31	6.51% 92	1.91
Research that directly or indirectly addresses human beings but that does not integrate sex and gender analysis, should not be funded	32.53% 460	30.20% 427	9.55% 135	1.98% 28	10.68% 151	15.06% 213	1.74
<i>Answered Question</i>							1414
<i>Skipped Question</i>							306

³ Calculated on the basis of the total number that answered the question (1530) minus the ones who responded either that the item is not relevant for their research or that they have no opinion.

For three items of the list, an overwhelming majority of more than 8 out of 10 respondents (totally) agreed:

- Academic freedom contributes to the quality of research ((totally) agreed upon by 94%)
- Pressure on researchers may lead to compromises on research integrity and standards (87%; varying between 84% for technological and engineering sciences and 91% in the biomedical sciences)
- The scientific quality should be the main criterion for evaluating research (proposals) (85%)

These items are followed by 'Responsible Research and Innovation improves research quality', with which 75% of the sample (totally) agrees. Notably, this is the item with the highest rate of respondents saying they have 'no opinion' (17%), undoubtedly to be explained by the lack of familiarity of many researchers with the concept (see further).

Considering the share of researchers that (totally) agree with the fact that pressure on researchers may lead to compromises on research integrity and standards, differences are limited when looking at the contractual status of the researchers: 88% of full-time fixed term researchers (totally) agree, 87% of the full-time permanent, 86% of the part-time fixed-term and 84% of the part-time permanent. The same observation applies when looking at the respondents' role in their research team (88% of the principal investigators (totally) agree and 87% of the members of research teams) or respondents' gender (88% of the men (totally) agree and 87% of the women). Considering the researchers' position (job title), the pressure appears to be highest among the Lecturers / Assistant Professors (93% (totally) agree), followed by Post-Doctoral Researchers (90%). For the PhD Candidates, Researchers without PhD and (Associate) Professors, the share that (totally) agrees is 86%. In terms of variation across the different institutions, the share that (totally) agrees that pressure may lead to compromises on research integrity and standards varies between 82% and 91%. The average share of those who (totally) agree across the Flemish universities amounts to 86% and to 88% across the French-speaking universities.

There are two items with which most of the respondents (totally) disagree:

- Research that does not embrace diversity in disciplines and perspectives should not be funded ((totally) disagreed with by 73%)
- Research that directly or indirectly addresses human beings but that does not integrate sex and gender analysis, should not be funded (63%)
- Notably, the latter item about the integration of sex and gender analysis, is also the one that received the least (total) agreement and has the highest share of respondents that did not express themselves in favour or against the statement (indicating 'no opinion' or that this point is not relevant for their research).

115 Respondents provided additional comments and/or clarifications for their answers. As was the case in the previous question, many comments related to the extent to which research must be of immediate relevance for society, and half of those commenting addressed the role and importance of 'fundamental research', next to applied research. Several also reflected on the issue of applying principles as 'evaluation criteria'.

• On societal challenges and societal impacts:

“The quest for societal impact can lead to short term research politics and a total lack of creativity.” (female, Post-Doctoral Researcher, Social sciences and humanities)

”Research that anticipates future societal challenges should be given priority for financing.’ is true but useless in a pragmatic sense: how would one be able to properly predict future societal challenges?! Those that are clear, are the challenges of today, not of the future! ‘The degree of benefits for society (economically or socially) must be an evaluation criterion.’ reflects short-term thinking only - in my opinion VERY dangerous and certainly not benefiting society.” (female, Lecturer/ Assistant Professor, Natural sciences)

“I agree with the opinion that research need to anticipate to future societal challenges. But who defines those future societal challenges? Politicians? Experts? As long as the challenges are not defined by a transparent and democratic process I tend to disagree. What is fundamental research? Who defines what research is fundamental and what not? Funding tends to prioritize economic research while more then 10% of the people in Belgium lives in poverty. What is the most fundamental? I cannot answer this question. The same with the question about 'the degree of benefits for society'? What is a benefit for society and what not? I often disagree with what for example in the media is considered as beneficial and what not. Are we thinking in short-term or long-term periods? I cannot answer this question.” (female, PhD Candidate, Natural sciences)

• On fundamental versus applied research:

“Both types of research should benefit from funding (both societally inclined and fundamental research) but research that has more clear or immediate societal benefits is more often funded by other bodies than FWO and FRNS. That is why it's important that these two organisations do support fundamental research (that may in the long run benefit society in ways we cannot see or predict).” (female, PhD Candidate, Social sciences and humanities)

“Fundamental research should be equally valued as directly applied research. It is not because research is considered fundamental that it cannot have an impact on applied research, even be it indirectly. As it also works the other way around. Not every applied research project will be put in place and I believe there could be a stronger connection to valorization. Making sure that applied research is in the end applied. Therefore a link between fundamental and applied research is a good one to be strengthened, together with a link to industry to have an economic output. However, it should be appreciated that these links can take years, but they should be supported nevertheless.” (female, PhD Candidate, Biomedical sciences)

“Although fundamental research is very valuable, the transition from fundamental research to daily clinical practice (medicine, physical therapy) is often lacking. This is being recognized as one of the most important flaws in my field of research. In my opinion, fundamental research is too heavily funded, whereas it is very hard to find funding for clinical research, which benefits the patients more directly. I think that more funding for clinical research should be a priority. Of course, research should try to innovate. However, when writing a research proposal, you often hear that the research should be 'sexy' or 'should look good'. I do not agree with this. Research does not have to be

fancy. It should be based on sound reasoning and good methodology, even when it might look boring at first sight.” (male, PhD Candidate, Biomedical sciences)

“My answers strongly depend on where the funding comes from. Fundamental research is essential but cannot provide yet or specify a contribution to innovative applications or benefits for society. However, as such, fundamental research contributes to innovation and society ...” (female, (Associate) Professor, Natural sciences)

“Applied research is very different from fundamental research and both should not be in competition with each other. Funding for fundamental research is important because it is the basis for future applications, which may take some time if the technologies are not yet present (e.g. discovery of laser well before the tools existed).” (female, Lecturer/ Assistant Professor, Natural sciences)

“One can never foresee all possible challenges or applications, and it is never clear from the start which fields, theories, or applications might benefit from the results of fundamental research in the future. They are all pieces of giant jigsaw puzzle, without every piece (of information), we will never get the full picture.” (female, Post-Doctoral Researcher, Social sciences and humanities)

“I find these questions to be somewhat misleading / implying a false choice between fundamental and applied research. Both should be funded.” (male, Lecturer/ Assistant Professor, Technological and engineering sciences (incl. bio-engineering))

• On applying principles as evaluation criteria:

“I am not sure that it is possible for a single project proposal to meet all the criteria listed here, and there should be some flexibility in the application of selection criteria based on the scope, availability of funding, stage of the researcher, size of the team and objective of the research. Historical and humanities research projects are of value to the advancement of understanding and knowledge, but may not necessarily have direct innovative applications or be directly relevant for major societal challenges. Would this set of criteria make such research less valuable? Would the simple advancement of knowledge for the sake of knowledge be downgraded if it did not have more applicable societal outcomes? I would urge caution in creating too many criteria and rigid checklists for assigning research funding.” (female, Post-Doctoral Researcher, Social sciences and humanities)

“Application potential is a good thing, but it is difficult and often misleading to use current concerns to evaluate future societal needs. The only criterion that should really matter for funding is scientific progress. Scientists should of course respect the law, but all the 'ethical' issues raised above are a matter of law, not criteria for science itself.” (male, (Associate) Professor, Social sciences and humanities)

“About criterions of funding: I can't imagine to give any priority neither to fundamental nor "societal challenging" research. This subdivision is absolutely superficial, what does "fundamental research" really mean and who judges what is "useful" and what is not? "improving society" has so many different meanings, depending on whose interests we are talking about.” (female, PhD Candidate, Social sciences and humanities)

“Setting ethical principles and privacy issues as evaluation criterion would be unfair to

those research applications where these principles are not an issue (or the opposite). Important studies might not even be applied for for fear it will be rejected based on those principles.” (female, Post-Doctoral Researcher, Social sciences and humanities)

3.5. The European Union’s research framework

The researchers were asked how familiar they are with and what their opinion is about some elements of the **EU’s research policy framework**.

A minority (37%) confirmed to be (quite) familiar with **the Horizon 2020 programme and the European societal challenges**, whereas the other 63% indicated either to be ‘rather unfamiliar’ or that they don’t know. Familiarity is highest among those from technological and engineering sciences (43% say to be (quite or very) familiar), followed by the natural sciences (38%), social sciences and humanities (34%) and biomedical sciences (34%). In terms of professional status, familiarity with Horizon 2020 is highest among the (Associate) Professors (54%) and the Lecturers / Assistant Professors (52%), followed by Post-Doctoral Researchers (49%), Researchers without PhD (33%) and the PhD Candidates (19%). Considering respondents’ age, familiarity with Horizon 2020 and the European societal challenges is lowest among the youngest (14% of those aged 22 to 25 say to be (quite or very) familiar) and rises with age (32% for those 26-35; 52% for those 36-45; 51% for those 46-55 and 54% for those 56-65), but is significantly lower again among those older than 65 (33%). Of the men, 39% and of the women 34% say to be (quite or very) familiar with Horizon 2020 and the European societal challenges.

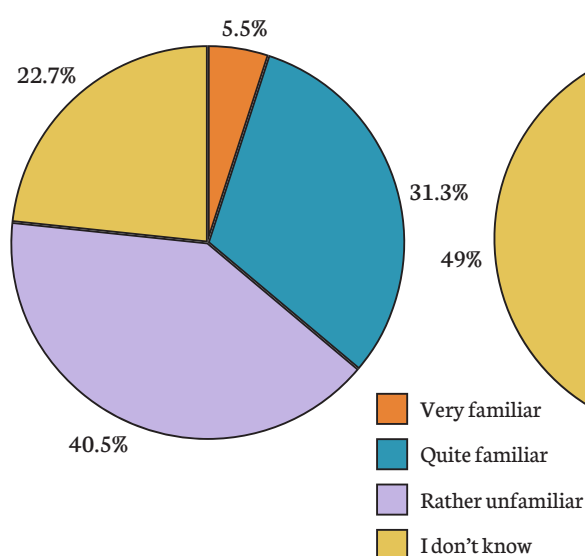
Only 11% of the responding researchers indicated to be (somewhat) familiar with **the European Commission’s concept of Responsible Research and Innovation (RRI)**.⁴ Considering the disciplinary areas, the share of those who say to be (very or rather) familiar with RRI is highest in the biomedical sciences and social sciences and humanities (13%). It is 10% among those from technological and engineering sciences and 7% among the researchers from the natural sciences. Similar to what is the case for Horizon 2020, in terms of professional status, familiarity with RRI is highest among the (Associate) Professors (18%) and the Lecturers / Assistant Professors (15%), followed by Post-Doctoral Researchers (14%), Researchers without PhD (8%) and the PhD Candidates (5%). In terms of age, familiarity with the concept of RRI is highest among those aged above 65 (25% say to be (very or rather) familiar) and lowest among the youngest (of those aged 22-25 and 26-35, 5% and 7% respectively say to be familiar with the concept). Among those aged 36-45, 46-55 and 56-65, the shares of those who are (very or quite) familiar with RRI are 18%, 18% and 17% respectively. There are not gender differences as regards familiarity with RRI.

How familiar are you with the H2020 programme and the European societal challenges? (Q15)		
Answer Options	Response Percent	Response Count
Very familiar	5.5%	78
Quite familiar	31.3%	442
Rather unfamiliar	40.5%	572
I don’t know	22.7%	321
answered question		1413
skipped question		307

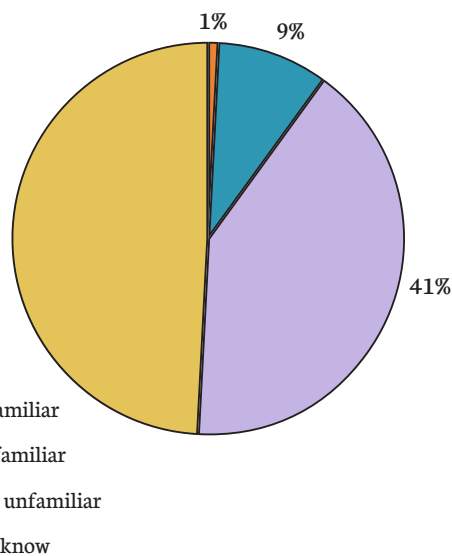
⁴ A weblink was provided in the survey to the European Commission’s H2020 funded project RRI Tools, which provides information on the concept (<http://www.rri-tools.eu/>)

How familiar are you with the European Commission’s concept of Responsible Research and Innovation (RRI)? (Q16)		
Answer Options	Response Percent	Response Count
Very familiar	1.3%	19
Quite familiar	9.5%	134
Rather unfamiliar	40.7%	575
I don’t know this concept of RRI	48.5%	685
answered question		1413
skipped question		307

How familiar are you with the H2020 programme and the European societal challenges? (Q15)



How familiar are you with the European Commission’s concept of Responsible Research and Innovation (RRI)? (Q16)



Base: 1413

Some further questions were subsequently asked about RRI, except to those respondents who responded they do not know the concept.

Despite the relatively low level of familiarity with the concept of RRI, the majority (58%) does find the concept (quite or very) **relevant for their research**. There are significant differences though, according to the main area of science or discipline the researchers work in. Up to 66% of those working in technology and engineering think RRI is (very) relevant for their research, 62% of those in biomedical sciences, 56% of researchers in social sciences and humanities, and 47% of those in natural sciences.

Do you think Responsible Research and Innovation (RRI) is relevant for your research? (Q17)		
Answer Options	Response Percent	Response Count
Very relevant	9.2%	67
Quite relevant	48.7%	354
Rather irrelevant	28.5%	207
Totally irrelevant	4.8%	35
Undecided (please clarify)	8.8%	64
answered question		727
skipped question		993

Of the 64 respondents who answered they are undecided whether RRI is relevant for their research, the majority explained their answer by their lack of familiarity with the concept. Some provided critical reflections, for example referring to the ‘societal values’ underlying the concept.

“I have doubts about the alignment with "the values of society". What are these values? There are already strong incentives for researchers follow intellectual fashions. And this is detrimental to scientific creativity.” (male, Lecturer/ Assistant Professor, Technological and engineering sciences (incl. bio-engineering))

“From a brief overview of RRI, it appears to be more concerned with procedures (again?!), than with the values (simple values such as freedom of speech and thought, critical thinking, working for the common good, ...) these procedures are meant to promote, therefore they make little sense to me, for the time being.” (male, Post-Doctoral Researcher, Social sciences and humanities)

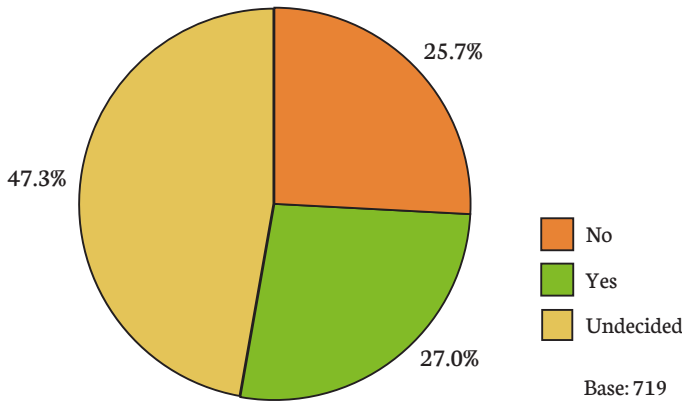
“I understand the relevance, but that does not mean I agree with the concept. It assumes that the European political landscape is a platform that has the moral right to call itself 'correct', and allows itself to judge others while ignoring values that are common to other regions and cultures of the world.” (male, (Associate) Professor, Biomedical sciences)

“RRI has always been part of Research - but the answers are different in different societies. It is good to talk about RRI. But I doubt you can structure the effort to arrive at a useful guideline.” (male, (Associate) Professor, Natural sciences)

“I think it is a good idea, but in EU funded projects the "how" you do research is becoming more important than the "what" you research.” (male, Post-Doctoral Researcher, Natural sciences)

On the question **whether the Responsible Research and Innovation (RRI) principles should be an evaluation criterion**, nearly half of the sample remains undecided (47%). The other part is divided between those in favour (27%) and against (26%) this idea.

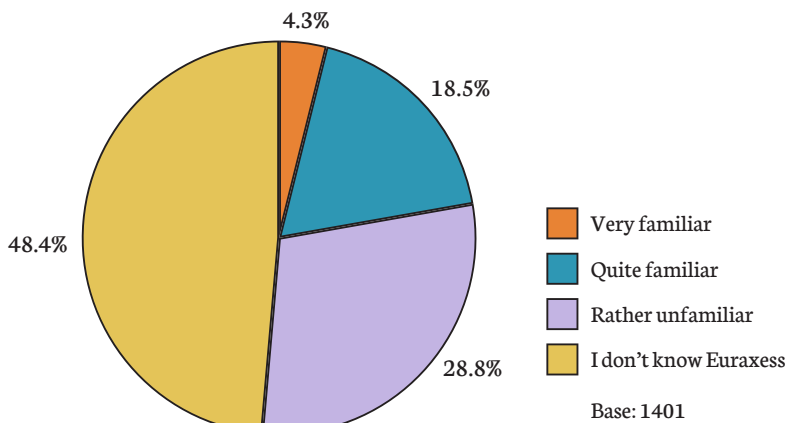
Do you think the Responsible Research and Innovation (RRI) principles should be an evaluation criterion in the assessment of your research proposals? (Q18)



While 23% indicated to be (quite or very) **familiar with Euraxess**, nearly half of the respondents indicated not to know Euraxess (48%). Among the researchers working in the area of natural sciences, the share of those familiar with Euraxess is significantly higher than in the other disciplines.

How familiar are you with Euraxess? (http://ec.europa.eu/euraxess/) (Q19)		
Answer Options	Response Percent	Response Count
Very familiar	4.3%	60
Quite familiar	18.5%	259
Rather unfamiliar	28.8%	404
I don't know Euraxess	48.4%	678
<i>answered question</i>		1401
<i>skipped question</i>		319

How familiar are you with Euraxess? (Q19) (<http://ec.europa.eu/euraxess/>)



3.6. Choice of research subject

The table below presents the **elements that are currently influencing researchers' choice of research subject**. The items are ranked according to their importance, based on the number of researchers that picked the item. The responding researchers could select up to three items from a given list of nine, indicating which item is strongest, second strongest and third strongest. Nearly all respondents indeed ticked three items (the average number ticked is 2.8).

'I decide on my own research' is the number one answer to the question of who or what determines the choice of their research for 51.3% of the respondents. This was followed at some distance by 'the university, my faculty, department or supervisor' (27.9%), 'societal challenges' (7.6%) and 'public funders of research in Belgium' (6.2%).

For the combination of the three possible answers, the two strongest elements influencing researchers' choices of research topic remain to their own preference and the institution (or its department, unit) where they work, followed by the societal challenges (however ticked by a significantly lower number of respondents). Noticeable is that the EU as funder of research comes low in the list.

Who or what is currently influencing the choice of your research subject? In the table below, you can tick up to three items. (Q20)								
Answer Options	Strongest factor		2 nd strongest factor		3 rd strongest factor		Weighted Average Score ⁵	Response Count
I decide on my own research	716	51.29%	298	22.41%	138	11.51%	68.8%	1152
The university / my faculty / department / unit / research supervisor	389	27.87%	335	25.19%	199	16.60%	48.6%	923
Societal challenges	106	7.59%	219	16.47%	215	17.93%	23.2%	540
The public funders of research in Belgium	86	6.16%	213	16.02%	207	17.26%	21.3%	506
Topic trends in journals	13	0.93%	92	6.92%	185	15.43%	9.7%	290
Industrial challenges	39	2.79%	83	6.24%	103	8.59%	9.2%	225
The EU as funder of research	24	1.72%	54	4.06%	73	6.09%	6.0%	151
Commissioners of research (companies or governments)	16	1.15%	22	1.65%	36	3.01%	3.1%	74
The ethical committee reviewing research	6	0.43%	14	1.05%	43	3.59%	2.1%	63
<i>answered question</i>								1396
<i>skipped question</i>								324

Subsequently, the researchers were asked **who or what, in an ideal world, should influence the choice of their research subject**. Again, they could select up to three items (from the same list as above). While the top three items remain the same, 'societal challenges' and 'the university / faculty / department' switch places. Also noticeable is that the weight given to the researchers' own preference rises significantly, while the importance of the (public) funders of research drops markedly.

⁵ The weighted average score was calculated as a percentage score obtained for each item, based on the hypothetical maximum of 4188 'points' that each item could receive if all respondents chose the same item as the strongest factor and assigning 3 points to the strongest factor, 2 points to the second strongest factor and 1 point to the third strongest factor.

In an ideal world, who or what should influence the choice of your research subject? In the table below, you can tick up to three items. (Q21)					
Answer Options	Strongest factor	2 nd strongest factor	3 rd strongest factor	Weighted Average Score ⁶	Response Count
I decide on my own research	923	235	120	80.3%	1278
Societal challenges	267	369	201	41.6%	837
The university / my faculty / department / unit / research supervisor	129	365	262	33.0%	756
Industrial challenges	35	116	153	11.7%	304
The public funders of research in Belgium	11	74	123	7.3%	208
Topic trends in journals	8	56	102	5.7%	166
The EU as funder of research	10	30	62	3.6%	102
The ethical committee reviewing research	4	21	72	3.0%	97
Commissioners of research (companies or governments)	5	16	36	2.0%	57
answered question					1394
skipped question					326

3.7. Effects of the research environment on the quality of research

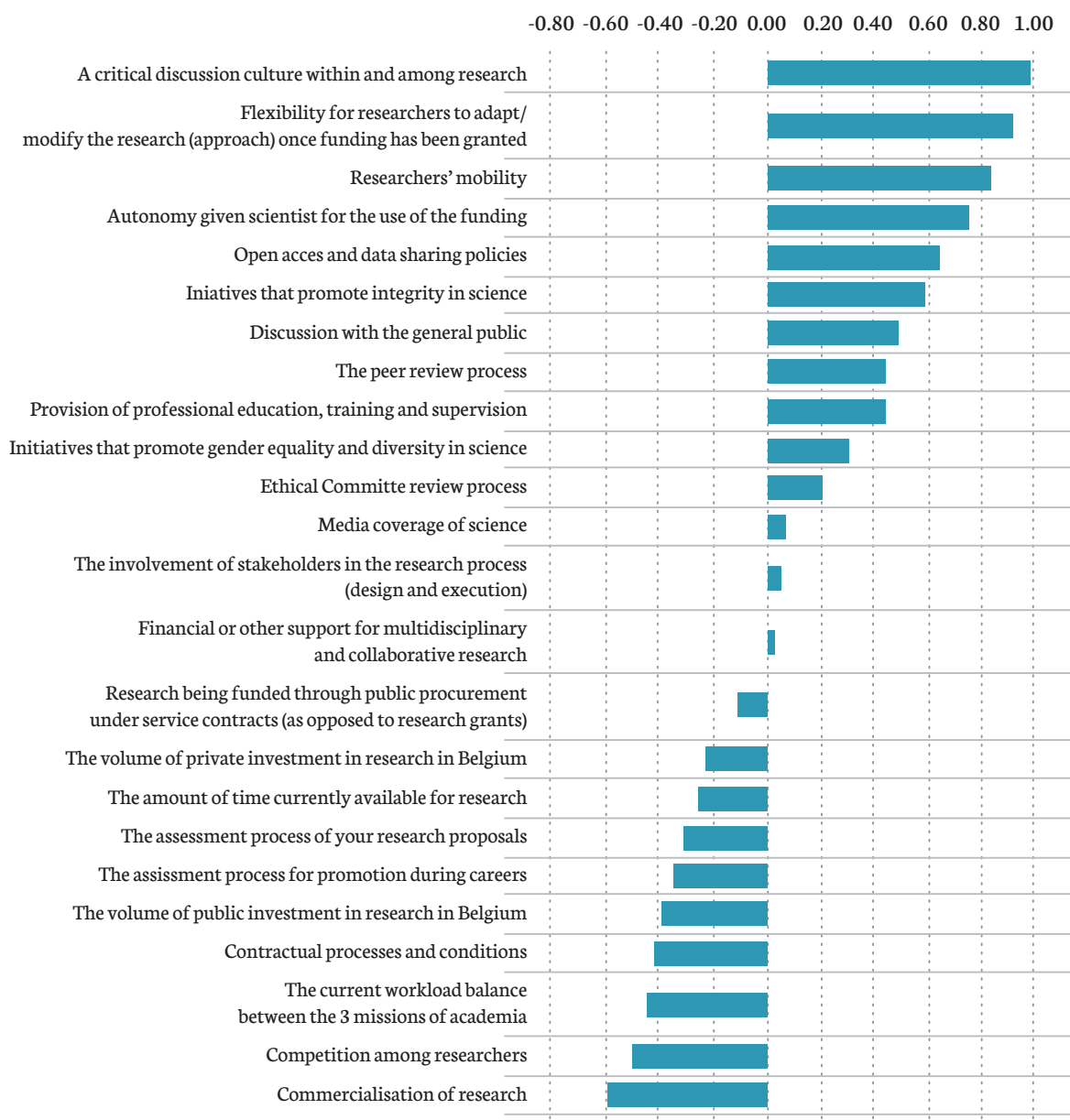
Overall results

Researchers were asked how they perceive **the effects certain features of the research environment are currently having on the quality of their research**. Respondents could express their opinion on a scale from very positive to very negative effect overall, with ‘no effect’ in the middle. They also had the possibility to indicate they did not know. The chart and table below show the results to this question for each of the 24 items that were checked, whereby the ‘average rating’ was calculated excluding the number of respondents who did not express themselves (i.e. the number who answered ‘I don’t know’).

Whereas 14 items are on average considered as having a (slight) positive effect on the quality of their research, ten items obtain a negative rating. Among the former, researchers clearly appreciate the critical discussion culture within and among teams, the flexibility they have to adapt/modify the research (approach) once funding has been granted, mobility and their autonomy as regards the use of funding. Among the latter, notably the availability of ‘time’ and ‘money’ are considered as problematic. Assessment processes, contractual conditions and the workload balance between the 3 missions of academia are other problematic features, negatively affecting the quality of research.

⁶ The weighted average score was calculated as for the previous question, but based on the hypothetical maximum of 4182 ‘point’s that each item could receive (1394 multiplied by 3).

**Effect of features of the research environment on research quality -
Average rating from 2 (very positive) to -2 (very negative) (Base:1327)**



The table on the next page presents the detailed results, also showing the share of the respondents who indicated not to know which effect a certain feature has on the quality of their research. For six items (all but one obtaining on average a negative assessment), this share even amounts to one quarter of the sample or more. Up to four out of ten said not to know the effects of ‘research being funded through public procurement under service contracts (as opposed to research grants)’, most likely because they do not perform commissioned research.

Please indicate what's your perception of the effect the following features of the research environment (as you know it today) are currently having on the quality of your research. For example, if you think that in general, there is currently not sufficient time to perform high quality research, you may answer 'negative effect overall' or even 'very negative effect overall'. (Q22)							
Answer Options	Very negative effect overall	Negative effect overall	No effect overall / not relevant	Positive effect overall	Very positive effect overall	I don't know	Rating Average
Rating	-2	-1	0	1	2		
A critical discussion culture within and among research teams	1.88% 25	6.18% 82	9.50% 126	47.40% 629	26.22% 348	8.82% 117	0.99
Flexibility for researchers to adapt/ modify the research (approach) once funding has been granted	1.81% 24	10.55% 140	8.29% 110	44.31% 588	28.03% 372	7.01% 93	0.93
Researchers' mobility	2.26% 30	8.59% 114	14.32% 190	45.37% 602	22.98% 305	6.48% 86	0.84
Autonomy given to scientists for the use of the funding	3.32% 44	13.11% 174	10.25% 136	43.63% 579	23.36% 310	6.33% 84	0.75
Open Access and data sharing policies	2.34% 31	9.80% 130	22.68% 301	38.66% 513	17.78% 236	8.74% 116	0.65
Initiatives that promote integrity in science	1.21% 16	5.43% 72	26.75% 355	36.62% 486	9.12% 121	20.87% 277	0.59
Discussion with the general public	2.34% 31	7.84% 104	29.62% 393	39.79% 528	7.76% 103	12.66% 168	0.49
The peer review process	3.84% 51	17.86% 237	16.28% 216	43.93% 583	11.91% 158	6.18% 82	0.45
Provision of professional education, training and supervision	3.32% 44	12.89% 171	20.57% 273	40.47% 537	8.29% 110	14.47% 192	0.44
Initiatives that promote gender equality and diversity in science	4.14% 55	9.50% 126	34.06% 452	24.04% 319	9.27% 123	18.99% 252	0.31
Ethical Committee review process	2.26% 30	7.54% 100	33.99% 451	20.50% 272	2.64% 35	33.08% 439	0.20
Media coverage of science	4.90% 65	18.69% 248	31.27% 415	27.05% 359	3.69% 49	14.39% 191	0.07
The involvement of stakeholders in the research process (design and execution)	5.20% 69	15.67% 208	31.65% 420	23.89% 317	3.01% 40	20.57% 273	0.05
Financial or other support for multi-disciplinary and collaborative research	10.78% 143	23.96% 318	14.54% 193	32.10% 426	7.69% 102	10.93% 145	0.02
Research being funded through public procurement under service contracts (as opposed to research grants)	5.73% 76	14.85% 197	22.00% 292	13.72% 182	2.56% 34	41.15% 546	-0.13
The volume of private investment in research in Belgium	6.86% 91	18.69% 248	19.59% 260	13.34% 177	2.26% 30	39.26% 521	-0.24
The amount of time currently available for research	15.15% 201	38.88% 516	7.54% 100	27.51% 365	7.91% 105	3.01% 40	-0.27
The assessment process of your research proposals	11.23% 149	34.59% 459	16.80% 223	23.51% 312	2.71% 36	11.15% 148	-0.32
The assessment process for promotion during careers	11.23% 149	25.02% 332	21.25% 282	15.45% 205	2.34% 31	24.72% 328	-0.36
The volume of public investment in research in Belgium	18.16% 241	26.98% 358	12.28% 163	16.88% 224	6.78% 90	18.91% 251	-0.41
Contractual processes and conditions	8.97% 119	25.24% 335	25.24% 335	9.27% 123	1.81% 24	29.46% 391	-0.43
The current workload balance between the 3 missions of academia	13.19% 175	26.53% 352	18.31% 243	15.07% 200	2.03% 27	24.87% 330	-0.45
Competition among researchers	19.82% 263	34.51% 458	16.13% 214	20.05% 266	3.39% 45	6.10% 81	-0.50
Commercialisation of research	19.07% 253	25.17% 334	22.23% 295	12.66% 168	1.21% 16	19.67% 261	-0.60
answered question							1327
skipped question							393

Gender

When disaggregating the answers given to Question 22 (about the effect of features of the research environment on the quality of research) by gender of the respondents, statistically significant differences appear for nearly all items. The tables in annex 1 show the results per feature of the research environment, whereby those cells that mark significant differences between the genders are shaded.

The main differences can be summarised as follows:

- Across the board, women (more than men) tend to tick the answer option ‘I don’t know’, whereas men are more inclined to tick ‘no effect overall / not relevant’.
- Women perceive a greater problem in the amount of time they have available for research than men.
- Women, more than men, find the support for multi-disciplinary and collaborate research problematic.
- Men see greater advantages in autonomy than women.
- Women – to the extent that they express themselves, because more women than men say they don’t know – are more in favour of stakeholder involvement than men.
- Women – again, to the extent that they express themselves – are more negative than men about the volume of public investment in research.
- Women are more negative than men about the ‘assessment process for promotion during careers’.
- About ‘provision of professional education, training and supervision’, there are mixed opinions: men are more neutral than women, and women are markedly more positive, but also more negative than men.
- About the ethical review process, there are about equal shares of men and women that refrain from taking a position (about one third); those who answer are predominantly positive, but men are somewhat less positive than women.
- As regards initiatives that promote integrity in science, women are more positive than men, who tend to take a more neutral position.
- Women are much more positive than men about initiatives that promote gender equality and diversity, while men tend to take a neutral to negative stance towards such initiatives.
- Workload balance between the 3 missions of academia: more women than men reply they don’t know whether this has a positive or negative effect on the quality of research, but otherwise there are no significant differences between men and women.
- Significantly more women than men perceive a very negative effect in the ‘contractual processes and conditions’.
- Women are less positive than men about the ‘critical discussion culture within and among research teams’.
- Women are markedly more negative where it concerns ‘the competition among researchers’.
- More women than men respond they don’t know when it comes to ‘the commercialisation of research’, but those that express themselves are more negative / less positive than men.

Flemish and French-speaking communities

Few differences appear throughout the whole survey between researchers at Dutch-speaking and French-speaking universities. Still, at the Flemish side, the workload balance between the three academic missions, the assessment procedures for proposals and for career promotion, as well as the time available to perform research, is perceived as more problematic.

Researchers at French-speaking universities highlight more that competition between researchers and the commercialisation of research are negative factors.

It must be noted though that this distinction may be influenced by the big difference between north and south as regards who is paying the respondents. The response of those funded by the ‘Fonds de la Recherche Scientifique’ (FNRS) was much higher than those funded by the ‘Fonds voor Wetenschappelijk Onderzoek’ (FWO)⁷: 35% of the respondents at French-speaking universities were paid by the FNRS, against 9% by FWO at the Flemish side.

Full tables with the answers for each feature of the research environment, for both groups of universities, are included in annex 2.

Answer Options	Rating Average Flemish universities	Rating Average French-speaking universities
Financial or other support for multidisciplinary and collaborative research	-0.11	0.14
Research being funded through public procurement under service contracts (as opposed to research grants)	-0.15	-0.11
The volume of private investment in research in Belgium	-0.23	-0.25
The amount of time currently available for research	-0.44	-0,11
The assessment process of your research proposals	-0.52	-0.13
The assessment process for promotion during careers	-0.49	-0.25
The volume of public investment in research in Belgium	-0.36	-0.44
Contractual processes and conditions	-0.46	-0.40
The current workload balance between the 3 missions of academia	-0.65	-0.25
Competition among researchers	-0.42	-0.58
Commercialisation of research	-0.52	-0.68

Researchers’ position

For three items, the responses have been disaggregated by position of the researchers, as reflected in the following tables. These items deal with the volume of public investment in research and the assessment of research/-ers. Considering researchers’ positions, mostly the (Associate) Professors are negative about the volume of public investment in Belgium: 64% of them state it has a (very) negative effect on the quality of research (against 45% of the total sample).

⁷ This is due to different ways of dissemination between Dutch-speaking and French-speaking universities

Q22: The volume of public investment in research in Belgium	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know	Total
PhD Candidate	7.71% 45	17.29% 101	13.87% 81	24.49% 143	10.79% 63	25.86% 151	44.01% 584
Post-Doctoral Researcher	5.86% 15	21.88% 56	13.28% 34	25.39% 65	14.45% 37	19.14% 49	19.29% 256
Researcher without PHD	10.00% 3	26.67% 8	10.00% 3	23.33% 7	10.00% 3	20.00% 6	2.26% 30
Lecturer/ Assistant Professor	4.92% 6	15.57% 19	15.57% 19	27.87% 34	26.23% 32	9.84% 12	9.19% 122
(Associate) Professor	6.27% 21	11.94% 40	7.76% 26	32.54% 109	31.64% 106	9.85% 33	25.24% 335

When it comes to the assessment process of their research proposals, it is the group of the Lecturers / Assistant Professors who express the most negative point of view: 66% of them say it has a (very) negative effect on research quality. Of the (Associate) Professors, 59% think this way, as well as 49% of the Post-Doctoral Researchers (against 46% of the total sample).

Q22: The assessment process of your research proposals	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know	Total
PhD Candidate	3.08% 18	26.54% 155	20.21% 118	28.08% 164	4.79% 28	17.29% 101	44.01% 584
Post-Doctoral Researcher	3.13% 8	26.56% 68	14.45% 37	32.42% 83	16.41% 42	7.03% 18	19.29% 256
Researcher without PHD	0.00% 0	20.00% 6	13.33% 4	36.67% 11	6.67% 2	23.33% 7	2.26% 30
Lecturer/ Assistant Professor	4.10% 5	15.57% 19	10.66% 13	48.36% 59	18.03% 22	3.28% 4	9.19% 122
(Associate) Professor	1.49% 5	19.10% 64	15.22% 51	42.39% 142	16.42% 55	5.37% 18	25.24% 335

Whereas 36% of the total sample consider that the assessment process for promotion during careers has a (very) negative effect on the quality of research, this share amounts to 55% of the Lecturers / Assistant Professors. It is 45% among Post-Doctoral Researchers and 37% among (Associate) Professors.

Q22: The assessment process for promotion during careers	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know	Total
PhD Candidate	2.40% 14	11.82% 69	18.32% 107	19.86% 116	9.08% 53	38.53% 225	44.01% 584
Post-Doctoral Researcher	2.34% 6	13.28% 34	20.70% 53	32.03% 82	13.28% 34	18.36% 47	19.29% 256
Researcher without PHD	0.00% 0	16.67% 5	16.67% 5	6.67% 2	13.33% 4	46.67% 14	2.26% 30
Lecturer/ Assistant Professor	1.64% 2	13.11% 16	23.77% 29	39.34% 48	15.57% 19	6.56% 8	9.19% 122
(Associate) Professor	2.69% 9	24.18% 81	26.27% 88	25.07% 84	11.64% 39	10.15% 34	25.24% 335

Comments provided with responses

86 Respondents added comments to responses they provided. Of these, 22% (19 comments) deal with the funding of research; 17% (15 respondents) express criticism on the question or uncertainty about their own answers as they find the question ambiguous or unclear; 7% (6 comments) refer to Open Access. Were also addressed: diversity and gender equality (7%) and the research environment (5%, or 4 comments).

- On the funding of research, comments refer to the high competition for limited funding, with low chances of success and within a system that is skewed. These points are illustrated by the quotes below.

“Universities (and to a lesser degree funding agencies, especially Belgian) do their utmost best to make sure no useful research can be conducted through procedures, administration, application processes, ... Overheads are created but in general not funded. The complete distrust of how funding is being used (e.g. through time sheeting, paperwork necessary needed for the smallest expenses, ...) and the general underfunding of research (e.g. FWO or H2020 fund only the direct research, not the overheads).” (male, (Associate) Professor, Technological and engineering sciences (incl. bio-engineering))

“I see the biggest challenges to research quality (especially as an early career researcher) being the competition for limited funding resources, and the corresponding lack of time that is spent on in-depth and meaningful research. Researchers, especially in the early stages of their career, spend a lot of time preparing project proposals, because they need to bring in funding to keep their jobs. If they are successful, the project(s) awarded usually run on a too-short timeframe, a too-small budget and with too many deliverables expected. Balancing this work with the work of teaching, administration, supervision, academic services etc., means that researchers are often working incredible amounts of overtime to complete a project and do not necessarily have the time once the project has been completed to valorise the results for more academic output (journal articles, e.g.). Without the journal articles, the researcher is then 'punished' in the next round of project proposals for not having enough high impact journal articles, but in this system of constantly chasing funding, it is particularly challenging to meet the high expectations placed on researchers.” (female, Post-Doctoral Researcher, Social sciences and humanities)

“There is a structural problem at universities where universities only invest in two extremes: PhD students (they are cheap) and tenure (track) professors (they can bring in money). These have to conduct high quality research, teaching and services to society, while managing their own group. It is impossible to obtain high and competitive standards in all of these areas. Having long term postdoc support staff within such a team would be a good solution as they can help develop and maintain these standards, either by collaborating on research or helping out in other areas to for example reduce the teaching load. However, currently this is impossible as they can only get temporary grants. This creates a workload that is too large for professors, who have to start over and over again with inexperienced PhD students as their experienced staff members cannot stay. It is also outrageous that postdocs cannot apply for funding for projects in Belgium.” (female, Post-Doctoral Researcher, Social sciences and humanities)

“We are facing the ultra-liberalism or ultra-capitalism in sciences, and this leads to more and more wrong behaviours that are beneficial to the wrongdoer until detected. It is like in

sport, the ones who do not take drugs to improve their efficacy tend to disappear from the contest... Sad reality of business science as it is promoted by the ultra-competition for scarce funding.” (male, (Associate) Professor, Biomedical sciences)

“The problem is not the funding but the way it is spent. There are too many mediocre researchers, and too many researchers who do not care about efficiency.” (male, Lecturer/ Assistant Professor, Technological and engineering sciences (incl. bio-engineering))

“My research by definition crosses different disciplines (medicine, statistics, epidemiology, economics, applied mathematics and simulation, etc.) Neither the existing academic culture and organization of universities and funding organizations (per discipline!) are adequate in this respect in Belgium compared to other countries where I worked in the past.” (male, Post-Doctoral Researcher, Biomedical sciences)

- On Open Access, there seems to be agreement that such policies are beneficial, but the high cost is an important obstacle.

“Open access would be of great value, but the publication fees are a large hurdle to the positive effect it can have.” (male, PhD Candidate, Technological and engineering sciences (incl. bio-engineering))

- On diversity and gender equality, the comments reflect mixed opinions.

“Initiatives that promote gender equality and diversity in science: in Wallonia, there are very few initiatives in fact ... even if it is changing for the moment, the women are still under-represented in academic positions and this is still an important issue for women who do want to have an academic career. Further steps should be taken in that direction by stakeholders.” (female, (Associate) Professor, Social sciences and humanities)

“Not relevant in my field. Money should be spent elsewhere. Not only because I think we are actually pretty much at equality in term of raw numbers (at least in the different laboratories and congress I have been), but also because we should fund the best and most appropriate candidate and not "the one whose sex/ gender will fill a gap". That is only detrimental for the quality of research. If the most fit for the team is a black transgender girl, then so be it, it's totally fine. If it's a white heterosexual male, then it's also perfectly fine. We already lack funding in research, so if there's a budget available, please let it be invested in research instead of promoting gender equality campaign". (male, PhD Candidate, Natural sciences)

“There seems to be zero effort at my university to promote diversity. Research group heads are still all white, middle aged, male Belgians. (...) It's not a very international environment. Unless you count France as international. There's not even anyone from the Flemish region.” (female, Post-Doctoral Researcher, Biomedical sciences)

- Some negative views were expressed about the overall research environment:

“Competition in academia, in order to enhance quality, is nonsense. It only leads to environments that are highly unfriendly towards women, ethnic-minorities and so on, and hence, a race-to-the-bottom since high-quality research preresquires as much different personal and disciplinary perspectives as possible. Literature in sociology of knowledge confirms these ideas.” (female, PhD Candidate, Social sciences and humanities)

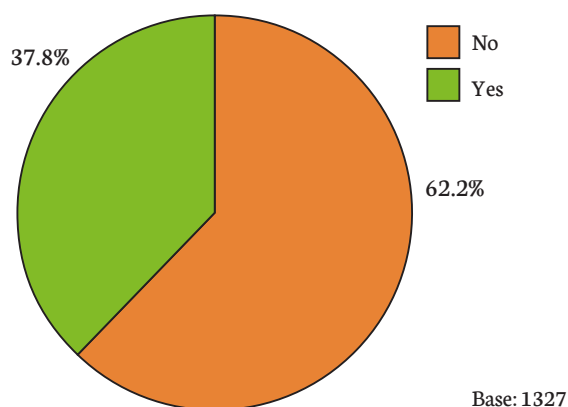
“Putting pressure on people is a good way to make them perform, temporarily, but also to take the heart and soul out of them. Several of my colleagues are suffering from the negative working environment and a contra-productive pressure. We are at our best when we are enjoying our work; we love our work, but feel like we are left in the desert without water, then are expected to blossom. Many of us are close to a nervous breakdown because ‘personalized goals’ are imposed on us, without even being consulted. Integrity is important. People need room to breathe.” (female, (Associate) Professor, Social sciences and humanities)

3.8. Awareness of research integrity policy or research integrity commission

Upon the question whether they are aware of a research integrity policy or a research integrity commission at their institution, the majority (62%) answers negatively; nearly four out of ten confirm to be aware of such policy or commission.

Are you aware of a Research Integrity Policy or a Research Integrity Commission at your institution? (Q23)		
Answer Options	Response Percent	Response Count
NO	62.2%	826
YES	37.8%	501
answered question		1327
skipped question		393

Are you aware of a Research Integrity Policy or a Research Integrity Commission at your institution? (Q23)



In terms of disciplines, awareness of a research integrity policy or a research integrity commission at their institution is highest in the biomedical sciences, and lowest among the respondents from the natural sciences.

Are you aware of a Research Integrity Policy or a Research Integrity Commission at your institution? (Q23)			
What is the main area of science or discipline that you work in? (single answer)	NO	YES	Response Count
Biomedical sciences	57.8% 167	42.2% 122	21.8% 289
Social sciences and humanities	60.8% 292	39.2% 188	36.2% 480
Natural sciences	66.5% 169	33.5% 85	19.1% 254
Technological and engineering sciences (incl. bio-engineering)	65.1% 198	34.9% 106	22.9% 304
answered question		1327	
skipped question		357	

Significant differences arise when looking at the individual institutions. At only three institutions, a majority is aware of a research integrity policy or commission. Awareness levels vary between 20% of the respondents confirming they are aware of such policy or commission and 65%. Across the universities, on average, 48% are aware of such policy or commission at Flemish universities and 27% at the French-speaking universities.

In terms of respondents' positions (or 'job titles') within their institution (Q5), the share of those who are aware of a research integrity policy or commission is the highest among the (Associate) Professors (49%) and lowest among the Post-Doctoral Researchers and the Researchers without a PhD (both 30%).

Not considering the oldest group of those over 65, awareness about a research integrity policy or commission among the researchers rises with their age.

Are you aware of a Research Integrity Policy or a Research Integrity Commission at your institution? (Q23)			
How old are you?	NO	YES	Response Count
22-25	64.79% 138	35.21% 75	16.05% 213
26-35	67.58% 394	32.42% 189	43.93% 583
36-45	58.48% 169	41.52% 120	21.78% 289
46-55	55.26% 84	44.74% 68	11.45% 152
56-65	40.51% 32	59.49% 47	5.95% 79
Over 65	81.82% 9	18.18% 2	0.83% 11
Total Respondents	826	501	1.327

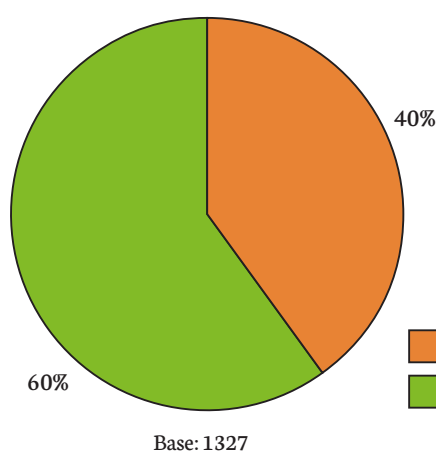
3.9. Open Access and open data

The majority of the responding researchers (60%) publishes in **peer reviewed Open Access journals**, but does not generally pay for such publications. Less than one third of the whole sample (29%) ever paid, as an author, to publish in Open Access. From those who confirmed they publish in Open Access journals, 54% say they never paid for such publications, while 46% state they did.

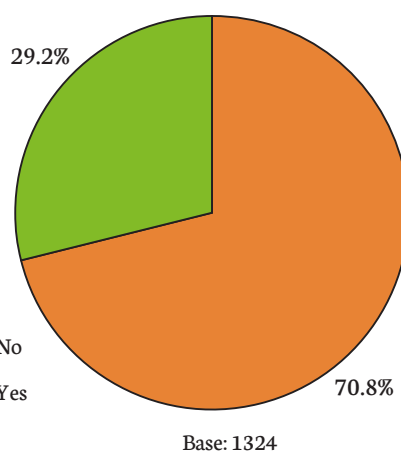
Do you publish in peer reviewed Open Access journals? (Q24)		
Answer Options	Response Percent	Response Count
NO	39.8%	528
YES	60.2%	799
answered question		1327
skipped question		393

Did you ever pay, as an author, to publish in Open Access? (Q25)		
Answer Options	Response Percent	Response Count
NO	70.8%	938
YES	29.2%	386
answered question		1324
skipped question		396

Do you publish in peer reviewed Open Access journals? (Q24)



Did you ever pay, as an author, to publish in Open Access? (Q25)



Looking at the respondents' positions (or 'job titles') within their institution (Q5), the share of those who publish in in peer reviewed Open Access journals is highest among the (Associate) Professors (72%), closely followed by the Post-Doctoral Researchers (70%) and Lecturers/Assistant Professors (69%). It is lowest among the Post-Doctoral Researchers and the Researchers without a PhD (both 30%).

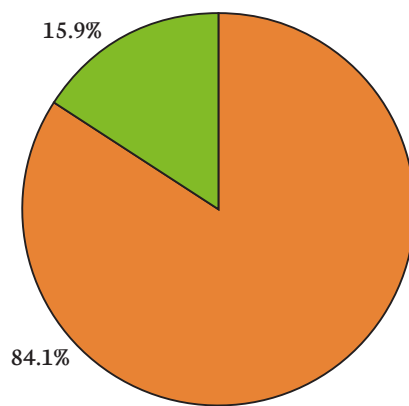
In terms of disciplines, the share of those who publish in peer reviewed Open Access journals is highest among those working in the biomedical sciences (74%) and lowest among the respondents working in social sciences and humanities (54%). Half of those working in the biomedical sciences, also confirm they have ever paid, as an author, to publish in Open Access.

Do you publish in peer reviewed Open Access journals? (Q24)			
What is the main area of science or discipline that you work in? (single answer)	NO	YES	Response Count
Biomedical sciences	50.4% 145	49.7% 143	21.8% 288
Social sciences and humanities	84.3% 404	15.7% 75	36.2% 479
Natural sciences	63.2% 160	36.8% 93	19.1% 253
Technological and engineering sciences (incl. bio-engineering)	75.3% 229	24.7% 75	23.0% 304
answered question			1324
skipped question			360

The new emphasis on Open Access does not generally cause researchers to make **concessions regarding the standing of the journals** they publish in. A large majority of 84% denies that they have ever published their work in an Open Access journal with lower impact factor, compared to journals that they usually submit their work to (Q26). Still, 16% confirm they have, which is not a negligible share. Notably, in the social sciences and humanities, the discipline with the smallest share of researchers saying they ever published in Open Access, the proportion saying they ever paid for such Open Access publication is the highest (19%).

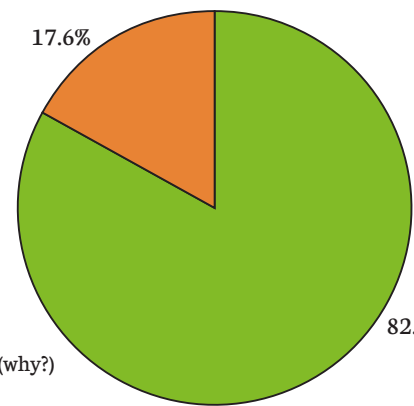
Four out of five researchers confirm they apply the **green Open Access policy (or self-archiving) by putting their publications in an institutional repository**. Those who do not (18% of the sample, or 233 respondents) were asked for the reason why. The main explanations given were either that the researcher had not yet published (26% of those who do not apply green Open Access), that the respondent does not know what 'green Open Access' is and/or is not aware of such institutional repository at his/her university (25%). Several also point out that putting publications in an institutional repository might violate the copyright rules of the journals in which they published their work. A few respondents answered that an institutional repository is not available at their institution or that it is too complicated to use.

Because of the new emphasis on Open Access, have you ever published your work in an Open Access journal with lower impact factor, compared to journals that you usually submit your work to? (Q26)



Base: 1324

Do you apply the green Open Access policy (or self-archiving) by putting your publications in an institutional repository? (Q27)



Base: 1323

No (why?)
Yes

Because of the new emphasis on Open Access, have you ever published your work in an Open Access journal with lower impact factor, compared to journals that you usually submit your work to? (Q26)		
Answer Options	Response Percent	Response Count
NO	84.1%	1113
YES	15.9%	211
<i>answered question</i>		1324
<i>skipped question</i>		396

Do you apply the green Open Access policy (or self-archiving) by putting your publications in an institutional repository? (Q27)		
Answer Options	Response Percent	Response Count
YES	82.4%	1090
NO (why?)	17.6%	233
<i>answered question</i>		1323
<i>skipped question</i>		397

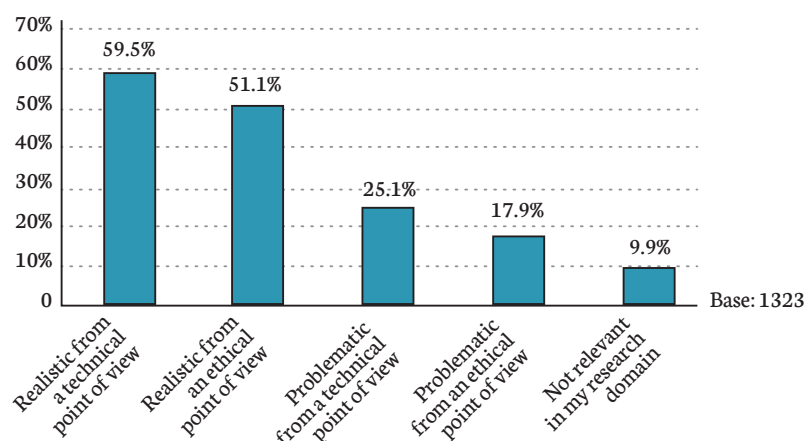
About **Open Data**, most researchers (60%) consider it is realistic from a technical point of view to make data fully open at a reasonable cost, while one quarter firmly states that it is problematic. Only about half (51%) believe it is realistic and 18% find it problematic from an ethical point of view. Ten percent believe the issue of open data is not relevant for their research domain.

In view of the new emphasis on Open Data, how realistic or problematic is it, in your field of research, to make data fully open at a reasonable cost? (maximum 2 answers possible) (Q28)		
Answer Options	Response Percent	Response Count
Realistic from a technical point of view	59.5%	783
Realistic from an ethical point of view	51.1%	673
Problematic from a technical point of view	25.1%	330
Problematic from an ethical point of view	17.9%	236
Not relevant in my research domain	9.9%	131
<i>answered question</i>		1317
<i>skipped question</i>		403

The table below presents the results for this question per scientific discipline. In the field of social sciences and humanities, the shares of those that find Open Data not relevant for their research domain and of those who find Open Data problematic from an ethical point of view are the highest (14% and 27% respectively).

In view of the new emphasis on Open Data, how realistic or problematic is it, in your field of research, to make data fully open at a reasonable cost? (maximum 2 answers possible) (Q28)					
	Realistic from a technical point of view	Realistic from an ethical point of view	Problematic from a technical point of view	Problematic from an ethical point of view	Not relevant in my research domain
Biomedical sciences	56.9% 161	53.4% 151	27.9% 79	18.4% 52	7.1% 20
Social sciences and humanities	57.5% 275	48.3% 231	20.5% 98	26.6% 127	14.0% 67
Natural sciences	58.3% 147	54.0% 136	32.1% 81	7.9% 20	9.1% 23
Technological and engineering sciences (incl. bio-engineering)	65.8% 200	51.0% 155	23.7% 72	12.2% 37	6.9% 21
Total Respondents	59.5% 783	51.1% 673	25.1% 330	17.9% 236	9.9% 131

In view of the new emphasis on Open Data, how realistic or problematic is it, in your field of research, to make data fully open at a reasonable cost? (maximum 2 answers possible) (Q28)

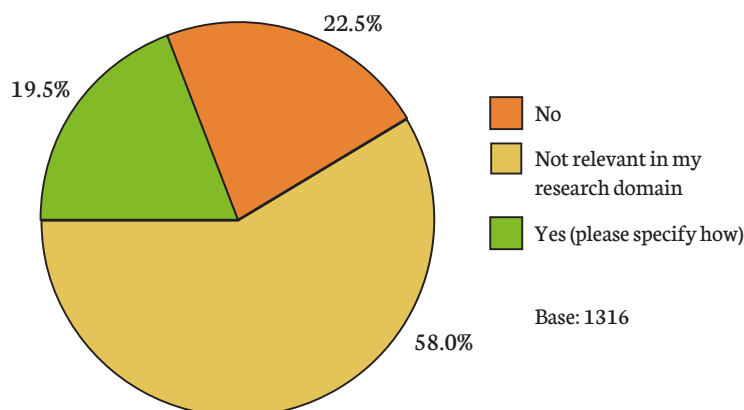


3.10. Gender issues

One in five researchers confirms to take gender issues into account in their research (Q29) while 23% state they do not. Almost six out of ten believe gender issues are not relevant in their research domain. Strikingly, even in the domain of social sciences and humanities, which per definition are concerned with human beings and social relations, up to 41% of the responding researchers answer that gender issues are irrelevant to their work. In general, across research domains, significantly more men than women tend to consider gender issues as irrelevant (61% versus 54% respectively).

Do you take gender issues into account in your research? (Q29)		
Answer Options	Response Percent	Response Count
NO	22.5%	296
Not relevant in my research domain	58.0%	763
YES (please specify how)	19.5%	257
answered question		1316
skipped question		404

Do you take gender issues into account in your research? (Q29)



Those 20% (257 respondents) who confirm they take gender issues into account in their research were asked to specify how they do that. In answer to this question, most of these respondents clarify how sex and/or gender is relevant for their work content-wise, with some adding how they take this into account in practical terms.

“Adapting questions in surveys to avoid reinforcing gender normative biases (e.g., assuming binary gender choice in demographic questions), - Reflecting on how the process of research production and communication can implicitly favor some groups over others (and take into account when organizing symposia; e.g., include as much as possible members of disadvantaged groups), - etc.” (female, PhD Candidate, Social sciences and humanities)

“By comparing results by gender, and exploring statistically possible elements explaining gender differences.” (male, PhD Candidate, Social sciences and humanities)

“Gender issues tend to be irrelevant in my research domain, but we always double check to be sure.” (male, Post-Doctoral Researcher, Social sciences and humanities)

Others state they take gender and work-life balance issues into account in the management of research teams. A few respondents provided different comments, reflecting concerns in favour, of skepticism or (exceptionally) against gender equality considerations.

“...but probably not enough. Taking into account gender dimensions is a whole new research in itself. But I work with more women than men, I am a feminist. Really taking into account gender dimensions takes time, resources, problematization, politicizes research and cannot be done in an ad-hoc manner or a check-list!” (male, PhD Candidate, Social sciences and humanities)

“As a P.I., I try to take them into account when hiring and when considering the degree of flexibility that would make life easier to people with family and especially women collaborators. I am very sensitive to this kind of issues, in particular since I have been myself for a few years a victim of blatant pressure from some of my superiors who wanted to interfere with my wife's career (when she got a contract abroad, I asked for permission to accept a part-time visitorship in the same country, and two of my superiors bluntly asked me to make her quit her contract or there would have been consequences on my career.)” (male, Lecturer/ Assistant Professor, Natural sciences)

“Gender issue is the most hypocrite criteria invented recently. If the best candidates are 100% I’ll hire them and I don’t want these stupid criteria to force me to hire men for improving the gender balance. The opposite is obviously true. Feelings with people is a matter of individuals and does not dependent whether they have XX or XY chromosomes.” (male Lecturer/ Assistant Professor, Natural sciences)

Do you take gender issues into account in your research? (Q29)				
What is the main area of science or discipline that you work in? (Q9)	NO	Not relevant in my research domain	YES	Total
Biomedical sciences	25.18% 71	58.16% 164	16.67% 47	21.43% 282
Social sciences and humanities	22.18% 106	40.59% 194	37.24% 178	36.32% 478
Natural sciences	21.03% 53	70.63% 178	8.33% 21	19.15% 252
Technological and engineering sciences (incl. bio-engineering)	21.71% 66	74.67% 227	3.62% 11	23.10% 304
Total Respondents:	296	763	257	1316
Skipped question:				368

3.11. Views of the general public and of public authorities regarding scientific research

One in five respondents believe that the **trust of the Belgian general public in scientific research** has declined in the last ten years, whereas 35% think it has remained stable. This share is significantly larger than the proportion who believes that the **interest of the public authorities** remained the same (24%). An important share (four out of ten respondents) believe the interest of public authorities in scientific research has declined. This proportion is highest among the researchers from the field of natural sciences (44%) and lowest among those working in technological and engineering sciences (33%).

How do you think the views of the following actors regarding scientific research have evolved in the last 10 years? (Q30)				
Answer Options	Increased	Remained the same	Declined	I don't know
I believe that the trust of the Belgian general public in scientific research has...	18.02% 237	34.98% 460	21.83% 287	25.17% 331
I believe that the interest of public authorities in scientific research has...	20.30% 267	23.73% 312	39.16% 515	16.81% 221
Answered Question				1315
Skipped Question				405

3.12. What to change about the Belgian research environment to encourage high quality science?

As a final (open) question, the respondents were asked whether there is anything they would like to change about the research environment in Belgium in order to encourage the production of high quality science. In total, 679 researchers provided an answer.

A majority of answers involved the topic ‘funding’, where many scientists expressed their discontent about the lack of freedom and fundings available. More funding would lead to less competition. Also, if the fundings were made easier-accessible, time can be spend more on real research (instead of bureaucratic processes). The importance of funding fundamental research is also mentioned. Many respondents suggested a change in the large pressure to publish and a reorientation on quality over quantity. In addition, a real Open Access system - that does not rely on the researcher’s/institution’s money - should be implemented, according to plenty researchers. Furthermore, the topic of job uncertainty, because of temporary contracts, is touched upon. Some of the researchers opt for more dialogue and multidisciplinary cooperation between colleagues, faculties and universities.

3.13. Option to be personally informed about the research results

Researchers who wished to be personally informed about the research results could provide their e-mail address, which 595 did.

Annex 1.

Effects of the research environment by gender

The amount of time currently available for research						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	9.30% 68	30.23% 221	7.52% 55	35.43% 259	14.36% 105	3.15% 23
Female	6.21% 37	24.16% 144	7.55% 45	43.12% 257	16.11% 96	2.85% 17

The assessment process of your research proposals						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	2.46% 18	24.49% 179	17.37% 127	34.20% 250	12.31% 90	9.17% 67
Female	3.02% 18	22.32% 133	16.11% 96	35.07% 209	9.90% 59	13.59% 81

Financial or other support for multidisciplinary and collaborative research						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	7.11% 52	35.29% 258	16.28% 119	20.38% 149	10.53% 77	10.40% 76
Female	8.39% 50	28.19% 168	12.42% 74	28.36% 169	11.07% 66	11.58% 69

Autonomy given to scientists for the use of the funding						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	26.27% 192	42.54% 311	9.99% 73	13.13% 96	3.15% 23	4.92% 36
Female	19.80% 118	44.97% 268	10.57% 63	13.09% 78	3.52% 21	8.05% 48

Flexibility for researchers to adapt/modify the research (approach) once funding has been granted						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	30.37% 222	41.59% 304	9.30% 68	10.81% 79	1.92% 14	6.02% 44
Female	25.17% 150	47.65% 284	7.05% 42	10.23% 61	1.68% 10	8.22% 49

The involvement of stakeholders in the research process (design and execution)						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	2.60% 19	21.48% 157	35.29% 258	19.02% 139	5.34% 39	16.28% 119
Female	3.52% 21	26.85% 160	27.18% 162	11.58% 69	5.03% 30	25.84% 154

The volume of public investment in research in Belgium						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	8.48% 62	17.37% 127	11.76% 86	29.00% 212	19.43% 142	13.95% 102
Female	4.70% 28	16.28% 97	12.92% 77	24.50% 146	16.61% 99	25.00% 149
Research being funded through public procurement under service contracts (as opposed to research grants)						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	2.60% 19	15.87% 116	23.39% 171	15.73% 115	6.16% 45	36.25% 265
Female	2.52% 15	11.07% 66	20.30% 121	13.76% 82	5.20% 31	47.15% 281
The volume of private investment in research in Belgium						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	2.60% 19	15.05% 110	20.52% 150	20.79% 152	7.39% 54	33.65% 246
Female	1.85% 11	11.24% 67	18.46% 110	16.11% 96	6.21% 37	46.14% 275
The peer review process						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	11.76% 86	44.32% 324	16.55% 121	17.78% 130	4.51% 33	5.06% 37
Female	12.08% 72	43.46% 259	15.94% 95	17.95% 107	3.02% 18	7.55% 45
Media coverage of science						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	3.28% 24	28.04% 205	32.28% 236	18.60% 136	5.20% 38	12.59% 92
Female	4.19% 25	25.84% 154	30.03% 179	18.79% 112	4.53% 27	16.61% 99
The assessment process for promotion during careers						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	2.46% 18	18.60% 136	20.52% 150	25.44% 186	10.40% 76	22.57% 165
Female	2.18% 13	11.58% 69	22.15% 132	24.50% 146	12.25% 73	27.35% 163

Provision of professional education, training and supervision						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	6.70% 49	39.40% 288	24.90% 182	11.08% 81	2.87% 21	15.05% 110
Female	10.23% 61	41.78% 249	15.27% 91	15.10% 90	3.86% 23	13.76% 82

Ethical Committee review process						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male (A)	2.05% 15	16.28% 119	37.35% 273	7.52% 55	2.33% 17	34.47% 252
Female (B)	3.36% 20	25.67% 153	29.87% 178	7.55% 45	2.18% 13	31.38% 187

Initiatives that promote integrity in science						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	8.34% 61	34.06% 249	30.23% 221	5.47% 40	1.09% 8	20.79% 152
Female	10.07% 60	39.77% 237	22.48% 134	5.37% 32	1.34% 8	20.97% 125

Initiatives that promote gender equality and diversity in science						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	5.75% 42	18.60% 136	39.26% 287	11.35% 83	5.06% 37	19.97% 146
Female	13.59% 81	30.70% 183	27.68% 165	7.21% 43	3.02% 18	17.79% 106

The current workload balance between the 3 missions of academia						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	2.33% 17	16.42% 120	17.92% 131	27.77% 203	13.68% 100	21.89% 160
Female	1.68% 10	13.42% 80	18.79% 112	25.00% 149	12.58% 75	28.52% 170

Contractual processes and conditions						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	1.37% 10	9.71% 71	27.09% 198	26.13% 191	7.52% 55	28.18% 206
Female	2.35% 14	8.72% 52	22.99% 137	24.16% 144	10.74% 64	31.04% 185

Open Access and data sharing policies						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	18.06% 132	38.30% 280	25.31% 185	9.30% 68	1.64% 12	7.39% 54
Female	17.45% 104	39.09% 233	19.46% 116	10.40% 62	3.19% 19	10.40% 62
Researchers' mobility						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	23.80% 174	47.20% 345	13.68% 100	7.39% 54	2.33% 17	5.61% 41
Female	21.98% 131	43.12% 257	15.10% 90	10.07% 60	2.18% 13	7.55% 45
A critical discussion culture within and among research teams						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	28.59% 209	46.10% 337	10.67% 78	4.92% 36	2.19% 16	7.52% 55
Female	23.32% 139	48.99% 292	8.05% 48	7.72% 46	1.51% 9	10.40% 62
Competition among researchers						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	4.51% 33	24.49% 179	17.10% 125	31.33% 229	16.42% 120	6.16% 45
Female	2.01% 12	14.60% 87	14.93% 89	38.42% 229	23.99% 143	6.04% 36
Commercialisation of research						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	1.37% 10	14.36% 105	24.62% 180	24.76% 181	18.47% 135	16.42% 120
Female	1.01% 6	10.57% 63	19.30% 115	25.67% 153	19.80% 118	23.66% 141
Discussion with the general public						
	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Male	7.39% 54	38.44% 281	33.79% 247	7.66% 56	2.87% 21	9.85% 72
Female	8.22% 49	41.44% 247	24.50% 146	8.05% 48	1.68% 10	16.11% 96

Annex 2.

Effects of the research environment – Flemish and French-speaking universities

Annex 2. Effects of the research environment – flemish and french-speaking universities

Flemish universities (n=621)	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
The amount of time currently available for research	4.83% 30	23.99% 149	9.18% 57	41.87% 260	17.39% 108	2.74% 17
The assessment process of your research proposals	1.61% 10	17.87% 111	15.78% 98	40.42% 251	13.69% 85	10.63% 66
Financial or other support for multidisciplinary and collaborative research	4.83% 30	29.95% 186	16.10% 100	25.60% 159	11.92% 74	11.59% 72
Autonomy given to scientists for the use of the funding	15.78% 98	46.70% 290	13.85% 86	13.04% 81	4.19% 26	6.44% 40
Flexibility for researchers to adapt/ modify the research (approach) once funding has been granted	23.35% 145	47.83% 297	9.34% 58	10.95% 68	1.93% 12	6.60% 41
The involvement of stakeholders in the research process (design and execution)	3.38% 21	30.43% 189	30.60% 190	14.65% 91	4.35% 27	16.59% 103
The volume of public investment in research in Belgium	5.15% 32	17.39% 108	14.65% 91	28.99% 180	13.85% 86	19.97% 124
Research being funded through public procurement under service contracts (as opposed to research grants)	1.61% 10	13.04% 81	25.12% 156	15.14% 94	4.99% 31	40.10% 249
The volume of private investment in research in Belgium	2.09% 13	12.24% 76	21.58% 134	18.84% 117	5.64% 35	39.61% 246
The peer review process	10.47% 65	42.67% 265	18.36% 114	20.13% 125	4.67% 29	3.70% 23
Media coverage of science	3.54% 22	25.76% 160	31.72% 197	19.81% 123	5.64% 35	13.53% 84
The assessment process for promotion during careers	2.25% 14	12.72% 79	21.26% 132	29.47% 183	13.04% 81	21.26% 132
Provision of professional education, training and supervision	9.66% 60	45.41% 282	20.29% 126	12.72% 79	2.09% 13	9.82% 61
Ethical Committee review process	2.58% 16	21.42% 133	36.55% 227	8.21% 51	2.25% 14	28.99% 180
Initiatives that promote integrity in science	7.89% 49	40.58% 252	28.50% 177	5.15% 32	0.81% 5	17.07% 106
Initiatives that promote gender equality and diversity in science	7.57% 47	25.76% 160	35.27% 219	10.14% 63	4.51% 28	16.75% 104
The current workload balance between the 3 missions of academia	1.45% 9	12.08% 75	17.23% 107	31.88% 198	17.71% 110	19.65% 122

Annex 2. Effects of the research environment – flemish and french-speaking universities

Flemish universities (n=621)	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Contractual processes and conditions	1.77% 11	8.70% 54	28.50% 177	27.21% 169	9.82% 61	23.99% 149
Open Access and data sharing policies	13.69% 85	38.16% 237	27.54% 171	9.34% 58	2.58% 16	8.70% 54
Researchers' mobility	15.78% 98	45.73% 284	19.16% 119	9.18% 57	2.42% 15	7.73% 48
A critical discussion culture within and among research teams	26.41% 164	48.47% 301	9.34% 58	7.09% 44	2.09% 13	6.60% 41
Competition among researchers	3.06% 19	22.71% 141	17.07% 106	33.49% 208	17.39% 108	6.28% 39
Commercialisation of research	1.29% 8	16.10% 100	20.93% 130	25.28% 157	17.71% 110	18.68% 116
Discussion with the general public	7.25% 45	39.13% 243	29.95% 186	8.70% 54	2.25% 14	12.72% 79

French-speaking Universities (n=706)	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
The amount of time currently available for research	10.62% 75	30.59% 216	6.09% 43	36.26% 256	13.17% 93	3.26% 23
The assessment process of your research proposals	3.68% 26	28.47% 201	17.71% 125	29.46% 208	9.07% 64	11.61% 82
Financial or other support for multidisciplinary and collaborative research	10.20% 72	33.99% 240	13.17% 93	22.52% 159	9.77% 69	10.34% 73
Autonomy given to scientists for the use of the funding	30.03% 212	40.93% 289	7.08% 50	13.17% 93	2.55% 18	6.23% 44
Flexibility for researchers to adapt/modify the research (approach) once funding has been granted	32.15% 227	41.22% 291	7.37% 52	10.20% 72	1.70% 12	7.37% 52
The involvement of stakeholders in the research process (design and execution)	2.69% 19	18.13% 128	32.58% 230	16.57% 117	5.95% 42	24.08% 170
The volume of public investment in research in Belgium	8.22% 58	16.43% 116	10.20% 72	25.21% 178	21.95% 155	17.99% 127
Research being funded through public procurement under service contracts (as opposed to research grants)	3.40% 24	14.31% 101	19.26% 136	14.59% 103	6.37% 45	42.07% 297
The volume of private investment in research in Belgium	2.41% 17	14.31% 101	17.85% 126	18.56% 131	7.93% 56	38.95% 275
The peer review process	13.17% 93	45.04% 318	14.45% 102	15.86% 112	3.12% 22	8.36% 59
Media coverage of science	3.82% 27	28.19% 199	30.88% 218	17.71% 125	4.25% 30	15.16% 107
The assessment process for promotion during careers	2.41% 17	17.85% 126	21.25% 150	21.10% 149	9.63% 68	27.76% 196
Provision of professional education, training and supervision	7.08% 50	36.12% 255	20.82% 147	13.03% 92	4.39% 31	18.56% 131
Ethical Committee review process	2.69% 19	19.69% 139	31.73% 224	6.94% 49	2.27% 16	36.69% 259
Initiatives that promote integrity in science	10.20% 72	33.14% 234	25.21% 178	5.67% 40	1.56% 11	24.22% 171
Initiatives that promote gender equality and diversity in science	10.76% 76	22.52% 159	33.00% 233	8.92% 63	3.82% 27	20.96% 148
The current workload balance between the 3 missions of academia	2.55% 18	17.71% 125	19.26% 136	21.81% 154	9.21% 65	29.46% 208

Annex 2. Effects of the research environment – flemish and french-speaking universities

French-speaking Universities (n=706)	Very positive effect overall	Positive effect overall	No effect overall / not relevant	Negative effect overall	Very negative effect overall	I don't know
Contractual processes and conditions	1.84% 13	9.77% 69	22.38% 158	23.51% 166	8.22% 58	34.28% 242
Open Access and data sharing policies	21.39% 151	39.09% 276	18.41% 130	10.20% 72	2.12% 15	8.78% 62
Researchers' mobility	29.32% 207	45.04% 318	10.06% 71	8.07% 57	2.12% 15	5.38% 38
A critical discussion culture within and among research teams	26.06% 184	46.46% 328	9.63% 68	5.38% 38	1.70% 12	10.76% 76
Competition among researchers	3.68% 26	17.71% 125	15.30% 108	35.41% 250	21.95% 155	5.95% 42
Commercialisation of research	1.13% 8	9.63% 68	23.37% 165	25.07% 177	20.25% 143	20.54% 145
Discussion with the general public	8.22% 58	40.37% 285	29.32% 207	7.08% 50	2.41% 17	12.61% 89

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**Researchers at Belgian universities
What drives them?
Which obstacles do they encounter?**