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Gendering the Academy and Research: combating Career Instability and Asymmetries

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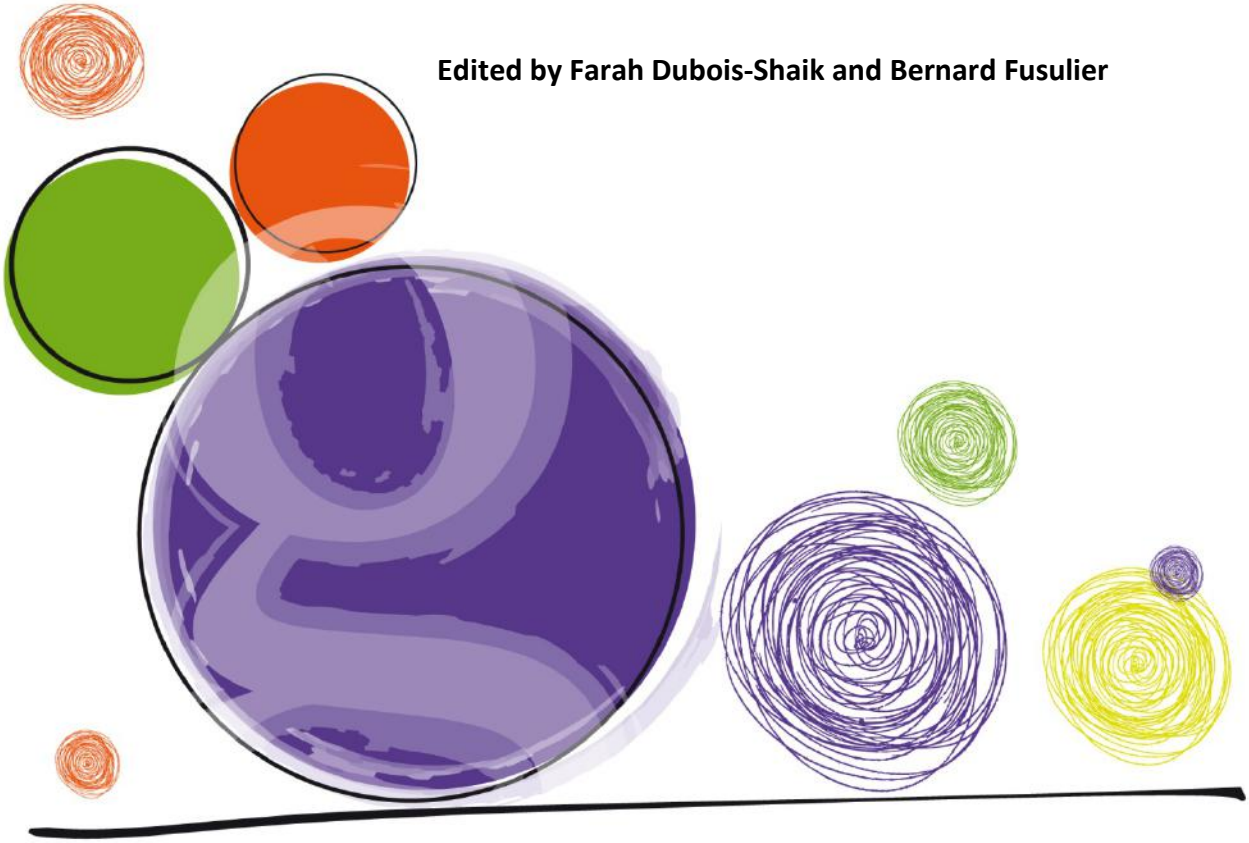
GARCIA WORKING PAPERS 5

Academic Careers and Gender Inequality: Leaky Pipeline and Interrelated Phenomena in Seven European Countries

Edited by Farah Dubois-Shaik and Bernard Fusulier



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Deliverable D6.1 – Quantitative report on the Leaky Pipeline phenomenon

Executive summary

By Bernard Fusulier, Farah Dubois-Shaik and Céline Remy

The literature on "gender and science" underlines how much careers in science and academia are still subject to discrimination according to the sex. This becomes visible in the famous scissor-shaped curve, where one can observe a progressive "evaporation" or disappearance of women as they advance in the career; an occurence, which is called the "leaky pipeline" phenomenon.

WP6 is aimed at inquiring into the Leaky Pipeline phenomenon with reference to the organization of scientific and academic careers taking into account singular national and institutional contexts involved in the GARCIA research project. This executive summary outlines the map of women and men in scientific/academic careers in several countries (Austria, Belgium, Iceland, Italy, The Netherlands, Slovenia, Switzerland) and institutes (SSH and STEM fields). It provides a brief transversal analysis of national and organizational data in terms of the leaky pipeline in each studied context. Finally, it suggests some recommendations for tools or implementations that could help in improving the situations described.

1. National case studies

Early stages scientific careers in **Italy** are characterized by: 1) the persistence and reproduction of gender asymmetries already at the early stages of career after PhD graduation, 2) the rise of the level of precariousness and job instability experienced by the new generation of PhD holders, 3) an increased level of competition for permanent positions that in turn follows from the inability of the University system to absorb the rising numbers of PhD holders, from the limited development of research positions in other sectors as well as from the low level of employability of doctorate holders outside academia, 4) the persistence of disadvantages suffered by women both in terms of scientific productivity and during selection processes and 5) the temporariness of research affects the quality of research outputs and the type of knowledge elaborated in academia. Already at early career stages, women employment positions are less stable and less paid than male ones and are more influenced by family and personal situations. These weaknesses are generally more evident in the STEM disciplines. Growing levels of precariousness and instability in the early stages of career, together with the low chances to obtain a permanent position inside the academic system, rise the necessity to support PhD holders to develop skills and competencies able to support inter-sectorial careers as well as to find effective strategies to give continuity to their personal career paths.

In **Belgium**, the gender question remains an open one, even if significant advances towards greater equality are observable. Although women are now in the majority in higher and university education, with higher graduation rates than the boys, yet two important reservations are still present: 1)access to the highest level of qualification, the obtaining of doctorate, still remains male in the majority; 2) a horizontal segmentation between 'male' tracks of studies (sciences and technology) and female (human and social sciences) is still reproduced. What is notable is that as in the general case for French-speaking Universities, women in academic/scientific careers work more part time than men (13% vs. 6%), but these part time positions are in lower scientific/academic career posts, such as assistants. The higher one climbs the ladder the more full time work in academic careers seems to be a condition. This would perhaps partially explain the lower number of women in professorships and ordinary professorships, and even lesser in decision-making organs and posts. Women (and men) therefore not only have to meet

high demands in research/teaching, but in addition also adhere to an important institutional investment and presence in terms of integrating into a hyper-complex system of bureaucracy and institutional culture. There seems to be an increasing requirement of «omnipresence» in all three pillars (teaching, research and service), of which each pillar has increased in levels, demands and complexity of required personal engagement. It can be argued that this can represent important issues to work/life conciliation or balance or having a family life, and that wanting to climb the career ladder also means important choices and pressures in terms of personal life.

In internationally comparison (OECD, EU), **the Netherlands** has one of the lowest numbers of women full professors. In both the STEM and the SSH field, on both the national and the organizational level, the leaky pipeline is present. The numbers and percentages of women on academic positions differ between the STEM and the SSH domain, on both the national and the organizational level, but the trend of decreasing numbers at every step in the pipeline is present everywhere. Yet, in both participating GARCIA departments in the Netherlands, the IMAPP (STEM) and the IMR (SSH), we see higher percentages of women full professors than women associate professors. In both the IMAPP and the IMR we found an increasing number of women non-tenured staff over the years 2010-2014, however no increase in the number of women tenured staff. This indicates an increasing leak in the pipeline at the assistant professor level in the IMAPP and IMR. In general, the Netherlands has the highest number of women working part-time, and a one-and-a-half earners model is prevalent. However, the prevalence of part-time work does not apply to women in academia. The research project in Tilburg also showed that women academics have more often no children or fewer children than women outside academia. A pay gap exists between men and women with tertiary education.

When analyzing data related to the leaky pipeline at the national level of **Iceland**, it is immediately obvious that women, in terms of numbers, dominate higher education. This might appear to be a positive development at first glance, but on closer inspection it is evident that even though women are in the majority, they are so predominantly in SSH fields, which enjoy the least amount of funding, the highest teacher-to-student ratio (i.e. bigger workload), the least amount of stature, and the fewest options for a future career in academia. Oppositely, STEM fields, which are dominated by men, receive considerably more funding and enjoy a higher stature even though they attract a much lower number of students. If we move up the academic ladder we also find that men overwhelmingly occupy the higher academic positions with the most stature. It is therefore a distinct possibility that the leaky pipeline to some extent has its roots in broader gender and welfare regimes, where women are traditionally left with the least prestigious societal responsibilities. On the macro-level, men might feel a pressure to conform to masculine ideals of stature and prestige and therefore end up choosing a technical field of study in a homo-social environment that is sure to land them a well-paid future job which will confirm their role as family-providers. In the same vein, men might opt out of certain careers in SSH fields because an overarching culture of masculinity does not connect male identity to SSH topics.

Structural characteristics of the gender regime in **Switzerland** have strong impacts on women's careers with, for example, very low levels of childcare provision, extremely high childcare costs, high levels of horizontal and vertical segregation, a relatively large gender pay gap, particularly at the upper reaches of the occupational hierarchy. Women tend to work part-time and/or to take extended breaks from the labor market when their children are young .The academic occupational hierarchy continues to manifest a clear "glass ceiling", although there has been a considerable improvement in women's access

to higher education over the past 15 years. Women are now well represented amongst doctoral students and make up a significant proportion of temporary scientific research positions, but they are much less likely than their male counterparts to reach permanent professorships. Although the 25% women professors target has yet to be reached, there has been a significant increase in the feminization of intermediate levels of the academic hierarchy. Increasing women's access to scientific occupations is a concerted policy objective and there are signs of quite strong institutional commitment to the fight against the horizontal and vertical segregation. But in a country with a low unemployment rate, a small university-educated population and relatively well-paid job opportunities in the private and public sectors, Swiss higher education institutions do not necessarily represent a particularly attractive employer, notably because of the large proportion of temporary, fixed-term contracts that characterize the early stages of an academic career.

In recent decades, women in **Slovenia** have massively entered into higher education and science. However, their career is usually completed at the level of Assistant or Assistant Professor (SURS 2015). The analysis highlights the presence of leaky pipeline phenomenon in science at the national level; a clear picture of vertical gender segregation in academic career paths of the PhD holders. However, on the level of individual STEM/SSH departments, this picture is not so uniquely expressed; it shows that the reality is far more complex. A comparison of statistical data on research and teaching staff with the data that pertains to PhD student clearly indicates gender segregation that is taking place in science. In their careers PhD holders, more frequently women than men, are faced with accumulation of disadvantages that arise from their working environment, as well as from family life and have implications for their less successful scientific career.

In **Austria**, around 53% of all university students are women, but significant differences between enrollment rates in SSH and STEM fields can be observed. In 2014 there were roughly 1/3 female and 2/3 male students in STEM. Since 2005 the number of scientific staff financed by third-party funds has increased from 5.773 to 8.773. Absolute numbers increased for women as well as men. In 2014 almost two thirds of third-party funded positions were held by men (39% women and 62% men). Concerning the highest scientific position (professors) at Austrian Universities the share of women is considerably low: only 17% of professors are women. There are wide differences across scientific fields. In the natural sciences and in engineering and technology the share of women is only 8%. The main bottleneck in academic career is situated in the transition from PhD student to assistant professor. Female doctorate holders employed as researchers earn 21% less than their male colleagues and those not employed as researchers earn even 27% less than their male colleagues.

2. Transversal analysis

Comparing all the countries together the number of doctoral students and PhD graduates are central indicators of a country's potential research capability. According to Eurostat data (2015), there were an estimated 717 thousand doctoral students in the EU-28 in 2012 and women accounted for 46.3 % of doctoral students and 47.3% of PhD graduates. There has been an increase of the total amount of PhD graduates in all the countries involved in the Garcia project, except for Austria. The gender split of doctoral students and doctoral graduates across the countries involved in the Garcia project was quite balanced in Italy, Slovenia and Iceland in 2012. On contrary women are under-represented among doctoral graduates in Belgium, the Netherlands, Switzerland and

Austria. All national chapters highlight the persistence of a strong segregation of men and women across fields of study.

Academic career remains markedly characterized by strong vertical and horizontal segregation even if there are important differences across countries. Among grade A ,only Switzerland have reached the target of 25% of women among full professors, while in Belgium and the Netherland this proportion remain below 15%. Female PhD holders show systematic disadvantages when compared with male PhD graduates: 1) higher risks of being unemployed or being employed in fixed term and part-time positions, 2) lower chances to perform research and development activities in their job or to be employed as researchers and 3) lower average wages.

To study the leaky pipeline phenomenon in depth, we implemented a Garcia web-survey research exercise in order to explore and measure the current job position of individuals who worked with unstable research positions in the departments involved in the Garcia project. The descriptive results on "Movers" support evidences highlighted by other researches on how uncertainties connected to these job positions, the lack of long-term perspectives, and unsupportive relations with PhD and postdoc supervisors seem foster the decision to leave research. On the other hand, when the persons are still in the process of research inside the departments from the GARCIA project, men and women do not hold the pressure put by the greedy institution between personal and working lives the same way. From this sight, parenthood seems to hold a major role.

The phenomenon of leaky pipeline and glass ceiling that can be recorded for all participating countries, whereby fewer women are recorded the higher we climb the scientific/academic ladder. An important fact still remains is that in most countries the bottle neck is located at either the doctoral or postdoctoral level, with the difficult jump to obtaining permanent positions. In STEM, the leaky pipeline tends to start already at bachelor and masters levels, with some exceptions, such as in Austria. However, this confirmation of the location of the bottleneck or what we would point out as a precarious stage of doctorate and post-doctorate remains largely unexplored so far in terms of actual numbers of researchers/contracts, or even the in-and outflow of persons, and mostly in terms of types of profiles and personal experiences of persons in this stage.

An important result obtained is that postdocs and assistant researchers with non-permanent contracts are significantly rising in numbers, and institutions are hosting a growing number of temporary researchers. These, we would argue, are a "floating and invisible" research body, contributing to an important production of knowledge and of teaching, but remaining institutionally largely invisible, unstable and unaccounted for. Increasing quotas of women in higher posts remains a controversial measure, which evokes many questions in terms of whether this will contribute in gaining access for women, or else shatter in the face of the complex interrelated workings of work and organizational culture(s) and lack of work/life balance in mainly male-conceived work ethics, which no longer apply to either sex in today's social contexts. Indications from the reports is that despite growing figures in favor of women in both STEM and SSH, women are still less represented in decision-making positions than their male colleagues; there are few measures that address this phenomenon. Moreover, often previously conducted studies address the issue as being located in higher posts of decision-making and power, but the Garcia reports show that one of the aspects of precariousness of doctorate and post-doctorate or lower research assistant positions is a serious lack of involvement in decision-making for this group, where women are overrepresented.

3. Recommendations

Drawing from this analysis on the one hand and the particular recommendations drawn from the different reports, we would recommend that there should be an *increased focus upon the doctoral and postdoctoral stage of the research/academic careers on behalf of research institutions and research itself*. This could be done on multiple levels:

a. On the level of access to PhD and purposes of the PhD and postdocs: research institutions should responsibly ask themselves why and whether they need a growing number of doctorates and postdoctorates indiscriminately, without considering carefully the further employment and stabilization of this group and without considering the kind of consequences for the future of this floating corps.
b. The shift from employership to enterpreneurship should be more carefully measured and weighed in terms of institutional obligations towards the work force and research/teaching corps, and in the kind of permanent positions and status that are created.
c. There should be a higher focus upon work/life balance issues and interference in terms of work and organizational culture by introducing more active policies that permit a non-censured culture of "care leaves"; of increased child care and support; of reduction of working hours; of a more attentive work ethics involving deadlines for teaching/research projects and institutional engagement/involvement (introducing policies at departmental and centre levels for meeting hours, regularity and density of meetings, avoiding overlaps of targets or work tasks, etc.).
d. Educating women and men PhD candidates about the gendered context of academia; and more transparency from the beginning of the purposes of PhD and postdoc, but also the question of career and employment; a part of this can be tackled in mentoring programms.
e. Focussing on hiring more women PhD candidates in STEM fields.
f. Loosening the criterion of international experience for postdocs, and taking into consideration that it can have gendered consequences, and that international networks and collaborations can be obtained in many different ways.
g. Create postdoc positions that contain the possibility to do teaching that is duly recognized, accomodated in time and pay. For example, a postdoc position that has funding for three years fulltime research can be extended to a four-year contract when the postdoctoral researcher has 25% teaching duties. The teaching time is paid for by the department (if the budget allows). This way the postdoc gets valuable experience in teaching and also has a longer secured position.
h. Developping a talent follow up system to trail talented women PhD candidates and postdocs after they leave, and offer them a position after a number of years (also recommended in the Delft project). Generally introducing more follow up data possibilities in HR for persons leaving institutions, enabling the retaining of networks and the importance and visibility of each person as a researcher.
i. Leaky pipeline research should focus equally on why there are many men in STEM sectors and lesser in SSH, as well as looking at why women are fewer in STEM and SSH the higher we climb: social pressures for men as breadwinners and as prestigious fields, as opposed to less valued sciences in SSH and why women are more represented here. Consequently, based on the quantitative data, we recommend implementations that seek to break down stereotypes both within SSH and STEM, not to merely provide equal attention to men in a debate on gender equality in science, but to ensure that men do not flock to STEM fields or avoid certain SSH fields because they are stuck in a rut of traditional masculine ideals.

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Introduction

By Bernard Fusulier and Farah Dubois-Shaik

The literature on "gender and science" underlines how much careers in science and academia are still subject to discrimination according to the sex. This becomes visible in the famous scissor-shaped curve (see the SHE-figures report 2013 for Europe), where one can observe a progressive "evaporation" or disappearance of women as they advance in the career; an occurrence, which is called the "leaky pipeline" phenomenon (Berryman, 1983; Alper, 1993).

WP6 is aimed at inquiring into the Leaky Pipeline phenomenon with reference to the organization of scientific and academic careers taking into account singular national and institutional contexts involved in the GARCIA research project.

In this WP6, amongst other sources, we draw on our theoretical and methodological conceptions from three previous studies conducted in Germany by Beaufays and Krais (2005) on women in academia; in Switzerland by Fassa, Kradolfer and Paroz (2012, 2013) and in French-speaking Belgium by Fusulier and del Rio Carral (2012) on young non-tenured postdoc researchers. We support the critique outlined in these studies that often "promising" women fall out of scientific and academic careers after their PhDs and that it is presumed that 'everything happens in these professional trajectories to make them leave as though it would be some kind of auto-elimination, a chain of decisions taken more or less consciously, but always freely, by young women, who decide to do something else rather than a scientific career (maternity, family life, following her partner to another country for his job, etc.) (Beaufays and Krais, 2005: 52-53). We deem that it is important to establish that the disappearing of women from the scientific or academic path, leading to higher position does not happen so simply as one could imagine at first glance (Beaufays and Krais, 2005). One cannot simply explain these decisions based on "subjective factors" (Le Feuvre, 2009). Fassa (2013) emphasizes that factors of very different nature contribute to select candidates (male and female) to professorial or permanent positions and that the articulation of these different factors can provide the reasons for the ascension, or non-selection into an academic career. Frequently, in research on gender, especially in Anglo-American research, the attention has been drawn to how institutions are *gendered organizations* (Acker, 1990), which means that the social division of work between the sexes is translated in distinctive ways in structured institutions; in the principle of its organization, in the habits of work at the heart of the institution. This can also be applied to scientific/academic work and the principles around which it is organized (organizing) and structured (structuring).

A study on the leaky pipeline is amongst others also an articulation of the symbolic and the practice of two classic models of sexual division of labour, namely "breadwinner" and "carer" (Fusulier and del Rio Carral, 2012). One of the hypotheses that we outline in WP6 on leaky pipeline is that the scientific "ethos" and the functioning of science as it is shaped in a "greedy institution" (Coser, 1974) and working today, essentially does not take into account the "carer" aspect of young researchers. Two further metaphors are frequently used to

characterize the discriminations that occur during the professional pathways of women: the "glass ceiling" effect (Hymowitz, Schellhardt, 1986) and the "sticky floor" phenomenon (Booth, Francesconi, Frank, 2003). The disappearance of women in research, their difficulties in accessing higher positions and their "getting stuck" in tasks, which are less valued is generally explained by different cumulative social mechanisms: a conflict of working life/family life (e.g. Etzkowitz et al., 2000; Marry, Jonas, 2004; del Rio Carral, Fusulier, 2013); a scientific social field (Bourdieu, 1976), which is imbricated by a masculine habitus (Beaufays, Krais, 2005); a "Matilda" effect for women (Rossiter, 1995), which shows that the "St Mathieu" effect (Merton, 1968) has different implications for women and men; not to mention the cooptation logic and the existence of the "old boys' club": "an informal but powerful collective of like individuals who either explicitly or implicitly signal whether full membership in an organization is granted or denied" (Case, Richley, 2012: 14).

Moreover, an important aspect that we deem necessary to include in any research on the leaky pipeline is to adopt an intersectional approach (Hancock, 2007), which takes into account the interaction of categories of difference, such as gender, age, nationality, socio-economic background, disciplinary sectors, and so on in order to identify multiple factors that work upon women and men in their scientific/academic work and careers. Moreover, the intersectional approach recognizes that there is a dynamic interaction between individual and institutional factors at play, which constructs a relation between structure, agency and reflexivity (Archer, 2010).

Thus an important and fundamental issue that needs to be clarified is that we do not consider the "dropping out" or "leaving" of young female researchers from scientific career paths as a failure on their part to pursue a scientific career. Drawing from discussions arising during Garcia meetings, the terminology therefore changed to using "movers". We want to avoid any negative connotations of decisions of opting in other career pathways other than the Garcia institutions. Therefore, we are interested in researching the different factors – in gendered organizations – that lead to the decisions of young researchers to deviate from or move within the scientific path. This is thus also a way to critique the more traditional ways of conceiving "leaky pipelines", or classic scientific/academic pipelines. This stance is important in order to avoid contributing to a scientific ethos that we are supposed to be researching. Furthermore, this permits us to focus upon what factors play a role of facilitating or of being obstacles during the processes of qualification and of professional recognition (Fassa, 2013) in scientific careers. This can also help us to get a detailed map of the structural environment while identifying and contextualising researchers/academics who are present and the (women or men) movers.

Using this perspective, this working paper outlines in a first instance, the map of women and men in scientific/academic careers in several countries (Austria, Belgium, Iceland, Italy, The Netherlands, Slovenia, Switzerland) and institutes (SSH and STEM fields). Each national and organizational case study (Chapters 1 to 7) aims at getting a snapshot (2010-2014) and historical development on the distribution and pathways of women and men, if possible in SSH and STEM disciplines, starting from their distribution and presence in higher studies, in PhDs, to their distribution and presence in the various academic and scientific positions and grades. It provides a brief interpretative transversal analysis of national and organizational data in terms of the leaky pipeline in each studied context.

Comparing the results summarized in the national chapters, the Chapter 8 systematizes the main results emerged by each national chapters on the leaky pipeline and the (early stages) research/academic careers at national level. Drawn on a web survey, the last chapter

(Chapter 9) presents some quantitative features on the research experiences, occupational trajectories and some descriptives on leavers/movers. This research exercise is also an opportunity to reflect on the difficulties of the data collection process.

This report is concluded by an interpretative comparative analysis based on the different country reports. Also it suggests some recommendations for tools or implementations that could help in improving the situations described.

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1. Italy

By Rossella Bozzon, Annalisa Murgia, Barbara Poggio

1. INTRODUCTION

It is not easy to get a complete picture on career trajectories as well as on gender inequalities that characterize (early stages of) scientific careers in Italy. Available data are incomplete; they focus mainly on employment conditions and/or on specific cohorts of graduation, or institutions, or scientific disciplines; and, hence, they not allow to monitoring the career trajectories in scientific careers over time.

At the national level, the main data sources are the Italian Ministry of Education, University and Research (Ministero dell'Istruzione, dell'Università e della Ricerca (Miur) database and the Italian National Statistcs Office (Istat, www.istat.it) survey of PhD holders.

The Italian Miur (http://www.istruzione.it/) publishes every year data on the composition of the academic staff (full professors, associate professors and assistant professors), as well as on fixed-term research and teaching contracts (fixed terms researchers, post doc research fellows) and PhD and graduate students. These data allow to monitor the structure and some career transitions only within the academic system. However, they do not allow to analyse the complexity and the growing instability that characterize the initial phases of scientific careers; nor do they allow to explore adequately the interrelation between individuals' career and private life, let alone career paths outside the academic system.

Some information about the early stages of scientific careers trajectories within and outside academia can be derived from two national surveys on "Doctorate Holders' Vocational Integration", carried out by Istat in 2009 and 2014. These surveys aim to detect the employment conditions of PhD holders some years after their graduation. The first survey interviewed the 2004 and 2006 cohorts of PhD graduates respectively 5 and 3 years after graduation, while the second interviewed the 2008 and 2010 cohorts of PhD graduates after 6 and 4 years after graduation. The surveys gather information about the educational experience; access to the labour market; experiences of mobility, especially towards other countries; and (few information about) family situation[1].

Finally, other information can be derived by research reports and analyses based on surveys conducted by some Italian Universities (Schizzerotto 2007; Argentin et al, 2012), scientific associations (Corsi 2014) and research projects (UPGEM 2008, Ricercarsi 2014; Stages 2014[2]), with the main aim of obtaining sets of information that are missing from official data released by Miur and Istat.

[1] Dataset on the first survey is available on the Istat website www.istat.it while for the second survey at this stage only a brief summary of main results is available (Istat 2015a; 2015b).
[2] http://www.stages.unimi.it/index.php

At the University of Trento, the data and the indicators on academic staff are mainly managed by the University Statistical Office (Ufficio Studi). Since 2009, the Equal Opportunity Commissions (CPOs) has published indicators on the gender compositions of the University community at all levels. Thus, some information on gender asymmetries among students and academic staff are available in the reports on university research and teaching activities produced by the University Evaluation Group. Finally, two ad hoc surveys were conducted in 2006 (Schizzerotto 2007) and 2010 on PhD graduates in order to monitor their career trajectories and to obtain some information of their PhD experience.

2. MAPPING THE INDICATORS AT THE NATIONAL LEVEL

Over the last ten years, four main dynamics have come to characterize the Italian academic system and thus have significantly re-drawn overall chances of pursuing a scientific career:

1. The steady increase in the number of PhD-holders, which has almost tripled between 1998 and 2013 (Fig 1).
2. The flexibilisation/precarization of the early-stages research positions introduced in 2005 by the Moratti reform (Law n. 230/2005) and completed in 2010 by the Gelmini reform (Law n. 240/2010). The main changes related to academic careers concern the abolishment of permanent assistant professors positions and the subsequent introduction of fixed term research positions (for more details see Bozzon et al. 2015; Rapetti et al. 2015; Peroni et al. 2015).
3. The substantial modification of recruitment and promotion procedures, in order to limit collusive behaviour as well as to increase competition within the academic system[3]. The recruitment procedure was reorganized and partially (re)centralized in 2010 through the introduction of a 'national scientific qualification' (NSQ)[4] as a mandatory prerequisite to access permanent positions (associate and full professorships)[5]. Moreover, as the Gelmini reform stresses the importance of 'merit evaluation', selection processes have witnessed a significant increase in the use of bibliometric indicators and other quantitative measures of academic performance.
4. The increasing level of restrictions imposed to the University system in order to reduce public expenditure. More in particular, since 2009 the academic staff turnover has been limited by law (at a threshold of 50% on the ceasing staff for the recent years) (Donina et al. 2014: 7). Moreover, in conjunction with the economic crisis, severe cuts to University public funding have been set by law (-18.7% between 2008 and 2013). Such budget restrictions have in fact been imposed in an overall context where the national

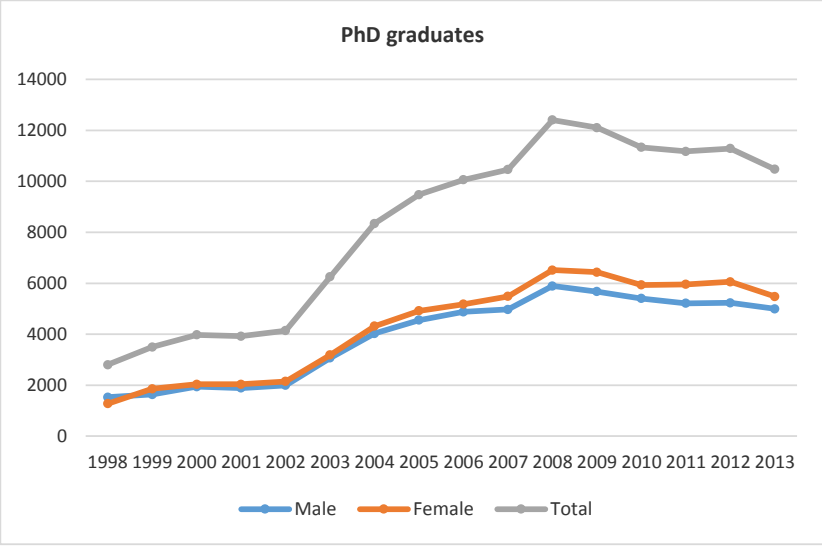
[3] The Italian university system is regulated by national laws and by local statutes. Recruitment procedures, employment conditions and salaries fall under the control of nation-wide norms.

[4] In Italian: Abilitazione Scientifica Nazionale (ASN).

[5] With the current rules, to move up to a professorship position, a researcher needs first to get what is called *idoneità* (i.e. a scientific qualification); that is, he/she has to apply for a national competition in order to be acknowledged as 'idoneo' (employable, or fit for service) by a national committee within a specific "research field" (settore disciplinare). Once the national committee has provided the list of 'candidati idonei', those candidates can proceed to the second step and apply for a position at a local university, within a period of four years. If the candidate does not get a position within this period, s/he must apply again for the 'idoneità'. Candidates who do not pass the national competition have to wait for two years to re-apply.

research and development expenditure is considerably lower than the OECD average, and has remained steady between 2001 and 2011 (Oecd 2013; Martucci 2011).

Figure 1 – PHD graduates in Italy – 1998-2013



Source: MIUR "Indagine sull'Istruzione Universitaria", May 2015 - http://statistica.miur.it/scripts/postlaurea/vpostlaurea.asp

The current composition of the academic staff reflects the consequences of these dynamics. Table 1 shows the distributions of men and women in a typical academic career in Italy in three different moments: in 2003, before the abovementioned reforms; in 2008, during the legislative reform process; and in 2013, three years after the introduction of the Gelmini reform. The table shows the involvement of men and women in each position and, for each position, its level of feminization.

Between 2008 and 2013, a consistent decrease in the number of the Italian permanent academic staff occurred - from 62768 to 53446 employees (-14.9%) - mainly due to the massive retirement of part of the permanent academic staff (full, associate, and assistant professors) recruited in the first part of the Eighties. Such decrease went hand in hand with a steadily increase of the new non-permanent positions, post-doc research fellows, and fixed term researchers. In 2013 temporary positions accounted for 29% of the total research staff (academic staff plus postdoc research fellows) while their incidence was around 22% in 2008.

The proportion of temporary research positions grows up to 93.2% for researchers aged less than 35 and up to 51.8% for the age class 35-39 (Table 2). Women shows higher level of job instability: for women aged 35-39 the share of temporary positon is 55.8% while for men aged 35-39 this share is 48.4%.

Despite these substantial changes in the composition of the Italian research staff, the *gender gap* among the various academic positions seems to remain stable over time. Because the outgoing flows from the academic system - mainly due to retirements- have not been not compensated by a virtuous recruitment and promotion process, small improvements have been made on re-balancing the proportion of men and women at the top of the academic hierarchy (*vertical segregation*). While women in 2003 were only 15.9% among full professors and 31% among associate professors, in 2013 they were respectively 21.1% and 35% (Table 1). These changes correspond to the ones documented at the European level in *She Figures 2012* (EU, 2013: 88).

Frattini and Rossi (2011) documented that the disadvantage (understood as transition rate) of Italian female academic staff in career advancements has not changed between 2000 to 2011 – both for the transition to associate professorship and to full professorship (Frattini and Rossi, 2012). Lower chances in career advancement are documented also for women in physics (Lissoni et al. 2011), in the field of economics (Corsi 2014), and for employees of the CNR (National Research Council) (Palomba 2000; Menniti and Cappellaro 2000).

The structure of the Italian academic hierarchy maintains a scissor pattern. According to the data, female students outnumber male ones; the proportion of women and man is quite balanced among PhD students, PhD graduates, and post-doc research fellows. However, the transition into the academic career corresponds to a typical drop of female presence in assistant professor positions: only 45.6% among permanent assistant professors are female and 43.1% among fixed term assistant professors (these latter are mainly the researchers hired after the introduction of the Gelmini reform).

This scissor pattern varies substantially across fields of study (Table 2) (*horizontal segregation*). Women are still strongly under-represented in all academic positions in engineering and technology and thus draw a "*non-scissor pattern*" (Badaloni et al., 2011). In the natural sciences, the gap is still relevant among senior positions, but is significantly reduced among PhD students and postdocs[6]. Recently, the access to and the participation of women in STEM has been addressed by several initiatives. The number of women who take up a career in the scientific sector has remarkably increased in the past 25 years, and there is a positive evolution in the number of female students and graduates in STEM. However, the gender gap remains over the career evolution and reaches particularly striking levels when considering top positions.

The pictures for the SSH disciplines is quite different in terms of gender balance. Within humanities, males are over-represented only among full professors, while females weight more than males in the distribution of the early stages positions.

This trend does not exclude the presence of a leaky pipeline if we take into account that, among graduate students, females are more than 80% in this field (OECD, 2014) and their proportion drops by 20 percentage points among PhD graduates. This means that male graduated in this field are more frequently involved in the PhD courses than women.

In the social sciences, the distribution of male and female appears quite balanced among PhD graduates and post-doc research fellows but the scissor blades are particularly open

[6] The classification adopted in this report (Canberra classification adopted by Oecd) partially hides the heterogeneity among the various areas within the natural sciences group. While women are strongly under-represented in Mathematics and Physics describing a pattern closer to the Engineering field, in Biology and Chemistry the gap between men and women is almost nullified among students and in the earlier research positions.

when considering the top positions. This pattern has remained almost stable over the last ten years. A recent report on the status of the members of the Italian Economic Association (SIE) (Corsi 2014) shows that for women in this disciplines the persistence role in lower bands (assistant professor positions) seems to be more frequent. In the same way, career advancements are slower and more difficult, whereas male career trajectories seem to be faster and linear (Corsi and Zacchia 2014).[7]

As largely documented (Badaloni et al. 2011; EU 2013; Lasconi et al, 2011; Ajello et al. 2008), one of the main bottlenecks for women within universities is situated between the end of the PhD and early career stages.

The significant growth in the numbers of the PhD holders occurred over the last 20 years has increased the level of competition during the early stages of scientific careers (Fig 1). The increase in the numbers of PhD graduates characterizes all fields of study, although the SSH disciplines – which have a weaker link with the labour market - show even a sharper growth (Argentin et al. 2012).

In this regard, the main critical aspect is that in Italy the number of PhD holders has increased more than the demand of PhD holders. Thus, such growth has been accompanied by a reduction of chances to pursuit a career within the Italian academic system. Observers estimated that in the decade 2004-2013, only 6.7% of researchers with a temporary position actually succeeded in obtaining a permanent position in academia (Toscano et al. 2014). Conversely, the diminished capability of the Italian academic system to absorb all these resources has been compensated only partially by an increased chance to obtain a research position outside academia (Martucci 2011; Ballarino Colombo 2010). Indeed, in Italy a PhD degree is not appreciated outside academia and it does not entail any added value to facilitate the access other positions both in the public and in the private sector (Bonatesta et al. 2014; Kehm 2007).

The opportunities to find more qualified and better-paid positions are the main reasons that motivate Italian PhD holders to leave Italy (Istat 2015b). Data confirm that among the PhD holders moving abroad, 68% are employed in universities and research centres, while this proportion drops by 27 percentage points among PhD holders who live in Italy (40.9%) (Istat 2015a). Women are less likely to move abroad than men and personal as well as family issues are the main reasons that prevent international mobility (MORE2 2013).

[7] The report also shows that the investment of women in the profession (in terms of education, organizational activities and research) is significant, equivalent to, if not higher than that of men. However, women face difficulties in career advancement. In particular, women do not succeed especially when cooptation is at work and some professional skills are acknowledged. Women (especially the younger cohorts) do research, but they are less visible and less involved in professional networking. Moreover, about 43% of the women in the sample survey acknowledge to have suffered from some form of discrimination (but only 18% among men), and 67% of cases are related to the mere fact of being a woman. On a personal level, the data show that for a significant number of women there is a trade-off between family and work: a large share of female economists in Italy do not live with a partner and do not have children (Corsi 2014b).

Table 1 – Proportions of men and women in a typical academic career, 2003, 2008 2013

	2003				2008				2013			
	M	F	TOT	F/TOT%	M	F	TOT	F/TOT%	M	F	TOT	F/TOT%
Academic staff (a+b+c+d):	*39109*	*17371*	*56480*	*30.8*	*41812*	*21524*	*63336*	*34.0*	*35954*	*20654*	*56608*	*36.5*
Permanent positions												
Full professor (a)	15095	2862	17957	15.9	15364	3565	18929	18.8	10955	2935	13890	21.1
Associate professor (b)	12459	5638	18097	31.2	12080	6176	18256	33.8	10278	5532	15810	35.0
Assistant professor (c)	11555	8871	20426	43.4	14044	11539	25583	45.1	12923	10823	23746	45.6
Temporary positions												
Fixed-term researchers (d)	-	-	-	-	324	244	568	43.0	1798	1364	3162	43.1
Research staff												
Post-doc research fellows	4857	5400	10257	52.6	5712	6097	11809	51.6	9592	10107	19699	51.3
Research collaborators involved in research activities (1)	3653	3224	6877	46.9	2692	3053	5745	53.1	4222	3946	8168	48.3
PhD graduates	3066	3183	6249	50.9	5894	6514	12408	52.5	4994	5480	10474	52.3
PhD students	14372	15078	29450	51.2	17830	19890	37720	52.7	16281	17614	33895	52.0
MA/BA Students	779324	988971	1768295	55.9	780567	1028932	1809499	56.9	737318	972090	1709408	56.9

Source: our elaborations on Miur data ("Banca dati dei docenti di ruolo" and "Banca Dati del Personale Docente a Contratto e Tecnico Amministrativo"), May 2015, http://statistica.miur.it/

Note: (1) research collaborators are not considered part of the research staff.

Tab 2 – Distribution of research staff (Academic staff and postdocs) by age class. Italy 2013

	Total								
	min/34	35-39	40-44	45-49	50-54	55-59	60-64	>=65	Total
Full prof.	0.0	0.2	2.6	11.6	23.6	34.7	45.6	69.6	19.1
Associate prof.	0.1	3.3	16.7	33.3	40.1	34.5	30.5	28.5	21.8
Assistant prof.	6.5	44.5	60.2	49.0	34.2	29.8	23.5	1.5	32.7
Fixed term assistant prof.	7.0	12.0	5.8	2.0	0.7	0.2	0.1	0.1	4.0
Postdocs	86.5	40.0	14.8	4.1	1.4	0.7	0.2	0.3	22.4
Total	100	100	100	100	100	100	100	100	100
	Women								
	30-34	35-39	40-44	45-49	50-54	55-59	60-64	>=65	Total
Full prof.	0.0	0.0	1.2	5.5	13.2	23.6	32.9	59.7	10.2
Associate prof.	0.0	1.8	13.2	29.5	39.2	36.2	34.2	38.5	19.2
Assistant prof.	5.6	41.9	61.9	57.1	44.4	38.7	32.0	1.4	37.6
Fixed term assistant prof.	6.0	11.6	5.6	2.2	0.9	0.3	0.4	0.1	4.4
Postdocs	88.3	44.6	18.0	5.7	2.3	1.1	0.5	0.4	28.5
Total	100	100	100	100	100	100	100	100	100
	Men								
	30-34	35-39	40-44	45-49	50-54	55-59	60-64	>=65	Total
Full prof.	0.0	0.4	3.7	15.8	29.4	40.3	51.9	72.3	24.9
Associate prof.	0.1	4.5	19.6	35.9	40.6	33.6	28.5	25.8	23.4
Assistant prof.	7.3	46.7	58.7	43.4	28.5	25.3	19.2	1.5	29.4
Fixed term assistant prof.	7.9	12.3	5.9	1.8	0.6	0.2	0.1	0.1	3.7
Postdocs	84.8	36.1	12.1	3.1	1.0	0.5	0.2	0.3	18.4
Total	100	100	100	100	100	100	100	100	100

Source: our elaborations on Miur data, February 2015.

Table3 – Proportions of men and women in a typical academic career by fields of study, 2003, 2008 2013

	2003				2008				2013			
	M	F	Tot	F/Tot*100	M	F	Tot	F/Tot*100	M	F	Tot	F/Tot*100
Natural sciences												
full prof.	4466	765	5231	14.6	3814	846	4660	18.2	2514	694	3208	21.6
Associate	3830	1852	5682	32.6	3124	1839	4963	37.1	2505	1576	4081	38.6
Assistant	2652	2354	5006	47.0	3110	3160	6270	50.4	3046	3051	6097	50.0
Fixed term researchers									371	304	675	45.0
Post-doc	na	na	na		1612	1744	2151	42.8	2351	2448	4799	51.0
PhD graduates	829	993	1822	54.5	1283	1438	2721	52.8	1191	1268	2459	51.6
Medical science												
full prof.	2237	218	2455	8.9	2287	297	2584	11.5	1657	261	1918	13.6
Associate	2554	655	3209	20.4	2529	768	3297	23.3	2022	669	2691	24.9
Assistant	3117	1607	4724	34.0	3352	2032	5384	37.7	2723	1879	4602	40.8
Fixed term researchers									206	171	377	45.4
Post-doc					451	1198	1649	72.7	649	1669	2318	72.0
PhD graduates	329	523	852	61.4	775	1282	2057	62.3	600	1064	1664	63.9
Engineering/architecture												
Full prof.	1989	159	2148	7.4	2708	255	2963	8.6	2045	237	2282	10.4
Associate	1706	305	2011	15.2	2218	476	2694	17.7	2014	496	2510	19.8
Assistant	1321	475	1796	26.4	2568	976	3544	27.5	2418	965	3383	28.5
Fixed term researchers									384	161	545	29.5
Post-doc					1964	894	2858	31.3	3107	1462	4569	32.0
PhD graduates	809	369	1178	31.3	1448	739	2187	33.8	1329	719	2048	35.1
Agricultural science & Veterinary												
Full prof.	889	105	994	10.6	864	138	1002	13.8	607	112	719	15.6
Associate	651	246	897	27.4	626	313	939	33.3	543	317	860	36.9
Assistant	561	430	991	43.4	716	609	1325	46.0	680	617	1297	47.6
Fixed term researchers									67	62	129	48.1
Post-doc					362	434	796	54.5	504	677	1181	57.3
PhD graduates	174	207	381	54.3	333	339	672	50.4	309	331	640	51.7
Social sciences												
Full prof.	2987	523	3510	14.9	3396	782	4178	18.7	2604	709	3313	21.4

Associate	1817	823	2640	31.2	1956	1065	3021	35.3	1817	1058	2875	36.8
Assistant	1533	1201	2734	43.9	2451	2131	4582	46.5	2328	2035	4363	46.6
Fixed term researchers									385	284	669	42.5
Post-doc					832	870	1702	51.1	811	940	1751	53.7
PhD graduates	552	523	1075	48.7	899	1048	1947	53.8	805	891	1696	52.5
Humanities												
Full prof.	2177	999	3176	31.5	2295	1247	3542	35.2	1528	922	2450	37.6
Associate	1591	1556	3147	49.4	1627	1715	3342	51.3	1377	1416	2793	50.7
Assistant	1256	1911	3167	60.3	1847	2631	4478	58.8	1728	2276	4004	56.8
Fixed term researchers									235	293	528	55.5
Post-doc					560	891	1451	61.4	649	960	1609	59.7
PhD graduates	373	566	939	60.3	708	1080	1788	60.4	697	1116	1813	61.6

Source: our elaborations on Miur data ("Banca dati dei docenti di ruolo" and "Banca Dati del Personale Docente a Contratto e Tecnico Amministrativo"), May 2015, http://statistica.miur.it/

Recent data on doctorate holders' vocational integration (Istat 2015a; 2010) show that PhD holders do not face serious risks to remain outside of the labour market, when compared to other level of education[8]. Employment is particularly high among doctorate holders in mathematics and computer sciences, industrial and information engineering (more than 97% for the 2008 doctorate holders and more than 95% for the 2010's ones). Conversely, historical, philosophical, pedagogical and psychological sciences doctorate holders have a lower percentage of employed (around 88 percent) (Istat 2015a). Between 2009 and 2014 there has been a growth of PhD holders working abroad: in 2009, only 7% of the PhD graduates belonging to 2004 and 2006 cohorts were working in another country, but in 2014 this was the case for 12.9% of the PhD graduates in 2008 and 2010.

Argentin et al. (2014) examined possible advantages deriving from the achievement of a PhD position in terms of quality of employment conditions show that PhD holders seem to have lower risks of being employed in underqualified positions with respect to graduates. However, according to the authors, PHD holders face higher levels of job instability both in the short and in the long run, without a specific advantage in terms of wages especially for those work inside the academic system.

The share of doctorate holders employed in a fixed-term employment in 2014 was 43.7% for the PhD who graduated in 2008, and 53.1% for the 2010 PhD graduates cohort. These percentages are higher than those registered in 2009, when only 35.1% of the 2004 graduates and 43.7% of the 2006 ones were employed under the same conditions (Istat 2015a). The increase in job instability among the recent cohorts of PhD holders is a trend that pertains to both researchers working within the University system and those working outside academia with a research or a non-research position (Istat 2015a; Schizzerotto 2007; Toscano et al. 2014; Argentin et al. 2014).

In relation to tasks performed at work, almost one fourth of the PhD holders do not perform any research and development activities in the immediate aftermath of their PhD graduation (Table 3) (Istat 2015a). The chances of not performing research and development tasks is higher in the disciplines that are more connected with some liberal professions (e.g., medicine). At the same time, the share of researchers who perform exclusively research and development activities has significantly reduced by 10 percentage points between 2009 and 2014 (Table 3). This indicator suggests that PhD holders face increasing difficulties to actually continue their research career as job positions available on the market do require a wider range of skills.

In this context, female PhD holders show systematic disadvantages when compared with male PhD graduates. Such disadvantages can be summarized as follows:

- Higher chances of being employed in a fixed term position: for the 2008 PhD holder cohort, the percentage of fixed term position is 48.6% for women and 38.5% for men; while for the 2010 cohort it rises to 57,6% for women and 48.4% for men (Istat 2015a:4).
- Lower average wages independently from the field of specialization (Istat, 2015, 2010) and controlling for part-time job (Istat 2010).
- Lower chances to perform research and development activities in their job or to be employed in the academic and scientific sectors. Moreover, women employed in the

[8] In 2014, 91.5% of the 2010 doctorate graduates were employed and 7% were looking for a job while the 93.3% of 2008 PhD graduates were employed and 5.4% were looking for a job.

academic system take more time to enter in a tenured position (Istat 2010; Schizzerotto 2006; Toscano et al. 2014).

- Lower chances to be involved in research activities when women have children, or when they delay the PhD graduation because of family issues. These disadvantages are more marked for women with a specialization in the natural sciences and engineering (Bozzon, Murgia, Poggio 2015). However, there is no evidences that not having children produces positive effects in climbing the career ladder (Palomba, 2008).
- Lower levels of job satisfaction with respect to career prospect, economic remuneration, autonomy, job security, tasks performed, and use of their scientific knowledge. Women results particularly unsatisfied with career opportunities and job security (Istat 2010, 2015a).

Table 4 – Distribution of different cohorts of PhD holders by the frequency they perform research and development activities in their current job (Only PhD holders employed)

	Cohort 2004 – situation in 2009 (after 5 years)			Cohort 2006 – situation in 2009 (after 3 years)		
	Male	Female	Total	Male	Female	Total
Yes, almost all the time	50.0	47.2	48.6	48.9	44.7	46.8
Yes, occasionally	28.8	25.7	27.3	28.3	26.8	27.5
No	21.2	27.2	24.1	22.9	28.5	25.7
.	Cohort 2008 – situation in 2014 (after 6 years)			Cohort 2010 – situation in 2014 (after 4 years)		
	Male	Female	Total	Male	Female	Total
Yes, almost all the time	40.8	33.9	37.3	42.5	38.2	40.3
Yes, occasionally	36.8	35.5	36.1	35.4	32.8	34.1
No	22.4	30.6	26.6	22.1	29.0	25.6

Source: for cohorts 2008 and 2010, Istat 2015a; for cohorts 2004 and 2006 our elaboration on data "Survey on Doctorate Holders' Vocational Integration – Istat, 2010" (weighted data).

3. MAPPING ORGANIZATIONAL INDICATORS

The University of Trento (UNITN) is a medium size university for the Italian context, with 16119 students and 587 professors (permanent academic staff and fixed-term assistant professors) enrolled in 10 Departments and 3 Interdepartmental Centres[9].

UNITN is one of the Italian universities with the lowest presence of women among its research and academic staff (Frattini, Rossi, 2012). In 2014, the proportion of women in whole academic staff[10] was 27% while the Italian average was 36% (Table 5 and Table 1).

[9] Over the last years the institution has undergone profound changes. The most important is the Devolution of the University: in July 2011 the Italian government approved a legislative decree which devolved to the Autonomous Province of Trento (PAT) the national normative and administrative functions pertaining to the University of Trento (d. Lgs. 142/2011) (for more details see deliverable wp7). This transition has implied an increase of the levels of autonomy of the University from the national level.

[10] Academic staff is composed by the sum of full professors, associate professors, permanent assistant professors and fixed term researchers.

Only Italian Polytechnics have a similar composition, but the University of Trento hosts 5 Departments of SSH disciplines where, as we have seen above, women are generally more represented.

The low presence of women characterizes also the gender composition of UNITN boards: at the end of 2014, women were only 20% of the total number of boards' members and within each board or committee often there is only one woman (Rapetti et al. 2015).

Fig. 2 compares the proportion of men and women in a typical academic career at the University of Trento and in Italy in 2013. The resulting diagram confirms that the scissor pattern characterizing gender unbalanced in all positions is more marked at UNITN. Thus, as it shows, the higher the position in the hierarchy, the larger the gap between the scissor's blades – i.e., the greater the inequality. In particular, the proportion of women among full and associate professors at the University of Trento is lower than that documented in Italy in 2002 for the same positions.

This situation has slightly changed during 2014. In one year, the balance between male and female among associate professors has improved whereas it has reduced by 5 percentage points among permanent researches. This change is mainly due to the unusual internal promotions of permanent assistant professors to the position of associate professors approved by the University Senate after the publication of the results of the first 'national scientific qualification' (NSQ). This internal flow has involved overall 72 permanent assistant professors (40 males + 32 females) out of the 164 (98 males + 66 females) present within UNITN at the end of 2013[11]. The transition rate for assistant professors to associate professors in 2014 was higher among women than among men (respectively 48% and 41%[12]).

This process of career advancement followed two steps. In the first step, the "Committee for recruitment and career advancement"[13] selected among permanent assistant professors with the national scientific qualification the 15 most deserving ones. These individuals have been promoted independently by the needs of their Departments. The selection criteria declared in the related documents were based on publication indexes and research quality. However, no details are provided on which dimensions have actually been considered nor on how they have been weighted. Only 3 women out of 44 (6%) with the national scientific qualification were included in the final list of the most deserving researchers, against 12 men out of the 75 granted with the same qualification (16%). Hence, research performed by women seems to be underestimated according to the organizational criteria.

In a second step, each Department proposed other cases for career advancement according to their specific research and teaching needs[14] as well as to budgetary constraints (Rapetti et al. 2015).

[11] Values derived by official documents of the Academic Senate of the University of Trento available at: http://www.unitn.it/ateneo/50721/senato-accademico. At the beginning of 2015 there were other 3 promotions (2 males 1 female).

[12] It is the ratio% between the number of male or female promoted divided by respectively the number of male and female assistant professor presented in UNITN on 31/12/2013. We have not excluded the retired in 2014.

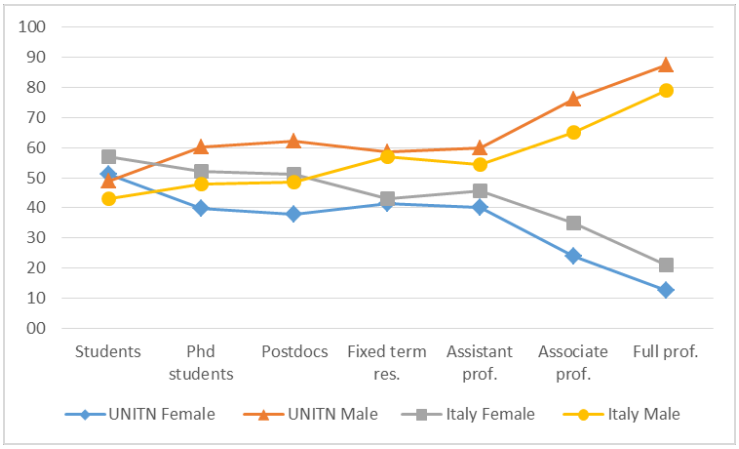
[13] The committee for recruitment and career advancement is a board that support the Governance of the University. It aims at enhancing the quality of recruitment and the advancement of the careers of professors and researchers. It is currently composed by 5 professors (4 men and a woman).

[14] In this occasion, the university senate has introduced a measure to support the call of academics of the less represented gender. University supports a quarter of the cost of all calls of less represented gender both in advancement of career and in external calls. (Rapetti et al. 2015).

These career advancements, which were not complemented by an equivalent flow from the position of associate professors to full professorship and were pursued in combination with the exit of some members from the permanent academic staff, have not helped reducing the overall vertical segregation within the University of Trento structure. On the contrary, there has been a slightly growth of the glass ceiling index due to the relative increase in the proportion of women among fixed-term assistant professors (from 21% in 2010 to 39.5% in 2014) (Table 5).

About the level of feminization of the post-doc research fellows, the recent reduction in the proportion of women is mainly due to the concentration of these positions in the scientific departments where they are generally under-represented. One fifth of the postdoc research fellows who are working at the University of Trento are part of the Department of Engineering and Computer Science. Differently from fixed term-researchers, postdoc research fellows are not part of the academic staff, but they are nonetheless involved in research activities financed by research projects. Hence, they reflect the capacity of each department to be involved in research networks and gathering research funding.

Figure 2 – Scissor diagram, University of Trento and Italy 2013



Source: For Italy: Miur data; for UNITN: Ufficio Studi.

Table 5 – Proportions of men and women in a typical academic career at the University of Trento, 2010-2014

	2010			2011			2012			2013			2014		
	M	F	F/ (M+F)%	M	F	F/ (M+F)%	M	F	F/ (M+F)%	M	F	F/ (M+F)%	M	F	F/ (M+F)%
Academic staff (a+b+c+d)	*436*	*141*	*24.4%*	*422*	*142*	*25,2%*	*425*	*147*	*25.7%*	*431*	*158*	*26.8%*	*431*	*155*	*26.5%*
Permanent positions															
- Full professors (a)	159	22	12.2%	154	23	13.0%	161	22	12.0%	155	22	12.4%	150	20	*118%*
- Associate professors (b)	137	42	23.5%	140	39	21.8%	140	43	23.5%	141	44	23.8%	181	75	*29.3%*
- Assistant professors (c)	125	73	36.9%	112	72	39.1%	100	68	40.5%	98	66	40.2%	56	31	*35.6%*
Non-permanent positions															
- Fixed -term assistant Professors type-A & B and Moratti (d)	15	4	21.1%	16	8	33.3%	24	14	36.8%	37	26	41.3%	44	29	39,7%
Postdocs	50	44	46.8%	103	74	41.8%	139	93	40.1%	176	107	37.8%	196	111	36,2%
Research collaborators involved in research activities (a)	79	63	44.4%	158	146	48.0%	234	192	45.1%	298	219	42.4%	295	244	45.3%
PhD students	302	237	44.0%	313	239	43.3%	341	236	40.9%	345	229	39.9%	376	245	39.5
N STUDENTS	7350	7876	51.7%	7648	8283	52.0%	7947	8384	51.3%	7927	8338	51.3%	7988	8131	*50,4%*
Glass Ceiling Index		*2.01*			*1.94*			*2.14*			*2.16*			*2.25*	
Glass Ceiling Index with post-docs		*2.27*			*2.24*			*2.48*			*2.45*			*2.53*	

Source: Ufficio Studi Unitn

If we move our focus onto the two Departments involved in the Garcia project, the Department of Sociology and Social Research (DSRS) and the Department of Information Engineering and Computer Science (DISI), we can notice that both of them are strongly unbalanced in terms of sex distribution across academic positions. Also, in both cases, the level of feminization of the academic staff is systematically lower than the national average of the related academic fields (Table 6 & Table 7).

The academic staff of the Department of Sociology and Social Research is composed by 33 men and 16 women. There is only one women among full professors, while 9 are currently associate professors due to the promotions obtained in 2014. However, it should be stressed that, in these case, all the permanent assistant professors who got the national scientific qualification were involved in a career advancement (Table 6).

The distribution of men and women occupying temporary positions at the DSRS is quite balanced: at the end of 2014, on 9 fixed-term assistant professors, 4 were women; and on 13 postdoc research fellows, 8 were women.

It has to be noticed that, at the time of writing (end of May 2015), the Department hosts only 7 post-doc research fellows ("assegnisti") (2 males and 5 females). In 5 months, 6 postdoc positions have expired and, out of these, 2 have been replaced with fixed-term research collaborations – i.e., temporary contracts usually put in place when research funds do not grant the coverage of 12 months of post-doc activity (that is the minimal required duration of a post-doc grant)[15].

In the Department of Information Engineering and Computer Science, the academic staff counts overall 45 members of which only 5 are women (2 associate professors and 3 assistant professors). There are no women among full professors. No women have been promoted as consequence of the national scientific qualification (Table 7).

The presence of women is relatively higher among postdoc research fellows (20%, i.e., 12 females out of 60 postdoc researchers). Interestingly, at the end of 2014, the postdocs outnumbered the members of the academic staff by 15 units. Moreover, the total amount of postdocs has tripled from 2012 to 2014. because post-doctoral positions can be financed by local, national and international funding, this trend reflects the considerable capacity of this Department to be involved in research networks and projects at all levels (indeed, in 2013 the DISI was hosting 166 active research projects[16]). Finally, this Department has an unusual high presence of foreign PhD students and postdocs if compared with the local and Italian context. As documented in the Department Strategic Plan, 60% of PhD students and 40% of postdocs come from other countries.

[15] The minimum amount of a post-doc grant is 19367 euros.

[16] For more details see Rapetti et al. 2015 and Peroni et al. 2015.

Table 6 – Proportions of men and women in a typical academic career at the Department of Sociology and Social Research, University of Trento (2012-2014)

	Department of Sociology and Social Research								
	2012			2013			2014		
	M	F	%F/TOT	M	F	%F/TOT	M	F	%F/TOT
Academic staff (a+b+c+d)	*37*	*16*	*30.2%*	*37*	*17*	*31.5%*	*33*	*16*	*32.7%*
Permanent positions									
Full prof. (a)	15	2	11,8%	14	2	12,5%	11	1	8,3%
Associate prof. (b)	9	3	25,0%	9	3	25,0%	16	9	36,0%
Assistant prof. (c)	10	10	50,0%	9	9	50,0%	1	2	66,7%
Non-permanent positions									
Fixed term assistant professors (d)	3	1	25,0%	5	3	37,5%	5	4	44,4%
Temporary research staff									
Postdocs research fellows (Assegnisti)	3	4	57,1%	6	9	60,0%	5	8	61,5%
Phd students	11	12	52,2%	7	9	56,3%	9	10	52,6%
Students	620	1341	68,4%	577	1247	68,4%	517	1128	68,6%
GCI	*2,6*			*2,5*			*3,9*		
GCI wirh post-docs	*2,8*			*3,0*			*4,6*		

Source: Ufficio Studi Unitn

Table 7 – Proportions of men and women in a typical academic career at the Department of Engineering and Computer Science of the University of Trento (2012, 20132014), and in the field of Industrial engineering.

	Department of Engineering and Computer Science								
	2012			2013			2014		
	M	F	%F/TOT	M	F	%F/TOT	M	F	%F/TOT
Academic staff (a+b+c+d)	*40*	*4*	*9.1%*	*40*	*5*	*11.1%*	*40*	*5*	*11.1%*
Permanent positions									
Full prof. (a)	11	0		10	0		10	0	
Associate prof. (b)	17	2	10,5%	18	2	10,0%	22	2	8,3%
Assistant prof. (c)	8	2	20,0%	8	2	20,0%	4	2	33,3%
Non-permanent positions									
Fixed term assistant professors (d)	4	0		4	1	20,0%	4	1	20,0%
Temporary research staff									
Postdocs research fellows (Assegnisti)	24	14	36,8%	39	11	22,0%	48	12	20,0%
Phd students	121	39	24,4%	121	43	26,2%	112	36	24,3%
Students	1046	125	10,7%	1097	150	12,0%	1161	175	13,1%

Source: Ufficio Studi Unitn

4. INTERPRETATIVE ANALYSIS

4.1 The situation in Italy

In spite of the general growth of their educational endowment and their considerable involvement in PhD programs, women continue to suffer from systematic disadvantages in career advancement. In the same way, they continue to be strongly underrepresented among the top position in the academic hierarchy. These disadvantages in the research and

development sectors and in the academic system reflect their difficulties in the wider Italian labour market[17].

In the same way, the growing levels of temporary research positions in the academic system clearly mirrors the rising levels of job insecurity that has characterized the Italian labour market over the last 20 years, which has fostered a market segmentation between fully included workers and marginal workers based on a generational divide. The new generation of workers suffers from significant disadvantages in gaining access to jobs with adequate rights and social security provisions (Bozzon et al. 2015). The situation is particularly discouraging for postdoc research fellows. Since postdoc grants ("assegni di ricerca") are not formally considered tantamount to job contracts, post-doc holders are not entitled to receive any unemployment benefit or other social security provisions. Thus, the lack of welfare supports is not compensated by higher wages but, quite the opposite, postdoc positions are considerably lower in Italy than the European average (Martucci 2011).

Job insecurity appears to be the most important barrier to pursue a research career (MORE2 2013) and produces negative consequences on researchers' ability to manage their present and future work. The lack of research funding or the non-renewal of research contracts seem to be the most important reasons motivating individuals to leave research (Toscano et al. 2014; Ajello et al. 2008).

Researchers in the early stages of their careers face stressful and pressuring contexts, as they are required to be at the same time passionate, productive, mobile, accountable, and competitive (del Rio et al., forthcoming; Peroni, 2015). The growing competition for permanent positions has produced a strong increase of pressure within the academic context where scientific production has accelerated its pace, entails competition at the national and at the international levels and imposes hyper-productivity and accountability (del Rio et al. forthcoming).

Furthermore, the limited time span of postdoc grants (usually one or two years, even if they are renewable up to 6) may affect negatively the chances to meet the expected research performance and can amplify the effects of competition and uncertainty making careers more vulnerable to an early termination. This may happen for different reasons. On one side, the need to find a new job before the current position expires overlaps with fundamental research and writing activities (Toscano et al. 2014). On the other side, unexpected events such as health problem, childbirth, or other type of events force to ease out job activities (Petersen et al. 2012; Falcinelli and Guglielmi 2014).

In this context, the general lack of social supports and unemployment provisions as well as the lack of policies and practices that are explicitly targeted to promote gender equality in academia (but also in the wider labour market), do actually increase the vulnerability of unstable workers. Toscano et al. (2014) documented that the most part of precarious researchers (84%) believe that their insecure work position is actually affecting in a negative way their work performance. Thus, they are often unable to give continuity to their job (43%) or to imagine their professional future in 10 years (50%). Temporary researchers involved in

[17] Italy continued to be among the worst performers in the Global Gender Gap Index (ranking 69th out of 142 overall in 2014), penalized above all by the economic participation and opportunity category (114th), while the gap in educational attainment was narrower (62th). Italy lags behind in women's access to the labour market, remuneration, career advancement, promotion to positions of leadership and new business initiatives (Bozzon et al. 2015).

the DISI and DSRS departments results really unsatisfied concerning the level of security and the chances of career advancements related to their job position (Figure 3)[18].

Hence, it is very likely that an increased number of postdoc researchers will have to seek jobs outside academia. In fact, it has been estimated that the current chances of recent PhDs to reach a tenure-track position is only 3.4%. Conversely, the 86,4% will exit from the Italian academic system after their period of research fellowship and the 10.2% after their period as fixed-term researcher of type A (Bonatesta et al. 2014: 33).

Relevance of research topics and the acquisition of additional skills and competences for non-academic labor markets have therefore became key challenges in doctoral education and training (Kehm 2007; Etzkowits and Ranga 2011) as well as in postdoctoral career development. Intersectorial mobility of researchers between academia and other economic sectors seems to be a growing policy priority (EU 2011). At the same time, supporting postdoc researchers in developing strategies to advance with coherent and competitive careers is even a more crucial matter.

Recent analyses on the consequences of the new rules on recruitment and career advancement introduced by the Gelmini reform shed some light on the persistence of some mechanisms that feed women's disadvantages in recruitment and selection processes.

The results of the first National Scientific Qualification pointed out a lower presence of women among Italian researchers habilitated to apply to permanent positions (associate and full professors). This result is mainly due to the lower number of female applications, rather than their lower success rate. In fact, there is only a negligible gender difference in the probability of success while the share of applicants on total 'potential candidates' is 48% among women and 54% among men (De Paola et al. 2014; Baccini and Rosselli 2014; Pautasso 2015).

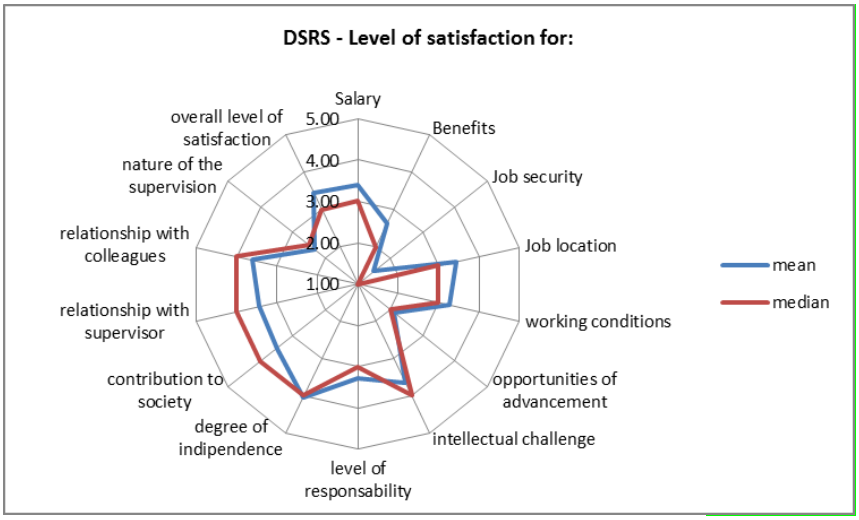
Women's aversion for risk in taking part in selections is documented also for other type of competitions, such as applications for research funding (Eu, 2013). Rather than focusing only on how to avoid gender bias in the assessment of female application, it is advisable to try to understand the reasons behind the low proportion of female applications (Pautasso 2015).

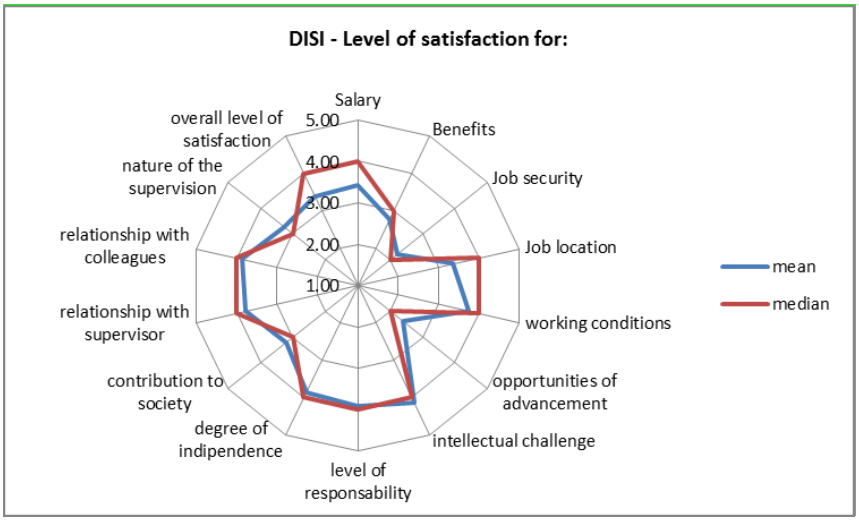
Several analyses, based on quantitative indicators, document that Italian female researchers continue to suffer from a certain productivity gap and are less competitive than men, facing *ceteris paribus* more difficulties than men in publishing (Baccini et al. 2014; D'Amico et al. 2011; Corsi and Zacchia 2014; Lissoni et al. 2011). Moreover, Lissoni et al. (2011) show that if female researchers manage to be promoted to higher ranks, then they publish as much as their male colleagues do.

Since the university system is leading to a massive use of quantitative indicators as a tool for evaluation of scientific activities at both the individual and the collective levels, it is crucial to foster the creation of networks aimed at promoting the role of women as well as their scientific production (Corsi and Zacchia 2014). At the same time, there is a deep need for a genuine knowledge on how different indicators and bibliometric databases work and may influence selection processes for different categories and scientific fields (first of all, the ones with a poor bibliometric tradition). In turn, this entails also a higher transparency in the criteria adopted and applied in the evaluation procedures both for national selections and at the organizational level (Rapetti et al. 2015).

[18] For more details on the Garcia web-survey see Chapter 9 in this report.

Figure 3 – Level of satisfaction of who is working with a temporary position (fixed term assistant professors and postdoc research fellows - for the current work position in the Garcia (1= very dissatisfied; 5=very satisfied) (DSRS n=18, DISI n=27)





Source: Garcia web-survey, 2015

4.2 The situation at the University of Trento

The picture drawn on the gender composition of the University of Trento is quite discouraging in terms of gender equality, in particular with reference to the low presence of women in the academic staff and within various governing bodies of the University, where decisions are made.

The need to reduce gender asymmetries is part of the objectives and statements included in the University Strategic Plan. However, their implementation in the actual procedures and practices is quite twisted.

In 2014, the UNITN senate has introduced a measure to support the inclusion of academics of the less represented gender with the aim to force the reduction of gender asymmetries in scientific career advancement (Rapetti et al. 2015). This measure has risen a lot of critiques within the University scientific community that has interpreted it not so much as an instrument to support gender balance but, rather, as a way to undervalue women scientific work.

Recently, the University governance has embodied the need to introduce measures to promote "merit evaluation" in recruitment and career advancement procedures as well as in procedures for funding assignment for research purpose. Quantitative indicators are systematically employed within university internal selections, even if there is still a wide debate on the definition of the type of indicators and on which are the thresholds that identify excellent performances.

Analysing the results of three internal competition for the career advancement of "excellent researcher" (see paragraph 3) and research funds allocation, Rapetti et al. (2015) point out that women result strongly underrepresented among winners.

It would be interesting to understand the reasons behind these results but, at this stage, few details are available on the evaluation criteria; on the results obtained by the selected/winner researchers and/or projects; as well as on the number and gender composition of participants. The main critique does not concern the lack of women *per se*, but it rather relates to the lack of transparency in the evaluation process (definition and application of evaluation criteria) and to the limited information about the various selection steps (Rapetti et al. 2015).

Further actions where the governance of the Trento University is putting effort to reduce gender asymmetries are: i) the constitution of CUG (Unified Committee for the Rights of the Employees)[19]; ii) the publication of the "Affirmative Action Plan 2014-2016"; and iii) the kick-off of the process to obtain the family audit certification. The effects of these actions, aimed at promoting work-life balance arrangements and increasing the level of wellbeing of men and women in the university community, will be assessed in the next years.

Certainly, a crucial point is understanding which categories are included in these activities. In fact, the majority of temporary positions, such as research and teaching collaborators and postdoc research fellows, are often excluded by or not fully included in university policies. Because postdocs are not employed with a dependent contract, they are simply not considered part of the university community.

[19] CUG (Unified Committee for the rights of the employees) combine the former CPOs (Equal Opportunity Committee) with the committees for protection against mobbing.

Such exclusion is becoming more and more problematic, in particular as postdocs are increasingly in charge of teaching and research activities. According to the data released by the Miur, in 2014, the University of Trento activated 539 collaborations to support research activities and the contracts for lecturer and teaching support in the academic year 2013/2014 were overall 957 (392 lectures and 555 tutors). Concerning post-doc research fellows, at the end of 2014 they were 307 and represented the 44% of UNITN overall research staff (academic staff + postdocs). It is therefore crucial to recognize the scientific and educational contribution that postdocs deliver to their University and thus give adequate visibility to their presence and to the role they play.

The condition of postdoc research fellows within the University organization is also quite problematic. From an organizational point of view, they are fundamental to carry on and develop research projects paid on external funding, that is one of the most important features on which the overall university performance is measured. In fact, postdoc research fellows' productivity (publications and projects funded) contributes to the department performance evaluation. At the same time, though, they are not entitled to benefit from research or mobility funds because they are not part of the dependent academic staff. Given the increasing importance of international experiences as well as of conference participation, the non-entitlement to any mobility funds limits postdocs' possibilities to improve their curricula (Rapetti et al. 2015) as well as to increase the value of their job skills, competences and productivity.

5. CONCLUSION

Early stages scientific careers in Italy are characterized by:

- The persistence and reproduction of gender asymmetries already at the early stages of career after PhD graduation.
- The rise of the level of precariousness and job instability experienced by the new generation of PhD holders.
- An increased level of competition for permanent positions that in turn follows from the inability of the University system to absorb the rising numbers of PhD holders, from the limited development of research positions in other sectors as well as from the low level of employability of doctorate holders outside academia.
- The persistence of disadvantages suffered by women both in terms of scientific productivity and during selection processes.
- The temporariness of research affects the quality of research outputs and the type of knowledge elaborated in academia.

The picture drawn in this work confirms a core statement of the leaky pipeline and glass ceiling debates. Also in the case examined the under-representation of women is drastically chronic and it will hardly self-correct in the foreseeable future (Badaloni et al. 2011; Frattini and Rossi 2012; Martucci 2011) nor it will naturally disappear over time as the numbers of women increase in the entry levels (Palomba 2001; EU 2013).

Already at early career stages, women employment positions are less stable and less paid than male ones and are more influenced by family and personal situations. These weaknesses are generally more evident in the STEM disciplines, but also the SSH fields,

where women are more represented, are not immune from unfair mechanisms that foster processes of exclusion of women from career advancements, governing bodies and positions of power.

At the institutional level, few measures are essential for improving women's status in scientific career (Etzkowitz and Ranga 2011b):

- changing recruitment, retention and assessment processes so that Universities are more transparent;
- providing equal support for men and women involved in scientific activities at every stage;
- including women in mentoring, peer review and research funding applications, gender monitoring and regular publishing of funding statistics, differentiated by discipline and research instrument.

Growing levels of precariousness and instability in the early stages of career, together with the low chances to obtain a permanent position inside the academic system, rise the necessity to support PhD holders to develop skills and competencies able to support inter-sectorial careers as well as to find effective strategies to give continuity to their personal career paths. The main idea is to overcome the linear (academic) path that underpins the leaky pipeline metaphor, moving to a non-linear model of careers across other sectors, new occupations and professions requiring scientific and research expertise (Vanish Box model) (Etzkowitz and Ranga 2011a).

The general vulnerability of postdoctoral positions ("assegnisti di ricerca") needs to be limited starting first and foremost from a redefinition of their ambiguous contractual condition. A first progress would be the inclusion of this position among the ones entitled to receive (at least) unemployment benefits, in order to better manage the high-level uncertainty that characterises (the early stages of) scientific careers.

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2. Belgium

By Farah Dubois-Shaik, Bernard Fusulier, Caroline Vinke

1. INTRODUCTION

The data for the national level were mainly summarized from a quantitative study conducted by Meulders et al. (2012), which give much useful information of the evolution of distribution of women and men in the different stages of the career for French-speaking Belgian Universities. Classification levels being somewhat different for the Flemish Universities, some holistic figures could be gleaned from SHE figures 2012. For the CDH follow up study on doctorate holders' careers, we referred to the report for Belgium compiled by Boosten et al. (2014) for the Belgian Science Policy Office (Belspo). This permits us to have some transversal information about the distributions in doctorate holders' careers according to sex, sector and further career positions etc. Having summarized and compiled this information, there are many figures that we feel need to be treated with caution as to prognostics or diagnostics made in terms of leaky pipeline and glass ceiling. In a classic sense of pure numbers, the figures calculated point to a progressive evaporation of women in the academic career ladder. However, this merely gives us information about the "leaks" and where they are located, which points to the doctoral stage of the career, in which numbers for women are seen to be inverted for the Belgian French-speaking universities. This is an important information in terms of where the "leak" is located and allows us to ask the question, why at this stage? Moreover, there is a lack of data in terms of the doctoral and postdoctoral stages of the career in more qualitative terms. We hope that the Garcia project allows us in modest terms to weave this question further and to analyse the qualitative interview data in 6.2, and to make a more transversal analysis with the other WP material, on organizational culture, recruitment procedures and deconstructing excellence, organizational structures and gender budgeting (see a part of this already in discussion/conclusion to this report). Moreover, an important step is to understand the modalities of the scientific/academic career in the Belgian and UCL case in order to situate the career. This would then take us a step further from merely analysing the "leaks" and glass ceilings, to understanding the nature of scientific/academic work and careers as it is conceived, structured, practised today (see Beaufays and Krais, 2005, Fassa et al. 2012, Fusulier and Del Rio Carral, 2012).

2. MAPPING THE INDICATORS AT THE NATIONAL LEVEL

2.1 Bachelor and Master students

The data we provide and had access to is mainly only for French-speaking Belgian Universities (apart from some overall SHE figure data), within which also features our Garcia institution Université Catholique de Louvain. Data Sources and Tables were retrieved from CreF (Commission de Recteur de la region francophone – Rectoral Commision of the French-

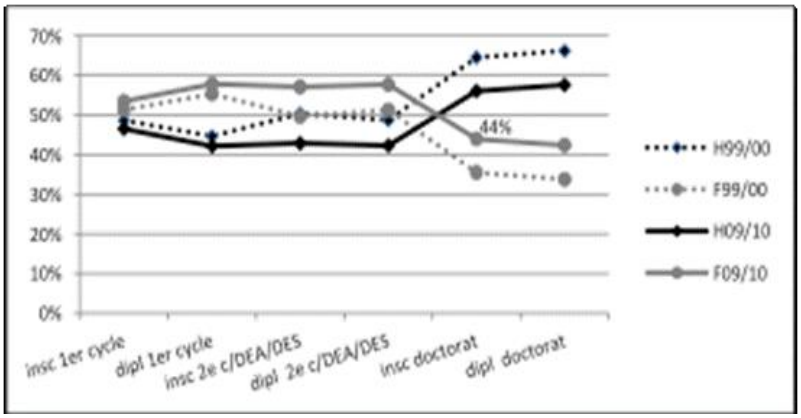
speaking region) and data analysis provided and assembled in Meulders et al. (2012), a large-scale quantitative study on women and men in scientific/academic professional pathways undertaken in 2011.

Student Population:

In the last twenty-one years, between 1988 and 2009, the number of students has increased from 52884 to 77346 in the French-speaking Belgian universities (of which female from 43% to 54 % (Figure.1). For the academic year 2010/2011, is the total number of students has reached 83'977, of which female are 45'163 and male 38'814. Therefore, since 2000, the girls amidst the students and their percentage has not yet stabilized (see Meulders et al., 2012).

These figures are comparable with those of the level of the EU (EU27) where the female students represent an average of 56% of all student populations in higher education in 2009. In all countries of the EU with the exception of Cyprus, the percentage of women amongst the student population in higher education surpasses 50%. Belgium shows a percentage of 55%, which is close to the EU average, whereby the female students are slightly higher in French speaking universities (56%) than in the Flemish (54%). The feminization of the female student population can be translated by an increasing difference between the level of education of women and men in Europe. In Belgium, in 2010, 50% of women aged 30 to 34 years have a higher education degree, whereas for men the percentage is only 39%. In all the European countries, the percentage of women of this age group with a higher education degree is higher than that of men. However, the analysis by level of studies reveals that the doctorate is the point of inversion in terms of numeric advantage of women, as the percentage of female doctorates is not higher than 44%. This inversion can be shown in the *scissor shaped curve* (Figure 1) that one finds in the majority of the European countries (Latour 2008).

Figure 1 – Proportion of women and men according to the level of studies in the French-speaking Universities in Belgium (1999/2000 and 2009/2010)



Source: Calculations of Meulders et al. (2012) of CreF database

Between 1999/2000 and 2009/2010, the percentage of women amongst the registered and certified degrees has increased remarkably at all levels: the scissor moves apart as the percentage of women increases for the first level, and then grows tighter for the second, where although the level for women is lower, there is more equality. In any case the numbers show a massive entry of women in the French-speaking Belgian universities and their proportion has not ceased to grow in the last twenty years. They do not only impose themselves in terms of presence but also in terms of academic performance. Although their number of doctoral inscriptions has also increased drastically, they remain however less in number than their male equivalents to complete their thesis. These phenomena can be observed in the different French-speaking Belgian universities.

Analysis according to sector of studies:

The analysis according to the sector of studies shows that the distribution of students according to sex between different faculties is not equal. This observation can be made in general for Europe: despite the massive presence of female students at university and their superior performance levels, the sexual division of orientation remains: the Sciences (STEM) remain less feminized (see Baudelot and Establet, 2001). In higher education establishments in the Europe of 27, the female students represent 72% and 78% in Health and Education sciences, although they are only at 25% in the Engineering, Industrial and Transformation and Construction sectors, and only 38 % in the Science, Mathematics and Informatics (Eurostat 2009). However, according to Meulders and al. (2011), it is dangerous to limit this phenomenon to a discussion about preferences of choice for girls, because the analysis shows a deeper phenomenon: there is general disinterest of all students for Science sectors, as much for men as for women, representing only a tiny percentage within the massive student influx for the majority of sectors.

An analysis that compares the three big sectors Social and Human Sciences (SSH), Health Sciences (SSS) and Sciences (STEM) shows that in French-speaking Belgium, SSH attracts the most of students: 57% of all students are registered in Human Sciences in 2009/2010 in contrast to 20% in STEM and 24% in SSS. The distribution by sex indicates that 62% of female students and 50% of male students are in Social and Human Sciences, in contrast to 11% of women and 29% of men in STEM and 27% of women and 20% of men in Health Sciences. Between the academic years 1999/2000 and 2009/2010, the growth of the number of students was the highest for SSH: 35% by contrast of 21% for STEM and 31% for SSS. Whichever the domain, the growth has always been stronger for women than for men. This difference in the dynamic of growth explains the progressive eviction of men in Human and Health Sciences, and the catching up of women in STEM. The percentage of women registered has increased from 56 to 59% in SSH, from 27% to 30 % in STEM and from 55 to 60% in SSS.

A double disaggregation of analysis by sector of study and level of study shows that women are more numerous than men in the first and second cycles of study in SSH and SSS. In the three sectors, their proportion is higher in terms of actual degrees obtained, which shows their higher level of success. Concerning the doctorate level, the decrease of the proportion of women (compared to their proportion in first and second cycle students and degree holders) is important in SSH and SSS sectors, while their proportion remains stable in STEM. The probability of a female degree holder of second cycle to go on to do a PhD Thesis is higher in STEM, which is less feminized.

The proportion of women amongst students registered for a doctoral degree has increased in the three sectors: from 41 to 50% in SSH, from 30 to 34% in STEM and from 43 to 55% SSS. However, the proportion of women obtaining a doctoral degree is higher than the percentage of women registered for doctorate in STEM (35%) and in SSS (56%). In SSH, the percentage is inferior (45%).

The analysis of the average age of doctorates (having defended their thesis successfully) in the period between 2004 and 2009 (see Table 1) shows that women are generally younger than men when defending their theses. In STEM the average age is the lowest (30 years for women and 31 for men). We can conclude that there is no maternity effect, which can be observed at the time of defending the thesis of doctorate, but this can also be due to an effect of delaying maternity.

Table 1: Average age of female and male doctorates (average between 2004 – 2009) for SSH, STEM and SSS (from left to right)

	SSH	STEM	SSS (Health)	Total
Women	33,3	29,9	31,9	31,4
Men	35,5	30,9	34,5	32,8
Total	34,6	30,6	33,2	32,2

Source: Table reproduced from calculations done by Meulder et al. (2012)

2.2 Scientific and Academic Personnel at French-speaking Belgian Universities

This section addresses the question whether the massive entry of girls at university is also translated by a rise in the percentage of women amongst teaching staff. The evolution of women at the different levels of the career is analysed based on the study by Meulders and al. (2011) for the time period between 1999/2000 and 2009/2010. Secondly, the analysis is disaggregated by age in order to see the average age of women and men in the different levels of the academic career. And thirdly, we address the question how part and full time is distributed in university and other sectors of women and men university degree holders. Finally, the analysis is detailed by sector and level of study in the same manner as was done for the student population.

Evolutions

Between February 2000 and February 2010, the percentage of women in the scientific corps of the French-speaking Belgian universities has risen from 41.5% to 50.5%. In the academic corps, it has risen from 13.6% to 23.2 %. These global figures show two tendencies: a degradation of the level of the framing, which has passed from 17 students per lecturer to 19.3 in 10 years and a rise of women in both groups. This rise however masks some large differences between levels of the career[20]. If in ten years, the proportion of women has

[20] In the Framework of the study by Meulders et. Al, they have distinguished between 5 levels of positions, which mark the stages of the scientific and academic career: 2 levels concerning the scientific corps: assistant and permanent scientific personnel (premier assistant/première assistante, chefs/cheffes de travaux and agrégés/agrégées of faculties); 3 levels concerning the academic corps: full time appointed lecturer, full time professor, ordinary professor. These grades do not consist of the totality of the scientific and academic posts

increased in all levels of the academic career, they have however increased most in the lowest ranks. Amidst the assistants, the women are 49,5% in 2010 whereas they had been only 44% in 2000. It is therefore at the lowest level of the career of the scientific career, of whom are not yet nominated a permanent status, where a parity is observed in 2010. Amidst the permanently designated or nominated corps, women represent only 39% in 2010, although the percentage has increased since 2000 (31%).

In the SHE figures result summaries published by the European Commission in 2012 the following detailed numbers are given for the different levels of scientific and academic career for the whole of Belgium in terms of grade, sex and field of science, whereby however there is an issue with different grade classifications in the Flemish and French-speaking universities. These figures have to be treated therefore with some caution, but can serve to show the overall trends in scientific and non-permanent posts or contractual employees:

Table 2: Number of Post-docs and non-permanent researchers by sex, 2002 - 2004

	2005		2006		2007		2008		2009	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
BE	14 413	34 344	15 098	34 155	15 927	35 351	17 597	37 027	18 270	37 588

Table 3: Proportion of female academic staff by grade and total, 2010

	Grade A	Grade B	Grade C	Grade D	Total
EU-27	20	37	44	46	40
EU-25	18	36	45	44	39
EU-15	18	36	43	45	39
BE	13	27	34	:	28

Table 4: Number of academic staff by grade and sex, 2010

	Grade A		Grade B		Grade C		Grade D	
	Women	Men	Women	Men	Women	Men	Women	Men
BE	222	1 063	741	2 030	1 918	3 785	:	:

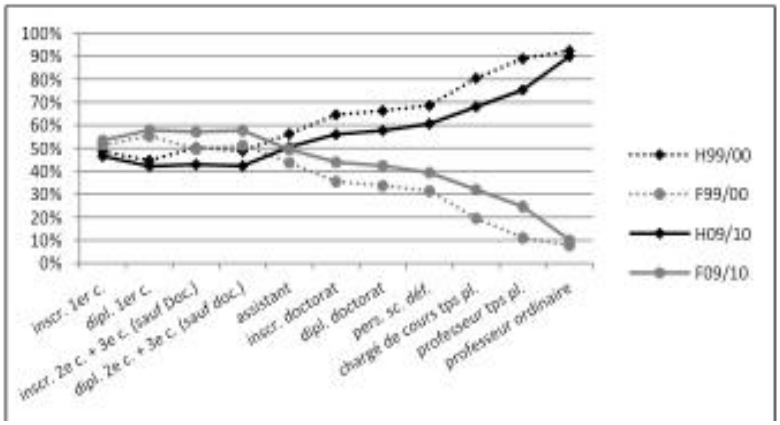
It is noteworthy that in 2009 the female number of postdoctoral and non-permanent researchers is still roughly half of the size of the male population. Moreover, in Table 3, we can see the decrease of proportions the higher the grade. Compared to men, moreover, the difference in numbers is quite striking in Grades A and B, and still about half the size of that of men for Grace C.

at universities, but they represent a large majority. The analysis is held in full time (ETP), in order to be able to do a valid comparison between women and men.

By field of science for 2010, SHE figures results show women represented most in Social Sciences and Humanities, whereas their proportion in STEM and Agricultural Sciences is between 6,3 to 8,5%, and around 11,4 to 12,3% in Natural and Medical Sciences.

According to Meulders et al. (2012) there is an existence of the leaky pipeline and of the glass ceiling. They argue that the distribution of women and men on different levels shows that the inequalities become all the more important the higher we climb the ladder of the academic career (Figure 2). Despite the reduction of the scissor on the different levels of hierarchy, which leads to nearly parity on the level of assistants, there are fewer female permanent research staff, lecturers, professors and ordinary professors. The famous scissor shaped curve depicting the effect of the leaky pipeline is still vividly present. The majority of 2nd cycle students will be diminishing steadily, starting at the level of the doctoral degree.

Figure 2 – The percentage of men and women in each stage of the academic career (and percentage of scientific and academic full time personnel) in 1999/2000 and 2009/2010:



Note: From left to right: registration and obtaining degree of 1 cycle degree (Bachelor), registration and obtaining degree 2nd Cycle (Masters) and 3rd cycle (other higher diplomas or degrees/engineering), Assistants, registration doctorate, obtaining doctorate, permanent scientific staff, full time lecturer, full time professor, ordinary professor (Table of calculation by Meulders et al. 2012 of CreF Database).

The analysis of the level of growth reveals a decrease of the number of members of permanent scientific staff, which is principally explained by the decrease of the number of "Chef de travaux", which is a permanent scientific position no longer assigned or practiced in all Belgian Universities. To conclude with this first analysis of the evolution of the women's percentages or proportions in the different levels of the university career, the figures analysed by Meulders et al. (2012) as well as the SHE figures raw figures of 2012 seem to point to a classic effect of leaky pipeline. Partially, the figures also imply the existence of a glass ceiling, which is reinforced with predominately male populated management and directive posts in universities, as will be discussed later. With the figures given for Belgian universities, they fair lower in comparison to other European countries. In terms of age and sex, women are upon average a little younger than women; however the age difference in terms of the different sectors are not very different for women and men. Meulders et al. (2012) point out that the group 55 – 59 holds an important difference between men and

women, whereby 39% of men of this age group are ordinary professors (12% are full time professors and 6% are full time lecturers), only 17% of women aged 55-59 have reached this level (18% are full time professors and 22% full time lecturers). There are no figures given for age groups of postdoctoral or non-permanent researchers, which would be interesting to know.

Full time/ part time work

According to the same studies cited above, the scientific personnel works majorly full time, especially the assistants and the permanent research staff. Although in 2000, the proportion of women working part time was slightly higher to that of men, in 2010 the differences have been effaced (with exception of scientific permanent staff: 13% of women work part time and 6% of men work part time). To conclude, the scientific personnel, as much men as women, are currently working full time. On the level of academic staff, part time work has diminished the higher you climb the ladder. The higher we go, according to Meulders et al. (2012), the more women work full time and are interpreted to be doing more work than their masculine colleagues. However, there is a lack of data about the profiles of part time workers, male and female, which could indicate better the way the rest of the time is employed. Male academics working part time often have private enterprises or business as a main other part time employment (lawyers, doctors, economists..), which would then undermine the idea that women work more in stable full time posts. Their male part time counterparts perhaps may have other employments that we are not aware of at this point.

According to sector (SSH, STEM, SSS)

Here we ask the question whether the progression of women in the academic careers differs according to the sector or field of science.

SHE-figures 2010, WIS Database DG Research and Innovation:

Table 5: Proportion of female PhD (ISCED 6) graduates by broad field of study, 2010

	Education	Humanities & arts	Social sciences, business & law	Science, mathematics & computing	Engineering, manufacturing & construction	Agriculture & veterinary	Health & welfare
EU-27	64	54	49	40	26	52	56
EU-25	64	54	49	40	25	53	56
BE	56	41	47	37	30	48	58

According to proportion calculations by Meulders et al. (2012) the majority of the degree holders of 2nd cycle are distributed in the Social and Human Sciences (68% women and 54% men in 2010). What is surprising is that in STEM Sciences there are a majority of doctorates (both men and women) (41% women and 55% men in 2010). The probability of pursuing a doctoral degree is higher for STEM. It is however in SSH that the probability to pursue a career at university after obtaining a doctorate is the highest for women: this sector hosts 51% of women amongst the permanent scientific/academic personnel. For men, not only is it

more possible to obtain a doctorate in STEM, but also to pursue a university career: STEM hosts 45% of men amongst the permanent scientific/academic personnel. These tendencies have already been observed in 2000.

Therefore, although it is in the STEM sector that it is most probable to do a thesis for both men and women, it is in SSH that one finds the most percentages of women in academic permanent personnel.

The indicator of chances of promotion is a static indicator, which gives the proportion of ordinary professors within the total number of academic personnel by sex and sector (Table 6). It therefore gives an overview of possibilities of promotion of a member of academic personnel. In 2010, the percentage of ordinary male professors within the academic personnel is three times as high as that of female ordinary professors (35% men and 12% women). Men therefore have in average three times more chances than women to get promoted into ordinary professorship once they become members of the academic personnel. In health sciences the chances for women and men to become ordinary professors are highest (4,6% women and 30,4% men in 2010). In this sector, one could say from the figures that the chances men have to become ordinary professors are seven times higher than women (2,8 times more in STEM and 2,5 times more in SSH).

Table 6: Indicator of chances of promotion (ordinary professors/academic personnel, in full time) in 2000 and 2010

2000	SSH	STEM	SSS	Total
Women	22,3%	16,1%	7,1%	18,4%
Men	42,9%	52,3%	17,6%	38,9%
Total	39,5%	50,6%	17,0%	37,3%
2010	SSH	STEM	SSS	Total
Women	13,2%	13,7%	4,6%	12,3%
Men	32,9%	37,8%	30,4%	34,7%
Total	28,3%	42,8%	26,9%	33,7%

2.3 Decision-making organs

The percentage of women in students, staff, decision-making organs of university and of the FNRS (Federal Funding Body) in 2011 (calculations by Meulders et al. 2012) are as follows:

- Rector: 0%
- Vice rector: 4%
- Ordinary Professor: 10%
- Dean: 14%
- FNRS Commission Heads: 17%
- FNRS CA and CG: 17%
- Research Council: 22%
- Administrative Council: 24%
- Professor: 25%
- Lecturer (permanent): 32%
- PhDs (obtainees): 42%
- Assistants: 49%

- Students: 54%

When consulting the above figures, that the picture is given that decision-making in French-speaking universities in Belgium is largely in the hands of men, and that major decisions made in terms of management, budgeting, administration and Human Resources are made principally by men. Comparing this to the situation of UCL (Garcia institution, see further below for UCL figures) in particular, it becomes clear that this organization too is inscribed in this constellation, although more recently there have been some additions in terms of female vice-rectors and general administrator (one female from roughly 2001 - 2009), who is responsible for budgeting of UCL. However, opinions in both research and in university actors are divided as to the importance of having an equal representation of male and female decision-makers; some opinions favor rather a gender sensitized approach to decision-making regardless of male or female representing staff. Others however, including Meulders et al. (2012) argue that having a male run university also significantly puts female representation and interests at disadvantage. Notably, they argue that this leads to more male posts being occupied for scientific/academic posts on permanent or nominated basis.

3. PATHWAYS AND PROFESSIONAL INSERTION OF PHD HOLDERS ON THE LABOR MARKET

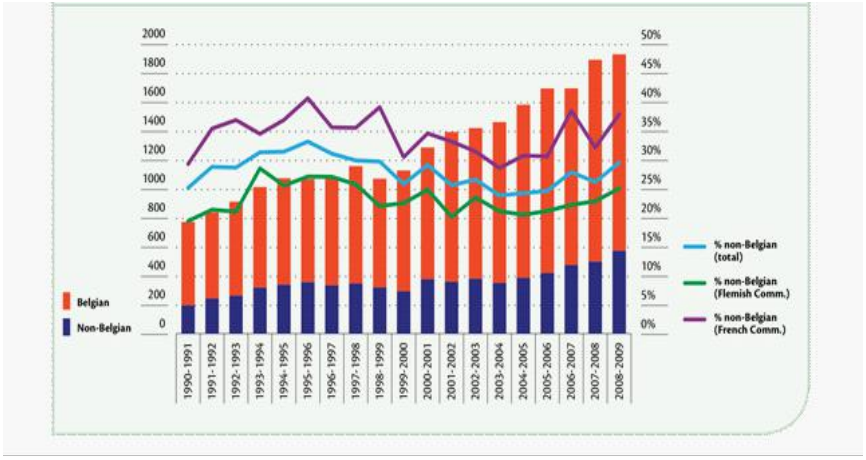
These results and data have been retrieved and summarized from the final report on OECD/ UNESCO Institute for Statistics/Eurostat Careers of Doctorate Holders (CDH) project - (2009 and 2006) worked on and written by Boosten et al. (March, 2014) for the Belgian results.

3.1 The situation of Doctorate Holders' Careers in Belgium

Evolution of the number of doctoral degrees by nationality

Although the number of doctorate holders shows an increasing trend over the last two decades, the number of academic positions available has increased very little in the same period. Over the last few decades, higher education in Belgium has undergone a process of internationalization like in many other countries. The share of doctoral degrees awarded to researchers from abroad, however, has increased only slightly over the last two decades, but this percentage hides the changes in absolute numbers. A remarkable increase in the numbers of foreign doctorate holders (from 195 in 1990-91 to 572 in 2008-2009) has been matched by a similar increase amongst the Belgian young researchers population (from 576 to 1356). The doctorate holders from abroad, carrying out their research work at a Belgian university, take up a larger share in the Walloon universities than in the Flemish universities. Overall, 27.9% of all doctorates have been awarded to researchers from abroad.

Figure 3 – Doctorate degrees awarded in Belgium, by nationality (Belgian-non-Belgian), and share of non-Belgian doctorate holders in the Flemish and French speaking Community (1990/1991 to 2008/2009). Source CReF and ECOOM



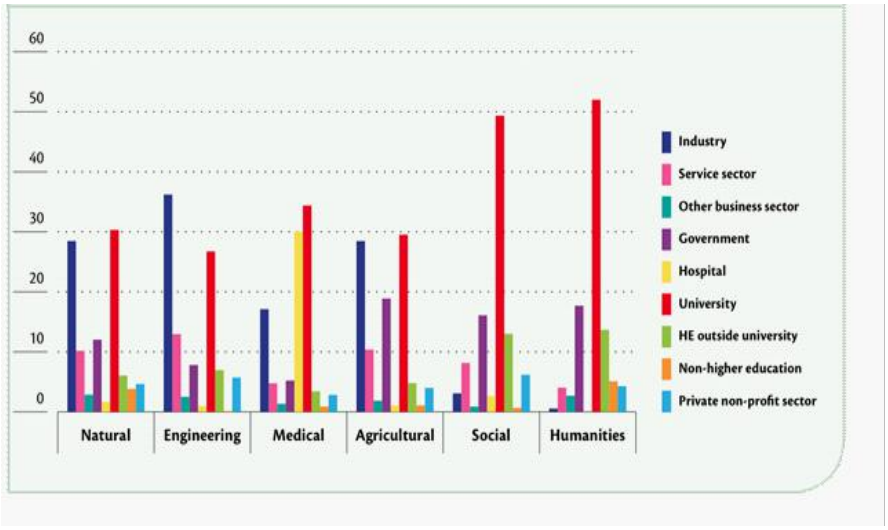
Source CReF and ECOOM

Many mobile researchers return to their home countries or continue to establish their career interna- tionally. They are however difficult to trace for a cross-sectional survey, which explains why the percentage of doctorate holders in the CDH dataset is as low as 4.2%.

Employment sectors of doctorate holders

In year 2010, people with a doctoral degree in the natural sciences (N=1544) or engineering (N=769) are strongly represented in industry (28% and 36% respectively) and at the universities (30% and 27% respectively). For agricultural scientists (N=396) we find similar figures, except that a considerable percentage of them are government employees (19%). With regard to health sciences (N=736), these doctorate holders are mainly active in industry (17%), hospitals (30%) and at university (34%). The social sciences (N=507) and humanities (N=437) deviate somewhat from this pattern, in the sense that they are strongly represented at the universities (49.3% and 52% respectively) and only in exceptional cases work in industry (3% and 0.5%). This is compensated by more employment in the government sector (16% and 17.7%) and the higher education system outside the university (13% and 13.7%).

Figure 4 – Sector of employment by knowledge field



Source: Belgian Science Policy Office, CDH Database 2010

Transition from the university to the labor market

A growing number of doctorate holders look for a job outside university because the number of research positions in the higher education system is not sufficient to employ the growing mass of doctorate holders. In order to comprehend how doctorate holders experience this change in working environment, in the CDH survey, they were given a series of statements to which they could attribute their level of agreement. Contact with other employment sectors during the doctoral track seems to smooth the path to the first job outside academia and the transition from academia to others sectors of the economy as well. The findings by Boosten et al. (2014) suggest that PhD holders have been increasingly interested in cooperating with economic players outside academia. Cooperation with other sectors occurs only in a limited number of cases. When cooperation is involved, it is rather located on the level of universities themselves. This could mean that universities are linked with each other by means of networks to make optimal use of the available resources. Another remarkable fact is the growing presence of industry in scientific research. Younger age cohorts collaborate more often with industry during the preparation of their dissertation than older age cohorts.

According to the survey, Belgian doctorate holders do not always have a clear-cut idea of their career possibilities after having obtained a doctoral degree. Writing a doctoral thesis is not a purely academic affair completely isolated from the sub-sequent career development: a considerable number of doctorate holders are convinced that the work they have conducted for their doctorate has a positive impact on their future careers. They consider their dissertation as a potential comparative advantage for entering the labour market. Moreover, a lot of doctorate holders consider their research experience as a means to create added value for the company or organization for which they work. Not many agree that there could be possible inherent shortcomings of following a doctoral trajectory.

When making a more in-depth analysis of the contrasts between the different knowledge domains there are no significant differences. Of all doctorate holders, the ones in humanities feel least prepared for a job outside the academic environment, as well as natural scientists and engineers. In terms of collaboration and about returning to the university, these factors caused the most divergence in opinion among doctorate holders when comparing results from different disciplines.

3.2 The professional situation of doctorate holders

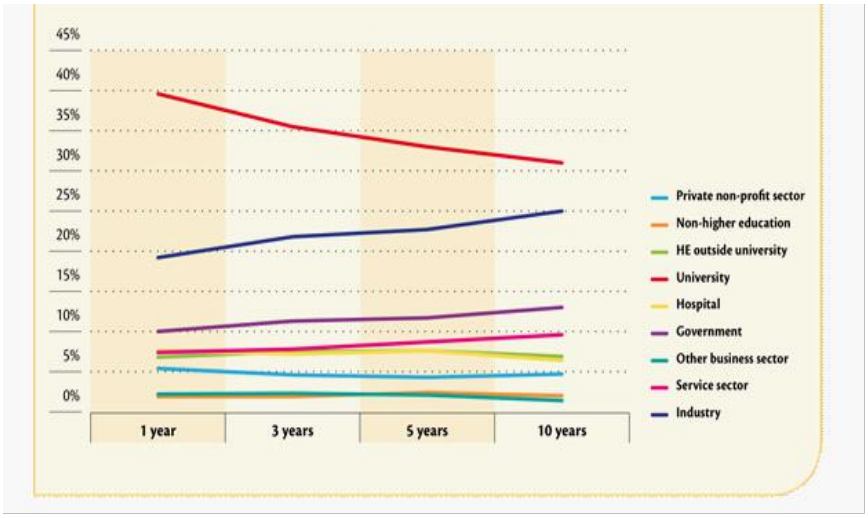
Sector of employment

After graduation, doctorate holders start working in a wide range of sectors, at university as well as in other sectors outside university, such as industry, the service sector, government, hospital, higher education (HE) outside university, non-higher education, the private non-profit sector, and in areas we define as the 'other business' sector. The results assembled by Boosten et al. (2014) show that 68.6% of the 4,445 respondents have been employed at least once in another sector outside university since their graduation, while 31.4% (N=1395) reported never having left university.

Figure 5 shows the evolution of the sector of employment by the time elapsed since obtaining the PhD. This changing pattern is a combined indicator of general labour market differences (younger cohorts versus older cohorts) and of individual career progression (early career versus later career). One year after graduation, 39.6% is employed at university, often as postdoctoral researchers. The percentage of doctorate holders working at university decreases over time. Five and ten years after graduation, respectively 33.0% and 31.0% of the doctorate holders are still working at a university.

The second largest sector of employment is industry. The percentage of PhD graduates in this sector increases over time, from 19.2% one year after graduation to 25.0% ten years after graduation. Government is the third largest sector of employment, providing employment to about 10.0% of the doctorate holders. This percentage remains relatively stable over time. Doctorate holders are less frequently employed in the service sector, hospitals, non-university higher education and in the private non-profit sector and they are rarely employed in the 'other business' sector and in non-higher educational institutions (e.g. secondary education).

Figure 5 – Sector of employment of PhD graduates, 1 year (N=2690), 3 years (N=2679), 5 years (N=2300) and 10 years (N=1332) after graduation



Source: Belgian Science Policy Office, CDH Database 2010

The results show significant differences in sector of employment for the various disciplines. University is the largest sector of employment for doctorate holders in all disciplines, except for those in engineering and technology, who are more likely to be employed in industry (37.6%). Industry is the second most important sector of employment for graduates in agricultural (27.6%). and natural sciences (27.4%) and the third largest employment sector for graduates in medical and health sciences (14.1%). As expected, this latter group is more often employed in hospitals (32.5%). Only a small minority of the doctorate holders in social sciences and humanities work in industry, whereas about half of them hold a position at university. Together with those working at non-university higher educational institutions, respectively 63.2% and 65.6% of the PhDs in the social sciences and humanities are employed in higher education three years after graduation. Government is the second largest sector of employment for this group and the third most important sector for PhD graduates in the agricultural and the natural sciences. PhD graduates in engineering and technology; natural sciences, agricultural and social sciences are more likely to be employed in the service sector than doctoral holders in humanities and medical and health sciences. Generally, few doctoral graduates are employed in the 'other business' sector and even less work in education other than higher education. Doctorate holders in the natural sciences (3.0%) and humanities (5.4%) are an exception to this.

Table 7: Sector of employment 3 years after graduation according to scientific discipline of the doctoral degree

Discipline	University	Industry	Government	Service sector	HE outside university	Private non-profit sector	Hospital	Other Business sector	Non-higher education	Total (N)
Engineering and technology	26.7	37.6	7.4	8.9	7.8	7.2	0.9	2.8	0.7	460
Agricultural sciences	31.6	27.7	18.8	10.2	5.5	3.1	1.6	1.2	0.4	256
Natural sciences	32.9	27.4	11.6	9.4	6.1	4.1	2.1	3.4	3.0	923
Medical and health sciences	36.3	14.1	5.3	3.7	3.5	2.6	32.5	1.5	0.4	455
Humanities	49.8	0.5	18.1	4.1	15.8	4.5	0.5	1.4	5.4	221
Social sciences	51.5	3.4	14.4	7.2	11.7	6.2	3.1	1.4	1.0	291
Total (N)	**933**	**572**	**295**	**201**	**191**	**119**	**185**	**61**	**49**	**2606**

Source: Belgian Science Policy Office, CDH Database 2010

Gender dimension in sector of employment

The sector of employment three years after graduation differs significantly between men and women ($\chi 2=26.5$, df=8, $p<.001$). Men more often have jobs in industry and the service sector than women, whereas women are more frequently employed in university and non-university higher educational institutions.

Figure 6 – Sector of employment by gender, 3 years after graduation

Source: Belgian Science Policy Office, CDH Database 2010.

Occupation

In general, the majority (87.5%) of the 4,095 respondents work as specialists, 12.1% work as managers and only a minority (0.8%) has an occupation that does not require a higher education degree. The most common occupations among doctorate holders are jobs as science and engineering professional (44.1%), and as teaching professional (21.7%).

Figure 7 – Doctorate holders' percentage in different occupation types

Source: Belgian Science Policy Office, CDH Database

The occupation of doctorate holders according to the time since obtaining the doctoral degree

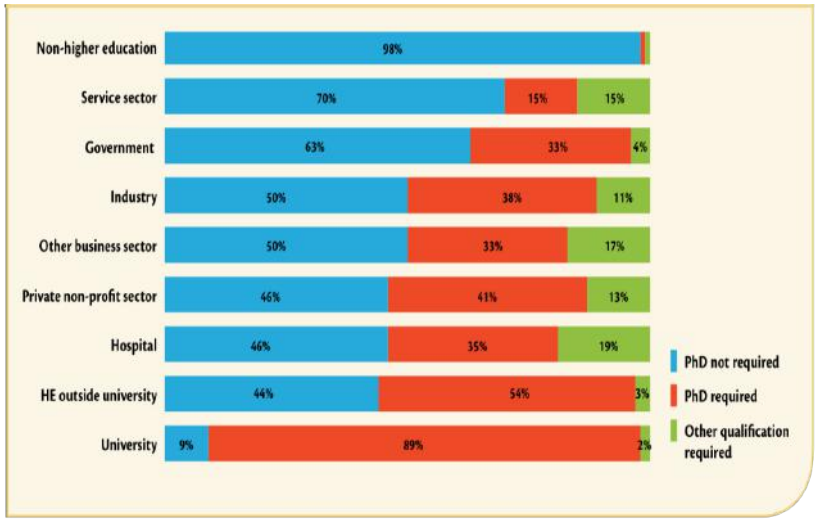
One year after graduation, 53.6% are employed as a science and engineering professional, which is probably situated in industry (see Boosten et al, 2014), although no specification is given as to where. This percentage is lower (38.0%) ten years after graduation. An opposite observation is found for managers. One year after graduation 6.7% are managers by profession, while ten years after graduation, 16.2% are employed as managers. Except for a small increase in teaching professionals, the percentage of doctorate holders in other occupations remains stable over time. The changing percentages might - but do not necessarily - indicate developments due to career progression of individual researchers; also labor market conditions may be different for those graduating ten years before their younger colleagues.

Level of qualification

The question is whether doctorate holders are working in a job that explicitly requires a doctoral degree; for 54% (N=2273) of the respondents, the minimum level of qualification required for the principal job was a doctoral degree or post-doctoral experience (See Figure 8). At least 39% of doctorate holders work in jobs that require no more than a master-level degree, a teacher training degree or a post-graduate degree.

However, the need for a doctoral degree as minimum required level of education for the principal job depends strongly on the sector of employment ($\chi 2=84.5$, df=10, $p<.001$). For 89% and 54% of doctorate holders respectively working in university and non-university higher educational institutions, a doctorate degree is required for their job. For doctorate holders working in the private non-profit sector, industry, hospitals, 'other business' sector and government, a PhD is less often required: between 33% and 41% need this degree for their principal job. Hence, many PhD graduates employed in sectors outside higher education may be formally overqualified for their job. This ties in with qualitative results that we obtained for the GARCIA project in the framework of WP7 for the 7.1 report; many interviewees formerly at UCL working in mainly STEM sectors for government or industry were paid on Masters level or engineering degree level and not for their PhDs obtained. For those employed in the service sector and in non-higher educational institutions at least 70% state that a PhD is not required for their current position. Nevertheless, in terms of job content and job requirements these employees are not necessarily overqualified: quite often the doctorate is not a 'required' degree, but still a 'desired' degree.

Figure 8 – Extent to which a PhD is required for the principal job according to sector of employment



Source: Belgian Science Policy Office, CDH Database 2010

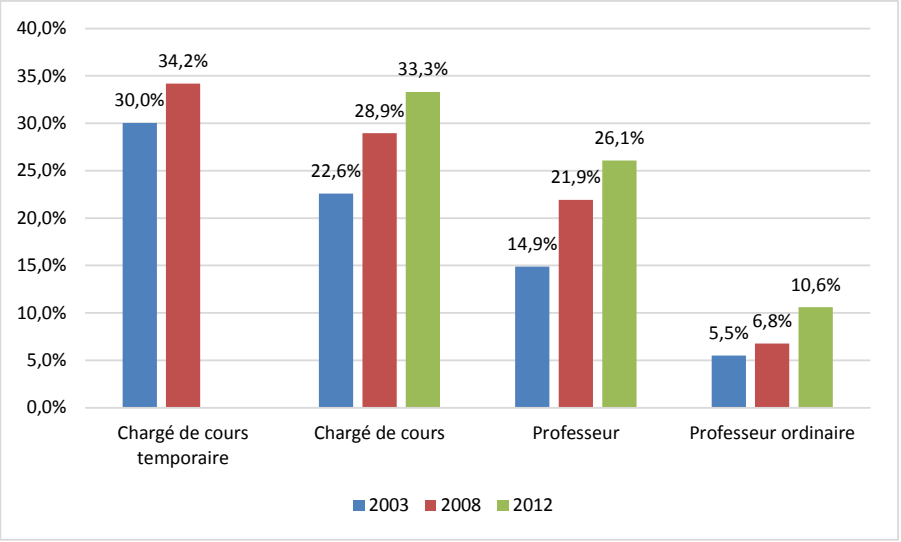
4. MAPPING ORGANIZATIONAL INDICATORS

4.1 Distribution and evolution of women and men in different levels of academic/scientific career at Université Catholique de Louvain, Belgium.

This section is mainly based on indicators that were drawn for the GARCIA project for WP4, which were caclulated with the help of M. Glinshi and E. Lefevbre of the Service of Personnel of UCL, as well as the Annual Gender Report for UCL assembled and written by Edithe Antoine (Human Resource Service). The figures are drawn for the periods between 2003-2012 or 2010 – 2013/2014 where available, but most are also for academic year 2011/2012.

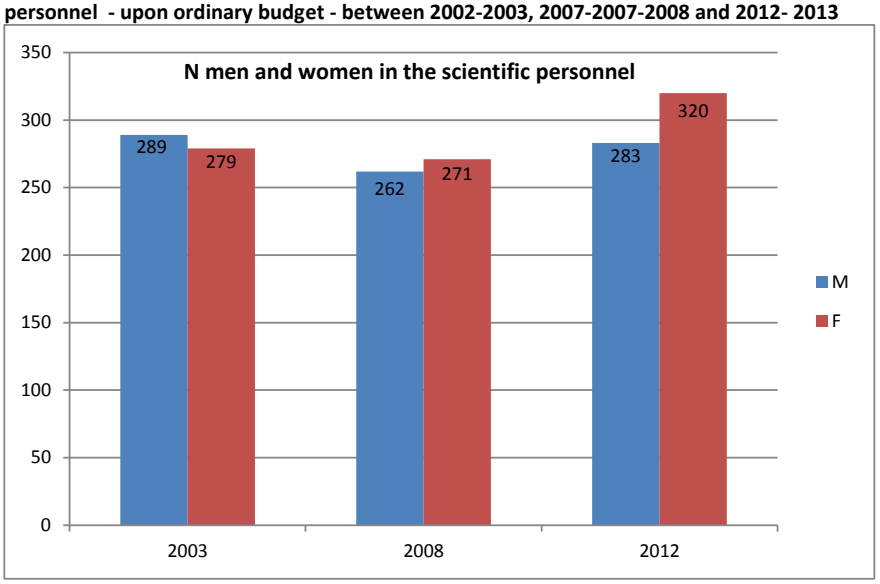
This Figure 9 shows that although percentages for women in academic posts has increased slightly since 2003, their proportion is feeble the higher you rise in the ladder; the figures for female ordinary professorships are particularly striking and are within the trend for Belgian French-speaking universities on the whole (10%). The phenomenon for the leaky pipeline would therefore seem to be also confirmed for the UCL case in the classic sense; female scientific non-nominated or non-permanent staff are equal (in 2003) if not higher than their male counterparts (see Figure 10 below) in 2012. Whereas for the permanent academic posts their percentages are fairly low ranging from 33, 3% for permanent full time lecturers, 26,1% for professorships and 10,6% for ordinary professorships. An interesting fact is that women are highly represented in Technical and Administrative Staff, particularly for the administrative tasks, as can be shown in the Figure 11 below.

Figure 9 – Academic Personnel - Evolution of the proportion of women on the different levels of the academic and scientific career - between 2002-2003, 2007-2007-2008 and 2012- 2013



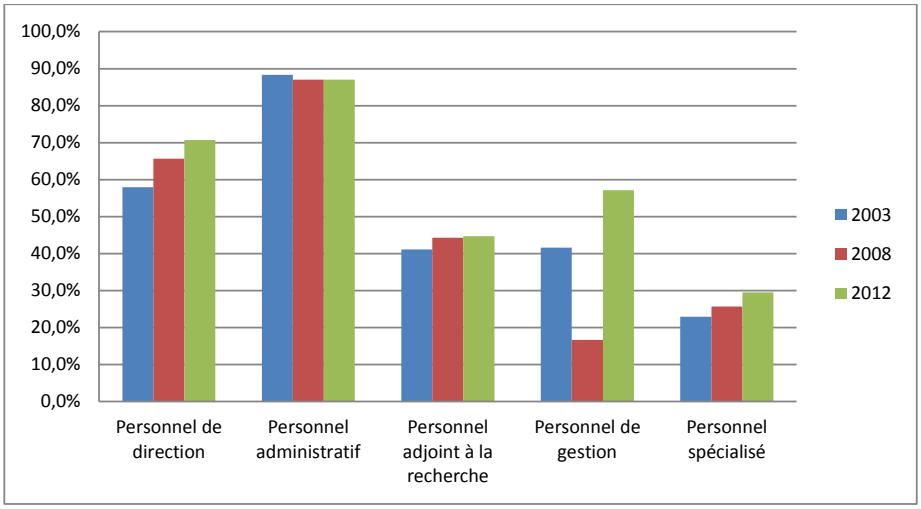
Source : Banque de données du Conseil des Recteurs : graphs created by gender adminstrator UCL Edithe Antoine, RHUM
Notes : Chargé de cours temporaire : Temporary lecturer ; Chargé de cours : Permanent lecturer ; Professeur, Professor ; Professeur ordinaire, Full professor

Figure 10 – Scientific Personnel: Evolution of the proportion of men and women in the scientific personnel - upon ordinary budget - between 2002-2003, 2007-2007-2008 and 2012- 2013



Source: Banque de données du Conseil des Recteurs

Figure 11 – Administrative and Technical Personnel - Evolution of the percentage of women in the administrative and technical personnel - between 2003 -2008 - 2012



Note: From left to right: personnel of direction, administrative personnel, adjuncts to research, management personnel, and specialized personnel

4.2 Glass Ceiling Index for UCL 2012

According to the calculation of the percentage of women in permanent A,B,C posts divided by percentage of women in A posts, the Glass Ceiling Index of UCL for women in academic positions is 6,6. Although the SHE figures 2012 glass ceiling index is for the year 2010, the average Belgian Glass Ceiling Index for academic positions was 2,5. So UCL can be considered having a pretty thick Glass Ceiling for women in academic careers in 2012.

The leaky pipeline can be further considered when looking at the distribution of women and men in different positions for the two Garcia institutes *IACCHOS (SSH) and ELI (STEM)*, whereby it was not possible to differentiate between full professors and full time lecturers, assistants and postdocs (full and partime!).

Table 8: SSH – IACCHOS Institute of Analysis of Contemporary Changes in History and of Society – Number of women and men in different academic and scientific grades from 2011 to 2013

	2011		2012		2013	
	Male	Female	Male	Female	Male	Female
N of full professors and associate professors (Full-time/part-time)	28	20	30	20	32	21
N of assistants, postdocs	7	21	7	23	9	20

Table 9: STEM – ELI Earth and Life Institute – Number of women and men in different academic and scientific grades from 2011 to 2013

	2011		2012		2013	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**
N of full professors and associate professors (Full-time/part-time)	29	9	30	9	30	9
N of assistants, N. postdocs, assistants	14	14	11	15	15	14

What stands out in these two tables is that in ELI for STEM the differences in numbers for permanent B or A level positions are quite striking between the two sexes, whereby women represent a less than a third of the number of men associate or full professors. The situation for SSH women in IACCHOS is much better. However, in IACCHOS, the female number of postdocs, assistants and ongoing PhDs is higher than the males. In ELI the numbers for men and women researchers (non-permanent) are fairly similar.

It is however not possible to calculate the glass ceiling index for the two institutes based on the lack of exact differentiation between C, B and A grades.

The ratio of female ongoing PhDs in ELI/STEM is about half of that of men. In IACCHOS numbers are more similar, with however still more men ongoing PhDs than women. The number of PhDs obtained vary from year to year for IACCHOS, but remain however more striking for the difference between women and men for ELI, nearly one to three ratio in 2013.

The tables on promotion in Appendix 2 for both SSH and STEM show that since 2010 the number of promotions are slim to none; for SSH, there has been one single promotion of a male full professor to ordinary professorship in 2010. In STEM there have been two promotions for male assistants who have obtained a permanent status in 2010 and in 2013.

In terms of exits there are no significant differences between men and women, and are also relatively rare once you reach a permanent status. The most of exits occur in the position of assistants, who are PhD holders with a temporary or visiting lecturer contract (needing to be annually reapplied for); or in postdoctoral contracts, which are temporary. The time period recorded for exits may be too short too record any tendencies, but it can generally be remarked that there is a gap between most exits in temporary contracts and lowest scientific/academic positions.

In terms of women and men in decision-making organs and committees (see Table 12), the UCL figures are similar to the French-speaking Belgian Universities outlined in the previous section. The percentage of women in governing organs does not exceed 26, 3 %, and is usually around 20%, however decreasing the higher the ladder goes. Percentages in deans and presidents of institutes are under 10%, The legal organs have a better equity in terms of representations of women and men. However, it is noteworthy that within the Councils (research, enterprise), the women representatives are largely to be found in worker or staff reps, or in the place of supplicants. There is however an equal number of women dedicated to the council for prevention and protection of work, as syndicate reps or members, or counselors.

Table 10: Number of male and female ongoing PhDs and PhDs obtained in both IACCHOS and ELI

	ELI							
	2010		2011		2012		2013	
	Male	Female	Male	Female	Male	Female	Male	Female
Number of Phds ongoing	522	241	543	253	531	263	507	261
Number of PhDs obtained	63	31	90	30	90	51	93	38
	IACCHOS							
	2010		2011		2012		2013	
	Male	Female	Male	Female	Male	Female	Male	Female
Number of Phds ongoing	486	422	475	438	504	425	455	399
Number of PhDs obtained	65	39	43	44	83	64	50	47

Source: Figures calculated by author with help of M. Glinshi and E. Lefevbre of SPER UCL

Table 11: Number of exits in the two departments SSH/STEM between 2010 and 2013

	SSH							
	2010	2010	2011	2011	2012	2012	2013	2013
	Male	Fem	Male	Fem	Male	Fem	Male	Fem
N of exits:								
N of exits in Full professors								
N of exits in Associate professors								
N of exits in Assistant professors (postdocs)			1					
N of exits in Assistants with a PhD			1	1				
	STEM							
	2010	2010	2011	2011	2012	2012	2013	2013
	Male	Fem	Male	Fem	Male	Fem	Male	Fem
N of exits:								
N of exits in Full professors								
N of exits in Associate professors								
N of exits in Assistant professors (postdocs)					1			
N of exits in Assistants with a PhD	2							1

Table 12: Distribution of women and men in decision-making bodies in 2015

	H	F	Total	%age
The governing organs				
Le Conseil d'administration – Administrative Council	18	5	23	21,73%f
Le Conseil académique – Academic Council	35	11	46	23,91%
Le Bureau Exécutif – Executive Bureau	14	5	19	26,3%
Le Recteur – Rector	1		1	0%
Le Conseil Rectoral – Rectoral Council	9	2	11	18,18%
L'Administrateur général – General Administrator	1		1	0%
The organs of sectors, of faculties and of institutes				
Bureau de secteur – Bureau of sector	25	7	32	21,87%
Doyens - Deans	13	1	14	7,14%
Présidents d'institut	19	2	21	9,52%
Responsables des commissions d'enseignement Heads of teaching commissions	10	0	10	0%
Les legal organs				
Le Conseil de recherche	?	1	?	
Le Conseil d'entreprise	31	23	54	42,59%
Le Conseil pour la prévention et la protection au travail	21	21	42	50%

5. INTERPRETATIVE AND CONCLUSIVE ANALYSIS

5.1 Numbers and tendencies in the Belgian French-speaking national context for scientific/ academic careers

The first primary statement can be made in terms of the *massive entry of female students* into the majority of fields in French-speaking Belgian universities, equaling that of their male counterparts in 2000 and surpassing them by 54% in 2010 on all levels. However, the doctorate is a point of inversion in terms of an existing leaky pipeline phenomenon.

In terms of *sectors of study/science* there is a structural effect of the distribution of students amongst sectors. The horizontal segregation is high. The percentage of students in SSH is high and the figures for STEM are low, for male and female students, which points to a limitation in terms of analysis only based on choice or preference.

There is also a feminization in the teaching corps, which concerns mainly the lowest levels of the academic ladder: the assistants and other non-defined or permanent status of the scientific corps (notably postdocs, or PhD holders without permanent posts). Moreover, there is an important lack of figures concerning the postdoctoral and contractual posts. The aims of the GARCIA project to focus upon these posts or stage of the career therefore seem all the more important, as the pivotal point or inversion of growth in female occupied posts is situated at the doctorate level, mainly while obtaining or defending the thesis. There is very little data about the quality and experiences during what can be definitely called a precarious stage of non-stability in careers. One could argue therefore that there are some key factors playing at that point of the career that are worth investigating in terms of why women becomes scarcer at that point, and why there is simultaneously an important

feminization on the level of postdocs, assistants and other non-permanent posts or contracts.

The *metaphors of leaky pipeline and glass ceiling* apply insofar that there are fewer women in higher permanent posts and even less so in ordinary professorship levels (only 10%). Moreover, this attrition happening the higher we rise in the hierarchical ladder (54% female students tò 50% of assistants, tò 32% full time permanent lecturers, to 25% professors and to 10% ordinary professors) becomes worse in decision-making organs of universities of important funding bodies such as the FNRS, where the male dominance is on all committee levels and organs.

According to Meulders et al. (2012) and Marry (2010, p.186) the glass ceiling effect is due to multiple factors: little differences at the beginning of the academic career translate themselves to larger differences for the later periods of the career for women. This tendency in part is explained by personal constraints in private life, but even more by structural barriers of the academic sphere. They argue that although the legal or juridic obstacles seem to have been removed, the discriminations are subtler, invisible and operate on multiple levels. One part of their argumentation runs in the direction of discrimination in recruitments for example and in nominations, which are played out in coopting networks of what are perceived as mainly male dominated recruitment committees and decision-making organs. However, within the Garcia project, the data sofar collected for UCL on a meso and micro level point to a complex interplay of both organizational cultural effects and interactions, structural and decision-making loops or logics, and the way that researchers articulate and make sense of their work. On a more macro level, different kinds of tendencies are recorded for multiple sectors, with some particularities for the university world.

According to Boosten et al. (2014), in the light of the findings from the CDH study follow up analysis for the Belgian case, first of all, doctorate holders across various sectors of employment and from the widest possible range of disciplines generally report high satisfaction rates for their salaries as well as their job contents. Second, the fact that many doctorate holders outside academia are still involved in research and research-related activities in private companies, industry and other organizations outside of higher education, from their own point of view, points to the transferability of high-level skills and knowledge as well as their employability across a wide range of sectors. Boosten et al. (2014) point out that according to the survey results, doctorate holders who chose a research career did so because of its potential for creativity, innovation and independent work. Doctorate holders are not simply trained to meet current labor market needs, but are also expected to make their mark on today's labor market in order to address innovation opportunities still ahead. Another interesting finding is the relatively large number of doctorate holders still pursuing a career in academia, which seems to point out that there continues to be an attractiveness of the academic profession. However, in terms of financial rewards, academia loses the competition with certain better-paid sectors of employment for the highly skilled, in particular hospitals, industry and the service sector. Moreover, at the level of salaries, there is an important shortcoming of lack of social security and pension scheme contributions in contractual postdoctoral posts that are conceived as bursaries or scholarships. Although exempt from this kind of contribution with a relatively high wage during contractual years, the persons employed are nonetheless confronted with a lack of social schemes contributions for a span of several years during their professional lives that may create important pension gaps later on.

Next, an examination of doctorate holders' skills suggests that what they have acquired during their doctoral degree and what they need in their current job is generally perceived to be a good match, notwithstanding some discrepancies, which are larger in some sectors of employment than in others. In particular with regard to research skills and personal effectiveness, doctorate holders find their competencies sufficiently meeting their job requirements. In business-oriented jobs, however, commercial skills, project management skills and leadership skills in particular are often reported to be underdeveloped at the time of completing the doctorate. Solutions that Boosten et al. (2014) suggest are collaboration between universities, their doctoral schools and industry, preparing researchers for a wide range of careers before and after this moment of transition. However, this is a less promising avenue as according to our analysis in WP5 D 5.1, there are funding policies by public authorities (see "closed envelop") that favor competition rather than collaboration between regional universities in order to bid for higher subsidies; they maintain a stance of trying to attract students for each university rather than offering trans-university schemes or professional insertion schemes.

The CDH study results seem to imply that not only doctorate holders themselves report that they provide additional benefits to the organization in which they work, also employers having doctorate holders amongst their staff, are generally positive about their added value (Vitae, 2009, De Grande et al, 2010). A more qualitative analysis of interview data would however be advisable to support this data.

Boosten et al. (2014) themselves however point out that these positive findings need to be considered with some reservation, as the overall results differentiate substantially across scientific fields. The chances to capitalize on their research skills in the non-academic labour market are significantly larger for doctorate holders in engineering as opposed to doctorate holders in the humanities. The former perceive fewer problems in the transition from academia to other sectors, earn higher salaries (this seems not to be the case for government based jobs, see section 1.1) and more often continue to perform research jobs when establishing a career outside university than the latter. The other scientific fields are positioned somewhere between these poles with regard to these indicators, with doctorate holders in medicine and the natural sciences enjoying many benefits from the doctoral experience, and agricultural and social sciences to a lesser extent, but still more so than doctorate holders in the humanities.

5.2 Main conclusions

For the Belgian case, the macro-sociological analysis (WP3, D 3.2) has shown us that the gender question remains an open one, even if significant advances towards greater equality are observable. Although women are now in the majority in higher and university education, with higher graduation rates than the boys, yet two important reservations are still present: firstly, access to the highest level of qualification, the obtaining of doctorate, still remains male in the majority; secondly, a horizontal segmentation between 'male' tracks of studies (sciences and technology) and female (human and social sciences) is still reproduced. The whole labour market has also been strongly feminized, but here too classical phenomena of horizontal segmentation (between sectors and trades) and vertical (employment and responsibility levels) are present, although they are decreasing. For that matter, an unexplained 10% gender pay gap is still present. One of the important aspects of female employment in Belgium is its part time character. The scale of female part time work can

partially be interpreted as the fruit of work/family conciliation difficulties, expressing the persistence of a sexual and gendered division of work in which an essential part of "care" is still attributed to women. Such a division is also visible in how the time of social activities is distributed between men and women, and within households. This kind of data however is not clearly available for the particular case of UCL or the two Garcia institutes. It will be interesting to learn from the qualitative narrative analysis how male and female researchers/academics manage and experience work/life (see WP4/WP6 interview analysis). However, what is notable is that as in the general case for French-speaking Universities, women in academic/scientific careers work more part time than men (13% vs. 6%), but these part time positions are in lower scientific/academic career posts, such as assistants. The higher one climbs the ladder the more full time work in academic careers seems to be a condition. This would perhaps partially explain the lower number of women in professorships and ordinary professorships, and even lesser in decision-making organs and posts.

Familial policies supporting work/family conciliation are nevertheless numerous and pursue two logics: a logic of decommodification via measures dealing with working hours (reduction, interruption, leave for familial reasons, etc) and defamilialization measures via early childhood care and education, and service-vouchers. If we observe figures of maternity and paternity leaves for the UCL and IACCHOS/ELI in particular, it is noteworthy that not many maternity leaves were taken for the year 2013: 4 women in SSH of which two are each postdocs and assistants and 2 are associate professors/2 in STEM of which 1 is postdoc and other is associate professor. For men, there are 4 paternity leaves taken for STEM, of which all are assistants, in other words ongoing PhDs, and none in SSH. Other types of leaves for family care were taken 2 male and 2 female for STEM and none for SSH. Such familial policies undoubtedly support employment rates among women, who are their principal users. They do not however manage to do away with the work/family contradiction, which would moreover seem to imply basically reconsidering the organizing principles of the wage society (Fusulier, Nicole-Drancourt, 2015). This argument could be supported by the conclusion of D 5.1 for WP5 for Belgium that points to the existence of a particular *gender dimension in a professional bureaucracy* that can be considered a main organizational logic in UCL, whereby an important glass ceiling is produced. A professional bureaucracy of this kind of constellation can point to an ever increasing workload transferred to individuals, which necessitates high demands of institutional commitment, not only in terms of political or governing involvement of individuals alongside their main work of research and teaching, but also an important increase in logistic, governance and administrative tasks, and of finding own funds, which research centres and faculties are not able to supply in sufficient amounts. There is a form of entrepreneurship (self-regulation and –funding) required on unit-and individual level, without adhering to managerialism. Parallely to this we can count in the effects of the university as a *greedy institution* (Coser, 1974; Grant et al., 2000; Hendrickson et al., 2011; del Rio Carral, Fusulier, 2013) in that research and teaching demands are today increasing in complexity and availability of the researcher/academic; in 2012 the rector of UCL remarked in the constitution of the university that the researcher/academic needs to be *entirely invested* in his work. Women (and men) therefore not only have to meet high demands in research/teaching, but in addition also adhere to an important *institutional investment and presence* in terms of integrating into a hyper-complex system of bureaucracy and institutional culture. Moreover, this type of organization requires a significant *actual physical presence of individuals*, because decisions are made in meetings, deliberations and through a heady process of negotiation. There seems to be an increasing requirement of

«omnipresence» in all three pillars, of which each pillar has increased in levels, demands and complexity of required personal engagement. It can be argued that this can represent important issues to work/life conciliation or balance or having a family life, and that wanting to climb the career ladder also means important choices and pressures in terms of personal life. It is noteworthy that the two highest posts attained by women at UCL today (vice-rector and general adminstrator), and some other heads of units (presidents of institutes or deans) have profiles of women without children, sometimes not being in a couple. It would be therefore interesting, beyond a mere tracing of glass ceilings and leaky pipelines at UCL to research the type of profiles that women and men in management and other posts have currently, to see whether certain types emerge as recurrent and more favorable to integration in the local culture and structures of organization, but less favorable to family or private life.

According to the findings in WP3 D 3.1 and 5.1, the problem of articulating work and family within a gender regime maintaining a sexual division of productive work and reproductive work is one of the apparent causes of this downfall. In addition, a horizontal segmentation is present too, certain scientific disciplines such as the sciences and technology remain male bastions.

In terms of the *models of scientific/academic career and the pathways of progression* or climbing the ladder, the nature of how recruitment works (see D 7.1) and the organizational culture point to an importance of the *informal* nature of dealings, interactions and *local* ways of integration into the system (see also above WP5 D 5.1). Firstly, for the primary stages of the career, doctoral and postdoctoral funding in French-speaking Belgian universities is largely dependent on external subsidies or funding bodies, such as the FNRS (National Foundation of Research and Science) or the EC. Some limited fundings is supported by industrial sectors. There is also some PhD research funded by governmental foundations (Roi Boudouin, Belspo). All these funding paths are however subject to a very harsh, and what can increasingly be gleaned for the case of the FNRS, very political selection and appointment of a massive increase in candidates (especially international or external candidates to the given university, which is hardly surprising if we consider the “international mobility and attractiveness” discourse running in university policy lately, see WP5 5.1). However, the large numbers of ongoing PhDs, both male and female point to multiple possibilities existent. Obtaining PhDs is a grey zone upon which we do not have much data apart from the CDH study data. There is an ongoing study about motivation and abandonment of PhDs conducted currently at UCL by a group of psychology researchers with whom we have some collaborative interactions. It will be interesting to have their large-scale quantitative and qualitative data on how PhD’s feel in terms of completing and advancing in their doctorates.

There is then after obtaining Phd and postdoctoral contracts, an important hurdle to overcome for young researchers to obtain or gain admission/nomination into permanent lectureship posts, which is the most common academic career path. Another pathway is through the appointment of a permanent FNRS researcher, affiliated to a particular university. However, this pathway too is very competitive and political often in nature. For the recruitment into academic posts, the figures at UCL point to as many female researchers being actually recruited as there are female candidates for the post (see D 7.1). However, at a closer look, the recruitment process is split into multiple complex segments: first there is a selection of “dossiers” of candidates (of which there are still many for very few openings per year or two/three year) based on competitive criteria (see 7.1 report for Belgium) such as

publications, types of projects obtained, CV, place of education and PhD, mobility etc. Then upon closer selection, three or four candidates are retained for a three-fold interviewing and self-presentation recruitment process, in which recruitment committees (with very different dynamics and presidents) negotiate the "ideal candidate" for what is often a very local nomination, defending the interests of being able to integrate/fit and collaborate with existing teams, and being able to ensure the handling of and carrying out what are deemed all three (or four) pillars of academic work (research production, teaching, institutional engagement and perhaps also contribution to society). Qualitative and policy findings point to a recruitment and scientific/academic career model which favours general or competitive criteria and focus upon high production of research and research-orientated skills in the early stages of the career ladder (Masters, doctorate, postdoc), and a sudden expected leap into local integration and juggling multiple academic spheres, of which the institutional and self-administering engagement level becomes higher the higher the post. If we consider the age groups of persons entering and progressing (or not) up the career ladder then it cannot be disputed that this is between early twenties and late thirties for doctoral and postdoctoral levels, which are arguably family forming or settling more firmly into adulthood from a social point of view. The gender dimension therefore may play a more significant role as to how much women and men are willing to invest, to engage in and what they can actually perform in terms of work, production, engagement etc., and how open or closed the organizational culture and structures (both of which is created by all actors in the organization) are towards these performances, these work/life articulations and whether integration of either are at order.

Incorporating the Helsinki Group's European recommendations, some limited political will to counter these phenomena has been making itself felt in the last few years. Today, in the context of applying the European Charter for Researchers (EURAXESS), each French-speaking university has appointed a person in charge of examining the "gender" issue in producing indicators and formulating proposals for action. A "Women and Sciences" Committee has been inaugurated by the Walloon-Brussels Federation including representatives of the various universities, the Administration, the Minister in charge of higher education and scientific research as well as the National Fund for Scientific Research. Within the GARCIA Project, we are trying to work in synergy with these initiatives, but are encountering nonetheless some resistance in local policy makers' about its action-orientated nature and intervening character.

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7. APPENDIX

TABLEAU 1.7.2. Etudiants par domaine, cursus, orientation et catégorie d'études, selon le sexe en distinguant la nationalité (Belges, Etrangers de l'U.E. et Etrangers hors U.E.) Tableau interuniversitaire et tableaux par institution

Année académique 2010-2011 (situation au 1er décembre 2010)

Total interuniversitaire

Domaine Cursus (- orientation) Catégorie d'études	Belges			Etrangers de l'U.E.			Etrangers hors U.E.			TOTAL		
	H	F	Tot.	H	F	Tot.	H	F	Tot.	H	F	Tot.
SOUS-TOTAL SCIENCES DE LA SANTE												
1er cycle de transition (grade de Bachelier)	3 108	4 823	7 925	1 248	1 584	2 832	218	288	505	4 575	6 695	11 268
Année préparatoire à un 2ème cycle	39	74	113	3	13	16	42	58	100	84	155	239
2ème cycle de base	1	4	5	3		3	2		2	6	4	10
Master en 1 année d'études	46	95	141	76	72	148	2	5	7	124	172	296
Master en 2 années d'études à finalité non encore définie	52	91	143	31	45	76	24	17	41	87	170	210
Master en 2 années d'études à finalité didactique	78	42	120		1	1		1	1	78	44	122
Master en 2 années d'études à finalité spécialisée	302	779	1 081	88	121	210	85	120	205	475	1 014	1 490
Master en 2 années d'études à finalité approfondie	93	138	166	5	33	20	7	30	10	88	100	202
Master en plus de 2 années d'études sans finalité	715	1 300	2 010	247	380	660	85	48	87	966	1 744	2 740
AESS	4	8	11		1	1	1		1	8	2	10
CAPAES	4	11	17							6	11	17
Master complémentaire	587	1 064	1 651	180	263	442	108	60	166	850	1 418	2 268
Certificat médecine clinique	1		1	10	27	37	58	37	96	63	64	133
Etudes spécialisées (DES)	8	13	21	2	3	5	2	1	3	13	16	29
Année supplémentaire de 2ème cycle		1	1		1	1	1		1	1	2	3
Formation doctorale	55	98	164	18	35	42	27	10	37	94	133	253
Doctorat avec thèse	220	398	620	52	85	137	106	53	160	378	418	828
TOTAL :	5 276	8 811	14 087	1 847	2 819	4 666	721	757	1 478	7 844	12 187	20 131
***** TOTAL GENERAL *****												
1er cycle de transition (grade de Bachelier)	17 528	20 338	37 866	2 908	3 528	6 436	943	872	1 815	21 661	24 439	46 089
Année préparatoire à un 2ème cycle	792	919	1 700	42	88	130	212	181	375	1 050	1 174	2 210
2ème cycle de base	5	4	8	3		3	2		2	8	4	10
Master en 1 année d'études	675	800	1 280	126	100	225	76	88	137	774	698	1 472
Master en 2 années d'études à finalité non encore définie	813	594	1 150	58	90	148	110	40	155	782	720	1 502
Master en 2 années d'études à finalité didactique	245	507	795	12	19	31	9	4	13	369	530	790
Master en 2 années d'études à finalité spécialisée	5 482	7 480	12 962	764	1 503	2 268	898	508	1 136	6 944	9 487	16 341
Master en 2 années d'études à finalité approfondie	745	790	1 535	84	71	155	117	45	162	940	906	1 846
Master en plus de 2 années d'études sans finalité	719	1 300	2 010	247	306	660	89	48	87	998	1 744	2 740
AESS	242	425	667	14	18	24	37	23	59	286	466	750
CAPAES	102	158	256	4	8	15				107	163	288
Année supplémentaire de 2ème cycle	2		2				12	3	15	14	5	17
Master complémentaire	1 077	1 600	2 699	302	351	653	465	236	691	1 145	2 228	3 563
Certificat médecine clinique	1		1	50	27	37	58	37	96	65	64	133
Etudes spécialisées (DES)	8	13	21	3	2	5	2	1	3	13	18	28
Année supplémentaire de 3ème cycle	1	2	3	1	2	3	6	5	11	8	9	17
Formation doctorale	425	418	843	97	104	201	185	75	261	708	597	1 305
Doctorat avec thèse	1 498	1 283	2 781	376	324	693	673	318	986	2 543	1 925	4 468
TOTAL :	36 739	35 921	68 331	4 899	6 309	11 607	2 490	2 459	5 049	39 814	45 153	85 977

Table on number of promotions in SSH between 2010-2013

	SSH							
	2010		2011		2012		2013	
	Male	Fem	Male	Fem	Male	Fem	Male	Fem
N of promotions of research staff with temporary position to a permanent one:								
N of promotions in Full professors			1					
N of promotions in Associate professors								
N of promotions in Assistant professors								
N of promotions in Assistants with a PhD								
N of vertical promotions of research staff with permanent position:								
N of vertical promotions in Full professors								
N of vertical promotions in Associate professors								
N of vertical promotions in Assistant professors								
N of vertical promotions in Assistants with a PhD								

Table on number of promotions in STEM between 2010-2013

	STEM							
	2010		2011		2012		2013	
	Male	Fem	Male	Fem	Male	Fem	Male	Fem
N of promotions of research staff with temporary position to a permanent one:								
N of promotions in Full professors								
N of promotions in Associate professors								
N of promotions in Assistant professors								
N of promotions in Assistants with a PhD	1						1	
N of vertical promotions of research staff with permanent position:								
N of vertical promotions in Full professors								
N of vertical promotions in Associate professors								
N of vertical promotions in Assistant professors								
N of vertical promotions in Assistants with a PhD								

3 The Netherlands

By Channah Herschberg and Laura Berger

1. INTRODUCTION

The participating STEM institute at the Radboud University in the Netherlands is the Institute for Mathematics, Astrophysics and Particle Physics (IMAPP). The IMAPP is one of the six research institutes at the Science faculty, and is divided into four departments: Mathematics, Astrophysics, Theoretical High Energy Physics, and Experimental High Energy Physics. The Mathematics department is divided into three sub-departments: Algebra & Topology, Applied Stochastics and Mathematical Physics. The Science faculty is one of the seven faculties of Radboud University.

The participating SSH institute is the Institute for Management Research (IMR). The IMR is the multidisciplinary research institute of the Nijmegen School of Management (NSM). The NSM is one of the seven faculties of Radboud University. The IMR conducts top-level research on the governance of complex societal systems. The IMR is divided into five sections: Business Administration, Economics and Business Economics, Political Science, Public Administration, and Geography, Planning and Environment. Each section is divided into different departments.

The various academic positions in the Netherlands are full professor, associate professor, assistant professor, other academic staff (teachers and researchers, among which postdoctoral researchers), and PhD candidates (De Goede, Belder, De Jonge, 2013). A PhD position in The Netherlands is a job that comes with a salary. There is no fee for tuition. The normal duration of a PhD contract is four years.[21] The assistant professor position is the stage in which an academic functions as an independent researcher (De Goede, Belder, De Jonge, 2013).

2. MAPPING THE INDICATORS AT THE NATIONAL LEVEL

For mapping the national indicators concerning academic personnel, we made use of the Academic Personnel Information System (WOPI) which is derived from the personnel information of all Dutch Universities by the Association of Collaborating Universities (VSNU). These data are publically available on the website (www.vsnu.nl). For mapping the national indicators concerning Bachelor and Master students, we made use of the information of the Central Bureau for Statistics (CBS) of the Netherlands, in particular their online program Statline (statline.cbs.nl).

[21] https://www.lorentz.leidenuniv.nl/freqques.html

2.1 National level indicators – gender

From Table 1 we learn that although women form a majority at the levels of bachelors and masters, from the level of PhD candidates onwards they gradually become a bigger minority, with the lowest number of women at the rank of full professor (grade A). The percentages of women and men bachelor and master students, PhD candidates, and postdocs and other non-permanent researchers remain stable over time, whereas we see an increase in the percentages of women and decrease of percentages of men in all levels from assistant professors onwards: women assistant professors from 33% (2010) to 38% (2014); women associate professors from 20% (2010) to 26% (2014); women full professors from 13% (2010) to 17% (2014).

Table 1: General table with % of women and men in different ranks in the Netherlands

Position	2010		2011		2012		2013		2014	
	M	F	M	F	M	F	M	F	M	F
Bachelor students**			45%	55%	45%	55%	44%	56%		
Master students**			46%	54%	46%	54%	46%	54%		
PhD candidates	54%	46%	54%	46%	55%	45%	55%	45%	55%	45%
Postdocs and non-permanent researchers*	61%	39%	61%	39%	59%	41%	61%	39%	61%	39%
Assistant professors	67%	33%	65%	35%	64%	36%	63%	37%	62%	38%
Permanent research staff - associate	80%	20%	78%	22%	78%	22%	75%	25%	74%	26%
Permanent research staff - full	87%	13%	85%	15%	84%	16%	84%	16%	83%	17%

* For postdocs and non-permanent researchers we have taken the "Other Academic Personnel Research" as a category in the WOPI (Academic Personnel Information System – national level).
** No information was available in Statline on the years 2010 and 2014.

From Table 1 we learn that although women form a majority at the levels of bachelors and masters, from the level of PhD candidates onwards they gradually become a bigger minority, with the lowest number of women at the rank of full professor (grade A). The percentages of women and men bachelor and master students, PhD candidates, and postdocs and other non-permanent researchers remain stable over time, whereas we see an increase in the percentages of women and decrease of percentages of men in all levels from assistant professors onwards: women assistant professors from 33% (2010) to 38% (2014); women associate professors from 20% (2010) to 26% (2014); women full professors from 13% (2010) to 17% (2014).

2.2 Tables for the number of women and men in FTE and % in the Dutch SSH and STEM fields

Comparing master students to PhD candidates, we see that disproportionally more women are hired as PhD candidates than men: in 2011, for instance, the percentage of women master students was 29%, whereas the percentage of women PhD candidates was 39% (see Table 2). Despite this fact, women on all levels are the minority, with the lowest point at the level of full professor (grade A).

The total number of PhD candidates increases from 1733 in 2010 to 2086 in 2014. The percentage of women PhD candidates decreases over time, from 40% in 2010 to 35% in

2014. The increase of PhD candidates thus seems to be caused by a disproportionate amount of new men PhD candidates. The total number of postdocs and other non-permanent researchers increases from 1085 in 2010 to 1142 in 2014. The number of women in this group remains stable around 32%. The total number of assistant professors slightly increases from 581 in 2010 to 597 in 2014. The number of women assistant professors increases from 21% in 2010 to 27% in 2014. The total number of associate professors decreases slightly from 352 in 2010 to 340 in 2014. The number of women associate professor increases from 2010 (13%) to 2011 (15%) and then remains stable at that percentage. The total number of full professors increases slightly from 458 in 2010 to 471 in 2014. The number of women full professors increases from 9% in 2010 to 11% in 2014. Interestingly, we see that there are more full professors than associate professors.

Comparing master students to PhD candidates, we see that disproportionally more men are hired as PhD candidates than women: in 2011, for instance, the percentage of men master students was 44%, whereas the percentage of men PhD candidates was 63%. In contrast with the STEM field, the leaky pipeline thus already starts at that transfer.

Table 2: STEM number of women and men in FTE and %*

Position	2010		2011		2012		2013		2014	
	M	F	M	F	M	F	M	F	M	F
Bachelor students			1341 64%	740 36%	1514 64%	836 36%	1328 61%	861 39%		
Master students			1699 71%	700 29%	1961 71%	789 29%	1764 69%	801 31%		
PhD candidates	1048 60%	685 40%	1142 61%	715 39%	1189 64%	682 36%	1272 65%	687 35%	1357 65%	729 35%
Postdocs and non-permanent researchers**	730 67%	355 33%	739 68%	342 32%	742 67%	370 33%	748 68%	358 32%	775 68%	367 32%
Assistant professors	459 79%	122 21%	456 77%	133 23%	417 76%	130 24%	423 74%	148 26%	434 73%	163 27%
Permanent research staff - associate	305 87%	47 13%	293 85%	48 15%	290 86%	48 14%	286 85%	51 15%	289 85%	51 15%
Permanent research staff - full	417 91%	41 9%	412 90%	44 10%	407 90%	44 10%	424 90%	45 10%	420 89%	51 11%

* The WOPI divides the disciplines in several categories. For IMAPP, our STEM department, we have taken the category of Science & Physics (Natuurkunde). For the information on BA and MA students, we chose the discipline 'Science&Physics/ Informatics' in Statline. No information was available on the years 2010 and 2014.
** For postdocs and non-permanent researchers we have taken the "Other Academic Personnel Research" as a category in the WOPI (Academic Personnel Information System).

The total number of PhD candidates decreases from 593 in 2010 to 576 in 2014. The number of women PhD candidates increases over time, from 37% in 2010 to 43% in 2014. The total number of postdocs and other non-permanent researchers decreases from 164 in 2010 to 142 in 2014. The number of women in this group fluctuates but there is, in the end, a decrease from 40% in 2010 to 38% in 2014. The total number of assistant professors increases very slightly from 453 in 2010 to 458 in 2014. The number of women assistant professors increases gradually from 26% in 2010 to 31% in 2014. The total number of associate professors increases from 243 in 2010 to 259 in 2014. The number of women associate professor increases from 13% in 2010 to 18% in 2011. The total number of full professors decreases slightly from 303 in 2010 to 292 in 2014.The percentage of women full

professors increases from 8% in 2010 to 9% in 2014. Again it is interesting to see that there are more full professors than associate professors.

Table 3: SSH number of women and men in FTE and %*

Position	2010		2011		2012		2013		2014	
	M	F	M	F	M	F	M	F	M	F
Bachelor students			7004 44%	8928 56%	7883 44%	10069 56%	7408 44%	9445 56%		
Masters students			8225 44%	10484 56%	9551 44%	12086 56%	8295 44%	10406 56%		
PhD candidates	374 63%	219 37%	366 63%	217 37%	370 60%	249 40%	347 57%	263 43%	331 57%	245 43%
Postdocs and non-permanent researchers**	98 60%	66 40%	118 65%	63 35%	126 64%	72 36%	101 61%	65 39%	88 62%	54 38%
Assistant professors	334 74%	119 26%	312 73%	117 27%	303 71%	123 29%	330 71%	136 29%	315 69%	143 31%
Permanent research staff - associate	211 87%	32 13%	206 85%	35 15%	210 84%	40 16%	214 85%	39 15%	212 82%	47 18%
Permanent research staff - full	280 92%	23 8%	276 91%	26 9%	273 92%	25 8%	268 91%	27 9%	265 91%	27 9%

* The WOPI divides the disciplines in several categories. For IMR, our SSH department, we have taken the category of Economics (Economie) as that was closest to the fields in which the IMR resides. This includes business administration (largest department within the IMR) and economy, but excludes, for instance, public administration, spatial planning and political science. The table thus gives a partial picture of the context of the IMR as different departments are located in different disciplinary fields. For the information on BA and MA students, we chose the discipline 'Social Sciences/Business' in Statline. No information was available on the years 2010 and 2014.

** For postdocs and non-permanent researchers we have taken the "Other Academic Personnel Research" as a category in the WOPI (Academic Personnel Information System – national level)

2.3 Other data on PhD holders & academic careers in the Netherlands

Rathenau Institute Facts and Figures 2012

- The proportion of total female academic staff has risen from 19.5% in 1990 (total: 21,314) to 36.7% in 2010 (total: 24,321).

Rathenau Institute Talent Centraal 2013

- The number of temporary positions has increased over the years, mostly in the form of postdoc positions (Postdocs 2005: 2,559; 2010: 3,548). Average number of years in postdocs: 7.5. The report states that especially 'postdoc-stacking' (i.e. doing multiple subsequent postdoc projects) within the same department and the same institute has a negative effect on the career perspective of researchers. After a few postdoc projects, these people are not only 'too old' but also too specialized to transfer to another organization, whether inside or outside of academia. The exit flow is higher than upward flow, which means they have little chance of climbing up the current institute.
- Important role for national stimulation grant "Vernieuwingsimpuls" ("Innovational Research Incentives Scheme")[22], including 'Veni', 'Vidi' and 'Vici'grants: 75% of Veni laureates was a postdoc and 45% of them went on to a higher position after the project (mostly Assistant

[22] http://www.nwo.nl/en/funding/our-funding-instruments/nwo/innovational-research-incentives-scheme/index.html

Professor). 36% of Vidi laureates was postdoc and 80% of them went on to a higher position after the project. The biggest part of Vidi laureates was Assistant Professor and moved on to associate or full professorship.

Rathenau Institute Facts and Figures 2013

- PhD candidates, researchers, lecturers and assistants professors are more likely to leave academia than associate and full professors.
- 2005: postdocs 35% of 'other academic personnel', in 2011: 43%. The number of postdocs is increasing.
- 13% of 'other academic personnel' flows through to a higher position in own institute, 7% to other university, 67% outside of academia.

She figures 2012. Gender in Research and Innovation

- According to the She Figures 2012 the number of women researchers in the Netherlands in the A level is among the lowest in Europe: 13%. Grade B: 21%, Grade C: 34%, Grade D: 45%.
- Proportion of female heads of universities or assimilated institutions based on capacity to deliver PhDs, 2010: 7% against 93% of men.

OECD 2014 Education at a Glance

- The average age for first-time graduation in the Netherlands is below 25.
- 90% of high-skilled people are employed in the Netherlands. Tertiary educated women: Type B 76% and Type A or advanced research programmes; men 84% and 90% respectively. Unemployment rates women: 5.2% and 2.7%; men: 4.7% and 3.0%.
- There is a minimal difference between younger and older tertiary-educated women who work fulltime. The difference between women and men is considerably larger. Percentage of fulltime full-year earners: 22-25% women and 65-70% men. The number of women working fulltime is the lowest compared to all other countries in this report (see page 108 of the OECD report).
- Average annual earnings of tertiary educated women as a percentage of men's earnings: 60% (2010). This difference has to do with the large amount of part-time working women.
- Average annual full-time, full-year earnings of tertiary-educated women as a percentage of men's earnings (2010): age 25-64: 74%; age 35-44: 83%; age 55-64: 74%.

3. MAPPING ORGANIZATIONAL INDICATORS

In the next paragraph, we will describe the available organizational indicators from the IMAPP and the IMR. We used the personnel data we received from the personnel departments in January and February 2015, when we requested the data for WP4 and WP6. All indicators required for writing this report were available, except the data on numbers of promotions of the scientific staff in the IMR and the IMAPP department. This information is not documented and therefore not available.

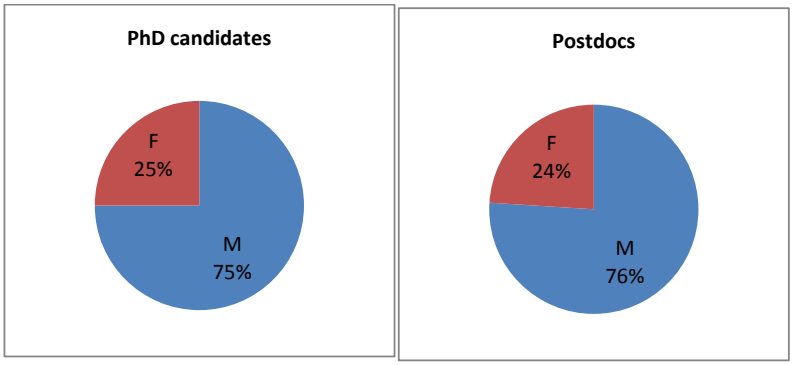
3.1 The IMAPP (STEM)

Looking at the tenured (permanent) staff within the IMAPP (see Table 4), over the time period 2010 – 2014, only two women professors and one woman assistant professor have been newly employed. Among the non-tenured staff, more women can be found. The highest numbers of women postdocs and PhD candidates work in the Astrophysics department. Within the Astrophysics department, the number and percentage of women PhD candidates and postdocs increased over time. In the other departments with women postdocs and PhDs, the number remained constant. Overall, the percentage of women staff has been constant over the years (16% women on average). With an increased proportion of women non-tenured staff, this means a decreased proportion of women tenured staff.

The proportion of women PhD candidates and postdocs was the same in 2014 (see Figure 1). The percentage of women assistant, associate, and full professors in that same year was respectively 8% (N=1), 0%, and 7% (N=1) (see Table 4). This shows a (very) leaky pipeline, starting between the postdoc and assistant professor level. Over the time period 2010 -2013 all assistant professor hires have been men, except for one. The one woman assistant professor hired was hired in 2011 on a gender tenure-track. At the moment she has a permanent contract.

In 2014, only the Astrophysics department contained women PhD candidates (N=10), so the percentage in Figure 1 is based on one department only. Women postdocs were working in three departments, of which the highest number in the department of Astrophysics (N=4). Since the number of women assistant professors, associate professors, and full professors is so low, we did not include them in a graph.

Figure 1 – Percentage of non-tenured women and men IMAPP staff in 2014



Over the years 2010 – 2013, one woman professor and five women postdocs have left the IMAPP, compared to three men professors, two men associate professors, one man assistant professor, and 15 men postdocs (see Table 6). Of the total number of 'exits', 22% was women. This is a higher percentage than the average percentage of women staff over the same time period.

Table 4 - Number of women and men IMAPP staff 2010-2014

		2010			2010	2011			2011	2012			2012	2013			2013	2014			2014
	Position	M	F	%F	Total	M	F	%F	Total	M	F	%F	Total	M	F	%F	Total	M	F	%F	Total
Tenured staff	Full prof	10	1	9	11	9	1	10	10	12	2	14	14	13	2	13	15	13	1	7	14
	Associate prof	7	0	0	7	7	0	0	7	6	0	0	6	7	0	0	7	9	0	0	9
	Assistant prof*	8	0	0	8	10	1	9	11	13	1	7	14	13	1	7	14	12	1	8	13
Non-tenured staff	Postdoc	9	3	25	12	10	2	17	12	13	3	19	16	22	4	15	26	19	6	24	25
	PhD candidate	17	4	19	21	24	7	23	31	26	8	24	34	34	9	21	43	30	10	25	40
Total		**51**	**8**	**14**	**59**	**60**	**11**	**15**	**71**	**70**	**14**	**17**	**84**	**89**	**16**	**15**	**105**	**83**	**18**	**18**	**101**

Note: Data on the 31st of December of each year

* In the IMAPP assistant professors on a temporary contract also belong to the category 'Tenured staff' because they are all intended to get a permanent contract after a fixed number of years (tenure-track system).

Table 5 - Number of women and men IMR staff 2010-2014

		2010			2010	2011			2011	2012			2012	2013			2013	2014			2014
	Position	F	M	%F	Total	F	M	%F	Total	F	M	%F	Total	F	M	%F	Total	F	M	%F	Total
Tenured staff	Full prof	8	22	27	30	7	23	23	30	8	27	23	35	9	24	27	33	9	22	29	31
	Assistant prof	19	34	36	53	20	32	38	52	17	29	37	46	16	24	40	40	15	24	38	39
	Associate prof	5	20	20	25	4	20	17	24	6	20	23	26	6	22	21	28	7	20	26	27
Non tenured staff	Full prof	1	9	10	10	1	8	11	9	1	8	11	9	1	8	11	9	1	7	13	8
	Researcher 3*	5	2	71	7	4	1	80	5	3	3	50	6	4	6	40	10	8	3	73	11
	Researcher 4*	3	2	60	5	5	4	56	9	4	6	40	10	6	4	60	10	7	7	50	14
	Assistant prof	1	1	50	2	6	5	55	11	7	14	33	21	7	14	33	21	9	15	38	24
	Associate prof				0				0		1	0	1		2	0	2	1	2	33	3
	PhD candidate	18	23	44	41	24	22	52	46	27	23	54	50	31	22	58	53	42	20	68	62
Total		**60**	**113**	**35**	**173**	**71**	**115**	**38**	**186**	**73**	**131**	**36**	**204**	**80**	**126**	**39**	**206**	**99**	**120**	**45**	**219**

Note: Data on the 31st of December of each year

* Postdoctoral researchers are indicated by the function Researcher 3 or 4

Table 6 shows that the number of newly entering women PhDs increased over the years and so did the number of PhDs obtained by women.

Table 6: Number of exits among the IMAPP staff 2010-2013

	2010		2011		2012		2013	
	M	F	M	F	M	F	M	F
N of exits of Full professors	1	0	2	0	0	0	0	1
N of exits of Associate professors	0	0	1	0	1	0	0	0
N of exits of Assistant professors	0	0	0	0	1	0	0	0
N of exits of Postdocs	3	1	2	1	5	2	5	1

Table 7: Information on IMAPP PhD candidates 2010-2013

	2010		2011		2012		2013	
	M	F	M	F	M	F	M	F
N of PhD candidates	17	4	24	7	26	8	34	9
N of newly entering PhD candidates	6	1	7	3	10	3	11	4
N of PhDs obtained	2	0	5	1	10	3	9	3

3.2 The IMR (SSH)

Overall, the percentage of women staff has been fluctuating between 34 and 45% over the time period 2010 – 2014 (see Table 5). The highest percentages of women staff can be found among the non-tenured Researcher 3 and Researcher 4 positions (postdoctoral positions), however the overall numbers of positions in Researcher 3 and 4 positions are low.

Of the tenured (permanent) staff, the percentage of women assistant professors is higher than the percentage of women associate and full professors. However, the percentage of women associate professors is lower than the percentage of women full professors. The percentages of women tenured staff have remained quite constant over the years. Of the non-tenured staff, the percentages of women have also remained constant, except for the temporary assistant professor position. Here the percentage of women has decreased in the recent years compared to 2010 and 2011.

Looking at the numbers of men and women staff, the number of tenured assistant professors has decreased over the years, whereas the number of non-tenured assistant professors has increased. The numbers of tenured associate professors and full professors has remained quite constant.

The percentage of women PhD candidates has been fluctuating between 44 and 68% over the years, with the highest percentage in 2014. In 2014, the number of women PhD candidates was more than double the number of men PhD candidates. In five years' time, the number of women PhD candidates more than doubled whereas the number of men PhD candidates remained stable.

Figures 2, 3 and 4 show the pipeline of the academic staff in the IMR. These graphs show a leaky pipeline in 2014, as the number of women is higher than the number of men at the PhD and Researcher level (non-tenured positions), but from the assistant professor level onwards, the number of men exceeds the number of women.

Figure 2 – Number of non-tenured women and men IMR staff 2014

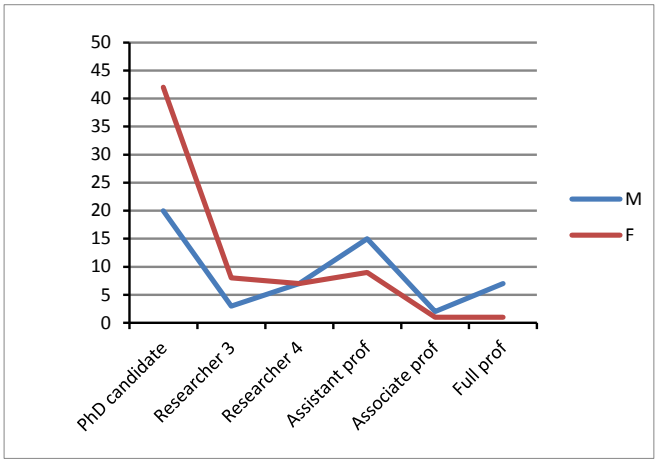


Figure 3 – Number of tenured women and men IMR staff in 2014

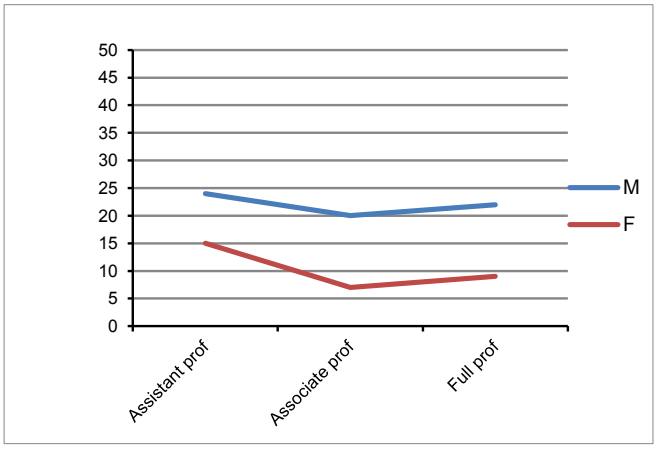
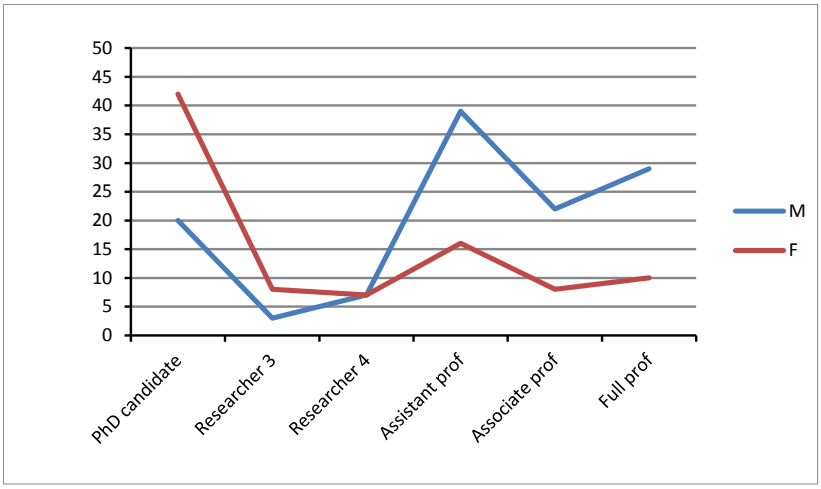


Figure 4 – Number of total women and men IMR staff in 2014



Over the years 2010 – 2013, three women assistant professors and two women researchers have left the IMR (see Table 8), compared to four men assistant professors and three men researchers. Of the total number of 'exits', 42% was women. This is in accordance with the percentage of women assistant professors and researchers in this time period.

Table 8: Number of exits among the IMR staff 2010-2013

	2010		2011		2012		2013	
	M	F	M	F	M	F	M	F
N of exits of Assistant professors	0	1	0	0	2	2	2	0
N of exits of Researcher 3 and Researcher 4*	2	0	0	0	1	1	0	1

Note: Information on associate and full professors was not available

* Postdoctoral researchers are indicated by the function Researcher 3 or 4

Over the years 2010 – 2013, more women than men entered a PhD position in the IMR (see Table 9). In 2011, 2013, and 2014 the number of newly entering women PhD candidates is more than double the number of men.

Table 9: Information on IMR PhD candidates 2010-2013

	2010		2011		2012		2013		2014	
	M	F	M	F	M	F	M	F	M	F
N of PhD candidates	23	18	22	24	23	27	22	31	20	42
N of newly entering PhD candidates	5	6	4	10	7	6	4	9	3	9
N of PhDs obtained	2	4	7	7	4	1	6	3	8	2

4. INTERPRETATIVE ANALYSIS

In this section we provide a short interpretative analysis of the different data on the leaky pipeline mapped in the previous sections.

4.1 National and organizational indicators on the Leaky Pipeline

Looking at the national figures, we can say that a leaky pipeline exists in Dutch academia: we learn that although women form a majority at the levels of bachelors and masters, from the level of PhD candidates onwards they gradually become a bigger minority, with the lowest point at the rank of full professor (grade A): the number of women PhD candidates in 2014 is 45% whereas the number of women full professors is 17%. However, we did see an increase over the years of women at the levels from assistant professors onwards, due to policies and practices to increase the numbers of female staff.

From the tables on the STEM and SSH fields we can conclude that in both fields the leaky pipeline exists. For the STEM field this starts from the transfer from PhD candidate to higher positions - a disproportionate number of women master students flow through to a PhD position, but then the number of women gradually decreases at each step. For the SSH field the leaky pipeline already starts at the transfer from master student to PhD candidate: a disproportionate number of men master students flow through to PhD positions, and this trend continues from there.

From the other studies on PhD holders in the Netherlands we learn that the number of women professors is among the lowest in Europe. We learn that the number of temporary contracts, among which postdocs are an important group, is increasing in the Netherlands. Gaining a Veni or Vidi grant is seen to be an important stimulant for researchers to gain higher positions. The yearly awarded amount of these prestigious personal grants are, however, very low, so obtaining such a grant is difficult and rare. If the obtainment of a Veni or Vidi is the norm for a career in academia, the pool of successful academics and potential candidates for tenured positions will be very small. The budget is a total of 150 million euros per year for the Veni, Vidi and Vici grants combined over all disciplines. In 2012, 38 of the 150 Veni grants were awarded in the social sciences field (25%). The emphasis on acquiring external funding is higher in the IMAPP than the IMR. Within the IMAPP there are more academics who received a Veni grant than in the IMR. Mobility is also an important factor for advancing as a researcher: remaining in one place, especially as postdoc, is disadvantageous for one's career as a researcher. This too, is more important in the IMAPP than the IMR.

The leaky pipeline is also present in the IMAPP and the IMR. Within the IMAPP, the percentage of women MSc students in Physics and Astronomy is similar to the percentage women PhD candidates. Within Mathematics, there is a big difference between the percentage of women students (27% in academic year 2014/2015, see Table 10 in the Appendix) and the percentage of women PhD candidates (8% in 2013 and 0% in 2014). Overall, in the year 2014 the percentage women at the PhD and postdoc level was the same in the IMAPP. The 'leak' seems to start between the postdoc and the assistant professor level, however it should be noted that when the data is divided by department, the leak starts at different moments in the different departments (e.g., already after the MSc programme). The number of academics on a temporary contract has increased over time. The total number of PhD candidates increased since 2011 and the number of postdocs sharply increased since 2012. The increase in the number of PhD candidates and postdocs is due to financial stimuli, as

the number of completed PhDs is part of the performance related financing of the Dutch government. The governmental budget for higher education in the Netherlands. has been under pressure for years. PhD candidates, and postdocs to a lesser extent, are relatively cheap human resources, for the most part paid out of external funding.

The number of IMAPP staff on a permanent contract remained relatively stable. In 2011, the only woman assistant professor in the institute was hired, which increased the percentage of women assistant professors. Since then, only men assistant professors have been hired, so the percentage women assistant professors has decreased again over time. No women associate professors have been employed in the period 2010 – 2014. In 2012 and 2013 there were two women full professors in IMAPP, but since one of them left in 2013, the percentage of women full professors in 2014 (7%) was the lowest in the years 2010-2014, and lower than the national average of 11% in 2014. Similar to the national data in STEM and SSH, there are more full professors than associate professors in the IMAPP and the IMR.

Within the IMR, the percentage of women MSc students (see Table 11 in the Appendix) is lower than the percentage women PhD candidates, particularly in recent years. No information is available per department. The number of PhD candidates is much larger than the number of postdoctoral researchers. The number of assistant professors is also higher than the number of postdoctoral researchers, particularly for men. The higher number of assistant professors can be explained by the focus on teaching within the IMR (on average 60% teaching duties per individual). Within the IMAPP, the focus is more on research than teaching. The number of academics on a temporary contract in the IMR has increased over time. The total number of PhD candidates sharply increased since 2010 (particularly women PhD candidates) and the number of postdocs slightly increased since 2010. This is in contrast with the national numbers, but similar to the IMAPP. The increase in the number of PhD candidates can be partly explained by policy choices and financial stimuli. After a reorganization of the Business Administration department in 2009-2010 in which the tenured staff was reduced from 58 FTE in 2008 to 40 FTE in 2010[23], more money became available for attracting PhD candidates. The faculty policy for internal PhD rounds is to finance the first three years of the PhD appointment. The fourth year has to be paid by the promoter him/herself.

Similar to the IMAPP, in the IMR we also see that the percentage of women assistant professors has decreased over time, but only the non-tenured assistant professors. The percentage of tenured women assistant professors remained constant, as did the number of associate and full professors on a permanent contract. Also similar to IMAPP and the national context, the percentage of women associate professors is lower than the percentage of women full professors. The percentage of women tenured staff in the IMR is higher than the national average in SSH (Economy and Business Administration only, see p. 5), particularly at the professor level if we look at the field of Economics and Business Administration (29% in IMR in 2014 versus 9% national in 2014).

[23] http://www.ru.nl/bedrijfskunde/actueel/laatste_nieuws/redactionele/reorganisatie/

4.2 Gender and welfare regimes

The conclusions from the D3.2 report on gender and welfare regimes summarizes the Dutch academic context very well:

Women's level of education has improved significantly over the years. In general, women nowadays are highly educated. More women than men have tertiary qualifications. At the highest level of education, only one third of all doctorate holders are women. However, when we consider the young generation, the number of women with a PhD is much higher. When we zoom in on the different fields of studies at the tertiary level, we find a persisting sex segregation. Particularly, the underrepresentation of women in Science – both in historical and cross-national perspective - is extreme. In the domain of employment, this same pattern of both horizontal and vertical segregation is reproduced. Women tend to work in particular sectors, and are underrepresented in top positions.

Currently, a high percentage of women in the Netherlands are participating on the labour market, yet most of them in part-time jobs. The Netherlands can be best characterized as a one-and-a-half-earner model: the most dominant working arrangement of (heterosexual) couples in the Netherlands is a situation in which the man has a full-time job, and the woman a part-time job. This situation is more often true when couples have children.

While part-time work is a key characteristic for the Dutch labour market, women with a university degree tend to work much more often in full-time jobs. The same goes for women working in the academic sector. Yet, female assistant and associate professors much less often than their male colleagues work in full-time positions. At the same time, the gender difference for full-time jobs is small at the level of full professorship.

Furthermore, the recent and sharp increase in temporary contracts in the academic sector in general particularly affects the job security of women as they more often than men work in temporary contracts. Academic staff who hold a PhD cannot get more than three consecutive temporary contracts. The total period of temporary employment cannot exceed six years (Collective labour agreement for Dutch Universities). As of 1 July 2015, a new law will be limiting this to four years. This has serious consequences for academics. The intention of the policy change was to reduce precarity, however within the current financial structure of universities, the measure will most likely increase precarity. One result of the change is that academics, also academics who attract external funding, might not be able to renew their contract in their current university when they reach the four years of employment.

The policies and practices around care and work-life issues remain rather traditional in the Dutch context. Child-birth affects women more than men. In 2013, 31% of women reduced their working hours after child-birth, a 4% decrease compared to 2011. Close to 60% of women kept working the same amount of hours after the birth of their first child (Merens, Van den Brakel, 2014). Compared to men, women are still primarily responsible for and spend more time on childcare and domestic work. Despite a culture of taking care of children in the family (by the mother), the use of formal childcare has increased rapidly.

Besides equal treatment laws, gender equality policy measures in the Netherlands are primarily soft policies. Emancipation policy continues to focus on women's labour market participation and women's economic independence. Measures taken often

intend to improve the representation of women. Politically, there is resistance to the more radical measure to improve the underrepresentation of women by compulsory quota and target figures are preferred. To conclude, measures mainly focus on increasing numbers, and less on more cultural and structural changes.

With regard to the academic sector, both the government and universities themselves have been actively introducing individual and structural measures to improve the situation of women. Unfortunately, there is a general lack of monitoring and evaluation of these policies and their effectiveness (van den Brink 2010). Research on the Dutch academic sector does show that measures are not fully applied everywhere, and success depends on committed initiators (van den Brink 2010).

4.3 Gender budgeting

A few findings from WP5 are relevant to the Leaky Pipeline report.

First, the strategic plan of the Radboud University speaks broadly of diversity and the intention to increase the (gender-based) diversity of full professors at the university. The diversity policy is mostly placed under the umbrella of HR, as the HR agenda is more elaborate on the diversity/gender policies of the universities. Both plans speak more of diversity in a broad sense – including also international diversity - than of gender equality. Target figures are set for the coming years regarding women and men full professors, as well as several measures to be taken (e.g., a tenure track system).

Second, a very small part of the budget of the university as a whole goes into the general diversity policy. The same goes for the institutes' budgeting processes: both institutes allocate a small part of the budget to gender-sensitive items such as a gender research group in IMR and measures to attract more women students in IMAPP.

Finally, regarding the conditions for an academic career we can conclude that the IMR is focused on the internal organisation of PhD candidates in a doctoral school. The IMAPP is more outward looking, as it has no central doctoral school but allocates PhD candidates to national discipline-related doctoral schools. The student-staff ratios show the different orientations of the two institutes, with the IMR being education-focused and the IMAPP being research-focused. This is also reflected in the number of fixed-term contracts, which is one-third in the IMR and about half in the IMAPP (going for a large part to postdocs).

4.4 Academic career paths and selection criteria

Within the IMR, it is not (yet) common to do a postdoc between the PhD and an assistant professorship. This is due to the high teaching load of staff within the department and to the lower amount of external funding that is available for and acquired by the IMR. Within the IMAPP it is a formal requirement for assistant professors to have some years of postdoc experience, also abroad. Committee members whom we interviewed, thought this to be important in order to acquire an international network and gain experience in a research environment outside one's home country. We expect that this criterion can have gendered consequences because it is argued that it can be harder for women to spend time abroad.

Interviews with committee members revealed that within the IMR international experience is preferred, but not required.

When comparing the selection criteria required as formulated by selection committee members in both institutes, we found that for both the IMAPP and the IMR the dominant criteria for assistant professors largely involve features as quality of research, publications, and teaching, and experience with applying for or obtaining research funding. Yet, in the IMR it is possible to be hired on an assistant professor position when candidates have recently or not yet defended their PhD. On the contrary, the IMAPP requires a finished PhD and a number of years of postdoc experience (also abroad). Thus, candidates for assistant professor positions at the IMAPP have to be more academically 'mature' compared to the IMR, in terms of research experience and academic age (number of years after PhD). Within the IMR, it is more so that the potential to become a successful assistant professor is assessed, whereas in the IMAPP the proven qualities of the candidates are important.

Also, selection committee members in the IMAPP stated that it is not common to climb the academic career ladder within the same institution. PhDs in the IMAPP have to leave the institute after their defense and the selection procedures between 2010 and 2013 showed that no internal candidates are hired on assistant professor positions. This is in contrast with IMR, where it is more common to hire internal candidates for postdoc and assistant professor positions. However, the limited number of postdocs that were interviewed in the IMR stated that they do not have the prospect of continued employment within the IMR. Postdoctoral researchers, in both institutes, are hired on temporary contracts or on personal grants, and work on research projects that are not necessarily at the core of the department. Most of the postdocs are hired from outside, and often they do not get the possibility to get teaching experience; a criterion that becomes important as an assistant professor. They are not embedded in the department. Therefore, postdoctoral positions are focused on a research project and not on a career path.

Within the IMAPP, most, if not all, of the women PhD candidates and postdoctoral researchers are foreigners. A research project in the Technical University Delft showed the same results and stated: "International women arrive from other universities abroad and disappear after a temporary stay in Delft" (Van Engen, Bleijenbergh, Vinkenburg, 2010). This is most likely the same in Nijmegen, causing early academic women to leave and never return to the Radboud University. When it is obliged to leave the organization after a period of time, this can have more negative implications for women than for men, as previous research showed that it is easier for women to get promoted within their own organization than outside (Baron, Davis-Blake, Bielby, 1986). If they have to apply outside their organization, informal contacts tend to play an important role, which has also gendered implications.

5. CONCLUSION

We see that in internationally comparison (OECD, EU), the Netherlands has one of the lowest numbers of women full professors. In both the STEM and the SSH field, on both the national and the organizational level, the leaky pipeline is present. The numbers and percentages of women on academic positions differ between the STEM and the SSH domain, on both the national and the organizational level, but the trend of decreasing numbers at every step in the pipeline is present everywhere. Yet, in both participating GARCIA departments in the Netherlands, the IMAPP and the IMR,

we see higher percentages of women full professors than women associate professors. The number of women full professors is higher than the national average in the IMR, but lower in the IMAPP.

In both the IMAPP and the IMR we found an increasing number of women non-tenured staff over the years 2010-2014, however no increase in the number of women tenured staff. This indicates an increasing leak in the pipeline at the assistant professor level in the IMAPP and IMR. In the IMAPP, the number of women staff leaving seems to be disproportionate, when compared to the number of women employed. This is not the case within the IMR.

Despite the similarity of the career ladder in the IMAPP and the IMR (PhD – postdoc – assistant prof – associate prof – full prof), the criteria for the positions differ, particularly at the early stages of the academic career. Earning a Veni or Vidi grant is a great stimulant for the career prospects of early career researchers within the Netherlands, however only attainable for very few academics. Within the IMAPP, getting a Veni or Vidi is almost a requirement to get hired or to get tenure, whereas in the IMR it is more of a bonus and more exceptional when a staff member receives such a grant.

In general, the Netherlands has the highest number of women working part-time, and a one-and-a-half earners model is prevalent. Care divisions between men and women are still conservative. However, the prevalence of part-time work does not apply to women in academia. Previous research in the University of Tilburg has shown that fathers and mothers in academia hardly differ in their contract hours (Van Engen et al., 2008), which was confirmed by a research project in Delft (Van Engen, Bleijenbergh, Vinkenburg, 2010). In Delft, only at the assistant professor level women worked slightly fewer hours than men. The research project in Tilburg also showed that women academics have more often no children or fewer children than women outside academia. A pay gap exists between men and women with tertiary education.

RECOMMENDATIONS:

- Educate women and men PhD candidates about the gendered context of academia.
- Focus on hiring women PhD candidates, particularly in the IMAPP departments except Astrophysics.
- Loosen the criterion of international experience for IMAPP postdocs, and take into consideration that it can have gendered consequences, and that international networks and collaborations can be obtained in many different ways.
- Create postdoc positions that contain the possibility to do teaching. For example, a postdoc position that has funding for three years fulltime research can be extended to a four-year contract when the postdoctoral researcher has 25% teaching duties. The teaching time is paid for by the department (if the budget allows). This way the postdoc gets valuable experience in teaching and also has a longer secured position.

- Develop a talent follow up system to trail talented women PhD candidates and postdocs after they leave, and offer them a position after a number of years (also recommended in the Delft project).

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7. APPENDIX

Table 10: Number of IMAPP MSc students 2009-2015

Year	MSc programme	N of students	%Female
2009/2010	Mathematics	16	38%
	Physics and Astronomy	49	10%
2010/2011	Mathematics	25	20%
	Physics and Astronomy	41	15%
2011/2012	Mathematics	26	8%
	Physics and Astronomy	32	28%
2012/2013	Mathematics	37	30%
	Physics and Astronomy	59	24%
2013/2014	Mathematics	54	33%
	Physics and Astronomy	62	19%
2014/2015	Mathematics	62	27%
	Physics and Astronomy	79	25%

Table 11: Number of IMR BSc and MSc students 2010-2014

	2010/2011			2011/2012			2012/2013			2013/2014		
	M	F	%F	M	F	%F	M	F	%F	M	F	%F
N of students BSc	1227	605	33	1323	682	34	1192	671	36	1331	717	35
N of students MSc	476	439	48	501	410	45	561	441	44	604	402	40

4. Iceland

By Thomas Brorsen Smidt, Þorgerður Einarsdóttir and Gyða Margrét Pétursdóttir

1. INTRODUCTION

In this deliverable we provide an overview of the available national and organizational data on university and doctoral students as well as organizational data on university staff in Iceland. We provide a short transversal interpretive analysis of the data in relation to gender and welfare regimes and gendered career paths, establishing a preliminary diagnosis of the nature of the leaky pipeline phenomenon in the Icelandic context.

When looking at the leaky pipeline in Iceland it is important to have some national and institutional particularities in mind. Currently there are seven higher educational institutions in Iceland but the University of Iceland (UI) is the oldest and by far the largest institution of higher education. It was founded in 1911, beginning with 45 registered students, thereof one woman. In 2013 the student body at UI was approximately 14.000 out of nearly 20.000 university students in total in Iceland of which 34% are men and 66% women. The fact that university funding also differentiates immensely according to academic disciplines is also worth bearing in mind.

Most national data was available via *Statistics Iceland.* Here data are compiled from a database comprising regular students enrolled at university and doctoral level. Each student is counted once. Students are counted and assigned to school level in accordance with ISCED97 (International Standard Classification of Education 1997). Three types of national data were unfortunately not available. Firstly, national data on post-docs were not available due to the fact that the concept of post-doc itself is very new in the Icelandic context and as such there are relatively few post-docs and these are not yet officially counted by the census. Other regional or national data on PhD holders and their careers do not exist either. Finally, while national data on professional academics was available, it was unfortunately not dividable by STEM and SSH fields respectively.

Organizational data was the same as was obtained in deliverable 4.1.1 through the University of Iceland website as well as through individuals at the university with more privileged access to data. Data on the number of exists from the University do not exist and the number of promotions is so small that it does not yield any statistical power whatsoever. Moreover, a change in the recruitment system in 2010, when tenure track was introduced, meant that assistant professor became what we define as a non-permanent position. In effect, assistant professors hired before this time might be in a permanent position today. This means that we cannot distinguish between assistant professors with a permanent and a non-permanent position. However, all full professors and associate professors are permanent positions. In the following our interpretive analysis is interwoven in the discussion throughout the text.

2. MAPPING THE INDICATORS AT THE NATIONAL LEVEL

In this section we provide an overview and analysis of the available national data. These numbers include all students at university level, across all fields of study.

Examining the combined number of students at the national level (Table 1), we find that women account for **63%** of all Icelandic university students on average. At both the undergraduate and the doctoral level, women accounted for **61%** of students while the difference was greatest at the Master's level where women accounted for **68%** of students on average.

Table 1: Number and % of University Students by Level and Sex, National Level

	Year	Men	Women	Total	Men %	Women %
Basic & first degree	2010	5450	8540	13990	39%	61%
	2011	5610	8736	14346	39%	61%
	2012	5655	8642	14297	40%	60%
	2013	5725	8786	14511	40%	61%
Master's degree	2010	1408	2826	4234	33%	67%
	2011	1327	2849	4176	32%	68%
	2012	1313	2847	4160	32%	68%
	2013	1456	3146	4602	32%	68%
Doctoral degree	2010	200	278	478	42%	58%
	2011	170	282	452	38%	62%
	2012	184	286	470	39%	61%
	2013	186	305	491	38%	62%

These numbers might seem comforting to those who value Iceland's infamous top ranking in the Global Gender Gap Report (Bekhouche, Hausmann, Tyson, Zahidi, Massoudi, 2014) and take it as evidence that Icelandic academia is not merely beyond equality struggles, but that women actually appear to have a head start.

However, if we look at the way in which students at the national level are distributed across SSH and STEM fields respectively, a different picture emerges (based on national data, see Table 8 and Table 9 in appendix).

In SSH fields from Bachelor's to Doctoral level, 2010-2013, women outnumbered men overall with an average gender ratio of around **62%** women and **38%** men. In some fields women were more over-represented than in others. The more extreme examples include social work (**94%** women), disability studies (**89%** women), sign language (**91%** women) and gender studies (**91%** women). Other examples include library and information science (**83%** women) and anthropology (**79%** women). In a lot of fields, however, gender was fairly evenly distributed. This was in the bigger fields such as business (**55%** women; **45%** men) and law (**53%** women; **47%** men), but also smaller fields such as graphic design, archaeology and media and communication studies approached something reminiscent of an equal distribution of women and men.

Interestingly, men outnumbered women in some SSH fields. Men accounted for **65%** of students at the BA and MA levels of philosophy (bar the doctoral level), which should not come as a surprise given the sexist roots of modern Western philosophy (Songe-Møller, 2003) and the fact that the status of women within it is known to more closely resemble that of the STEM fields than that of the SSH fields (Hutchison, Jenkins, 2013). Men also accounted for **67%** of students in economics where the absence of women in general is a well-known problem (Goldin, 2013). In this way, it is interesting to see that men also outnumber women in some SSH fields, which has to be kept in mind. However, on the whole, SSH fields remain largely dominated by women.

Surprisingly, in STEM fields, the average gender distribution across the spectrum since 2010 was actually better than in SSH, with **40%** women and **60%** men. Like in SSH, some STEM fields approach an equal gender distribution. These are fields like biology (**58%** women; **42%** men), geography (**49%** women; **51%** men), geology (**50%** women; **50%** men) and financial engineering (**42%** women; **58%** men). In some fields women even significantly outnumber men, namely in nature and environment (**80%** women), biomedical engineering (**77%** women) and biotechnology (**72%** women). Interestingly, it would seem that it is the STEM fields that involve direct contact with nature or has some relation to health care (e.g. biomedical engineering) that attract the most women. Men primarily dominate the technical STEM fields such as mechanical technology (**98%** men), electrical engineering technology (**90%** men), software engineering (**88%** men), physics (**82%** men), computer sciences (**82%** men), electrical and computer engineering (**82%** men), energy engineering (**80%** men), building technology (**80%** men), and mathematics (**71%** men).

Taken together, women largely dominate SSH fields and men the STEM fields. However, as is also obvious, more women have come to the STEM fields. If we look at the way in which students in respectively SSH fields and STEM fields are financed in Iceland (Table 2) we can see that the allocating of public funding within the university depends on discipline. For each *full-time equivalent student* in SSH, universities get ISK 611.000 and over triple this amount for a full-time equivalent student in STEM, or ISK 958.000 and ISK 1.200.000 respectively. The most "expensive" students are in odontology where the price category for each student is 4.3 times the price of a SSH student. This translates into a more unfavourable teacher-student ratio and a higher workload, which makes working conditions harder and career options tougher.

This overview reveals how different fields are financed on the national level from the state. Even though the University of Iceland makes small adjustments when distributing the funding within the university the overall picture is the same. These numbers are very telling. As pointed out, STEM fields receive more than **3 times** the amount of government funding than SSH fields do. Moreover, as we pointed out in deliverable 4.1.2, **31** out of **36** externally funded research projects (exceeding €50.000) from the University of Iceland were STEM related.

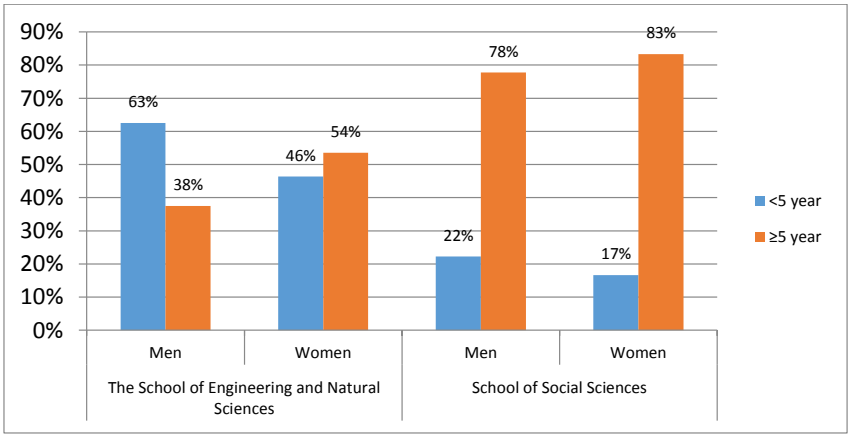
This huge discrepancy means that not only do the STEM disciplines receive more funding from the state in terms of payments per student; they also have more opportunities to get research funding, which affects the length of their PhD studies. Figure 1 reveals that the average length of PhD studies is lower in the STEM (the School of Engineering and Natural Sciences) than in the SSH (School of Social Sciences). In addition to this, there are gender differences within both STEM and SSH. Hence, 63% of the men in STEM complete their PhD studies in 5 years, and 46% of the

women. In SSH, however, a large minority or 22% of the men and 17% of the women complete their PhD within this time frame.

Table 2: Price category by full-time equivalent student by disciplines in UI for 2015

Price category	Price in ISK	Price proportion
Social and human sciences, theology, law and other comparable disciplines	611.000	1
Computer science, mathematics and other comparable disciplines	958.000	1,6
Education and other comparable disciplines	916.000	1,5
Nursing and other comparable disciplines	1.149.000	1,9
Natural sciences, engineering and other comparable disciplines	1.200.000	2
Medicine	1.649.000	2,7
Odontology	2.654.000	4,3

Figure 1 - Number of women and men in STEM (the School of Engineering and Natural Sciences) and SSH (the School of Social Sciences) who complete their PhD within 5 years.



The tendency that women have been moving into the STEM fields, while men do not yet seem to flock to SSH fields (which typically associated with women) is an issue of concern. It is not unthinkable that the influx of women into some STEM fields is connected to the stature and respectability that STEM fields enjoy (hence all the financing), which might also explain why we have not seen more men move into the SSH fields.

Yet another aspect of the financial superiority of STEM fields is reflected in the amount of students. As an example, from 2010-2013, STEM fields in Iceland boasted an average of **2.914** undergraduate students in each year spread over **27** fields of

study. SSH, on the other hand, boasted an average of **6.959** undergraduate students in the same time period, spread over **54** different fields of study. This also raises questions as to how we value the production of knowledge in the first place. SSH fields obviously attract more students, which means that SSH sparks a greater deal of interest and thirst for knowledge among the general population. And when it comes to contributing to the on-going social transformation of society, there is no reason to believe that SSH is less influential than the STEM fields, which tend to create the kind of knowledge sought after by the private sector and which can turn a profit. This not to say that one is more important than the other, but that both SSH and STEM fields make important contributions to society, which is why the huge discrepancy is financial aid and government funding is puzzling.

The number of students and the financial allocation create the framework and the prerequisites for the working conditions of women and men as well as respectively female and male dominated disciplines and fields. Whereas women are more numerous in SSH, career options in these fields are fewer and more restrained. In this respect, the number of students and the allocation of public funding are connected to the leaky pipeline.

The existence of a leaky pipeline is also evident if we look at the gender ratio among professional academics in Iceland (Table 3). It is immediately obvious that the higher the academic rank of a certain position, the fewer women we find occupying it

Table 3: Number and % of Academics by Level and Sex, National Level

		Men	Women	Total	Men %	Women %
2010-2011	Professors	232	84	*316*	73%	27%
	Associate professors	138	75	*213*	65%	35%
	Assistant professors	128	133	*261*	49%	51%
2011-2012	Professors	224	80	*304*	74%	26%
	Associate professors	142	80	*222*	64%	36%
	Assistant professors	125	131	*256*	49%	51%

This information is unfortunately not available for 2013, but in the available data we see that women made up only **26%** of full professors and **36%** of associate professors in the years from 2011-2012. These numbers are considered an improvement over the state of affairs in 1999-2000 when women accounted for only **9%** of full professors.

Taken together, at the associate and full professor level, women accounted for an average of **31%** of staff in the time period from 2010 to 2012. This is a strong indicator that, on the whole, there are fewer women than men at the top layers of academic careers. Only at the very beginning of academic careers (bar post-docs) do the numbers reflect an equal gender distribution. Among assistant professors the gender ratio is **49%** men and **51%** women. As such one might conclude that the more stature and power inherent in an academic position, the more likely it is that the position is occupied by a man. Women and men seem to be equally represented only in the academic position with the least amount of stature. In other words, in spite of international equality rankings, Iceland does not escape the “leaky pipeline”.

3. MAPPING AND ANALYZING ORGANIZATIONAL INDICATORS

Of course the data on academic staff would be much more interesting if we could see which academics taught in STEM and SSH fields respectively. While this data is not available at the national level, it is available in the context of the University of Iceland (see Table 4 and Table 5).

If we compare The School of Social Sciences (as representative of SSH) and The School of Engineering and Natural Sciences (as representative of STEM), we find that while the University of Iceland does in some ways reflect the national standard, it deviates in others. The number of research staff does not deviate greatly from 2010 to 2013. Across this time period women made up an average of **40%** of full professors and **38%** of associate professors in SSH. In STEM it was only **13%** of full professors and **35%** of associate professors on average. It is also worth noting that, on average, STEM has a much higher teacher-to-student ratio than SSH.

In the time period from 2010-2013, STEM fields had an average of **111** available staff compared to **117** in SSH. Even though STEM has a slightly higher number of teachers, this number pales into insignificance if we consider the volume of the student body in SSH compared to that of STEM, as we pointed out earlier. If we take the numbers from the University of Iceland alone, there were on average **2203** students in STEM fields each year between 2010 and 2013. For SSH fields this number was **4717**. This means that the student-to-teacher ratio in STEM at UI is around **1:20**, and a whopping **1:40** in SSH fields.

Moreover, if we look at the numbers of academic staff at the organizational level (Table 4 and Table 5) in the context of PhD students (Figures 2, 3, 4 and 5), this provides further insight into the leaky pipeline.

Whereas the total number of students is much higher in SSH than in STEM, and is comprised of more women than men, the opposite applies to the PhD level. The PhD students in STEM are much more numerous than in SSH, or 153 against 86 in 2013, and comprised of more men than women. As pointed out above, the majority of the large externally funded research projects are STEM related which reveals the gendered dimensions in this.

Table 4: Number and Percentage of Research Staff, Organizational Level (SSH)

	2010		2011		2012		2013	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
Professors	25	15	24	16	25	17	26	18
Associate prof.	14	9	17	9	16	11	17	11
Assistant prof.	19	12	17	13	18	13	18	16
Adjuncts	6	9	9	10	7	9	9	11
Total	***64***	***45***	***67***	***48***	***66***	***50***	***70***	***56***
Professors	63%	38%	60%	40%	60%	40%	59%	41%
Associate prof.	61%	39%	65%	35%	59%	41%	61%	39%
Assistant prof.	61%	39%	57%	43%	58%	42%	53%	47%
Adjuncts	40%	60%	47%	53%	44%	56%	45%	55%
Total	***59%***	***41%***	***58%***	***42%***	***57%***	***43%***	***56%***	***44%***

Table 5: Number and Percentage of Research Staff, Organizational Level (STEM)

	2010		2011		2012		2013	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
Professors	66	8	63	8	61	10	61	10
Associate professors	23	9	18	8	17	11	15	11
Assistant professors	7	5	8	5	6	2	5	5
Adjuncts	0	0	0	0	2	0	1	0
Total	***96***	***22***	***89***	***21***	***86***	***23***	***82***	***26***
Professors	89%	11%	89%	11%	86%	14%	86%	14%
Associate professors	72%	28%	69%	31%	61%	39%	58%	42%
Assistant professors	58%	42%	62%	38%	75%	25%	50%	50%
Adjuncts	/	/	/	/	100%	0%	100%	0%
Total	***81%***	***19%***	***81%***	***19%***	***79%***	***21%***	***76%***	***24%***

If we track the number of female PhD students in SSH from 2010 to 2013 (Figures 2 and 3, and Tables 1 and 2 in appendix), it is obvious that women have increasingly been choosing the PhD option. At the same time, fewer and fewer men have been doing the same, even though, when it comes to newly entering PhDs, things are lightening up towards 2013, when the number of newly entering PhDs was **42%** men and **58%** women. At the same time, however, this seems to be because fewer and fewer women are choosing the PhD option, not because more men opt for a PhD in SSH. The reason for this might be the realization amongst students that fewer jobs will be available in academia in the future because of the high number of graduating PhDs.

Figure 2 – Number of PhD candidates (newly entered, ongoing and obtained PhD) by Sex, Organizational Level (SSH)

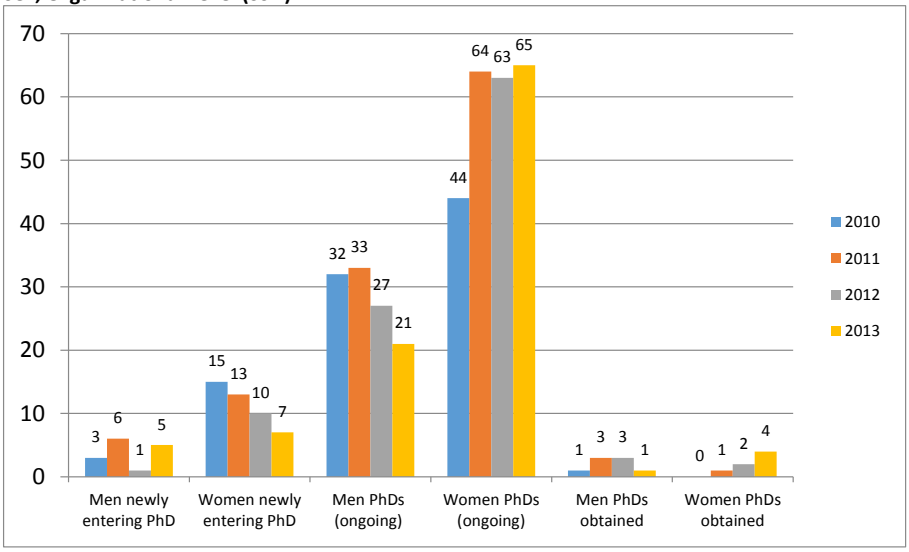


Figure 3 – Number of PhD candidates (newly entered, ongoing and obtained PhD) by Sex, Organizational Level (STEM)

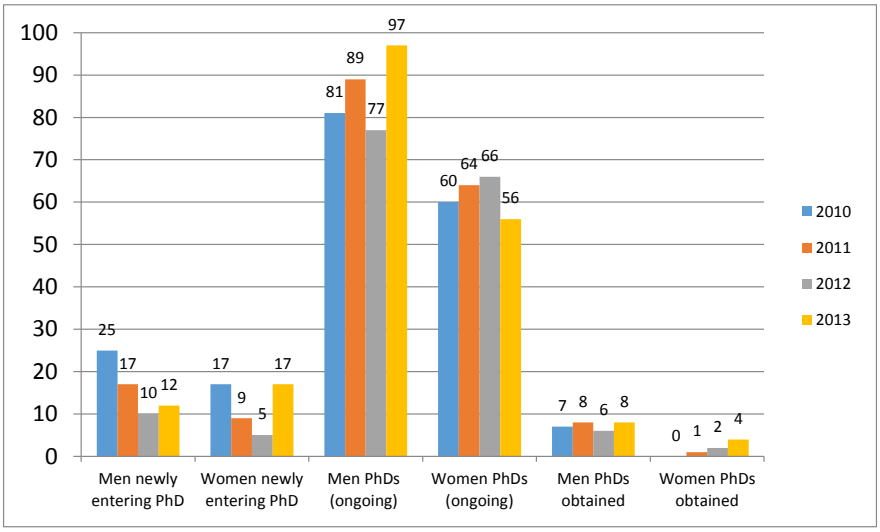


Figure 4 – Number of PhDs vs. Academic Staff at UI, SSH 2013

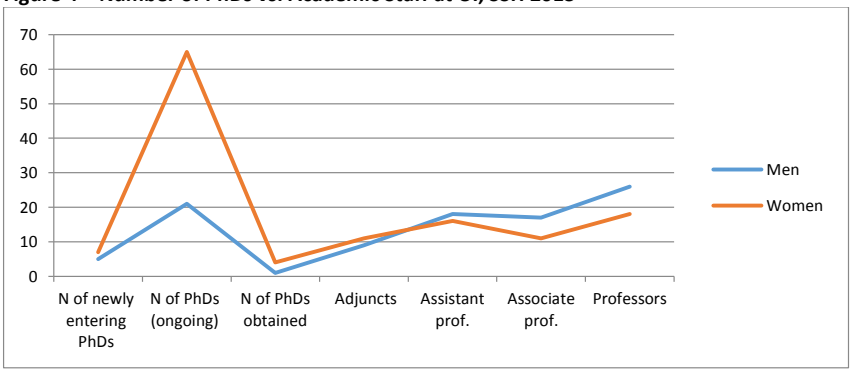
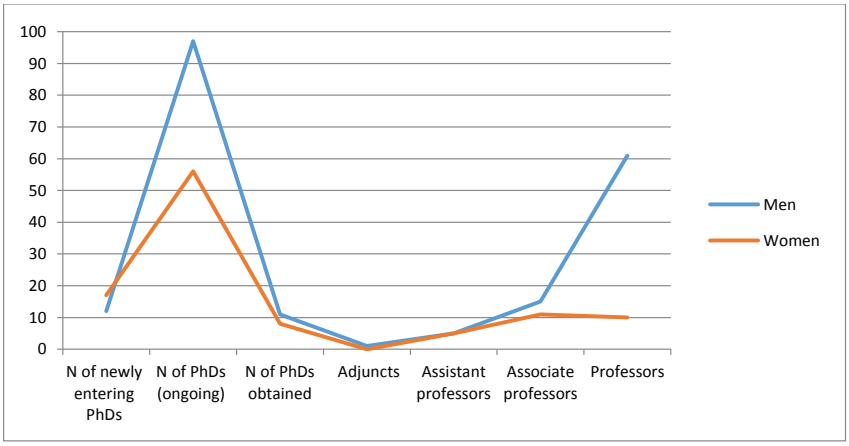


Figure 5 – Number of PhDs vs. Academic Staff at UI, STEM 2013



Oppositely, in STEM (Figure 4), more men are currently working on their PhDs while the number of women PhD candidates remains low in comparison. It is positive to observe, however, that women make up **59%** of newly entering PhDs in 2013, possibly signalling a future change in gender distribution.

Interestingly, these figures also show that full professors are more numerous than associate and assistant professors due to a promotion system that has been in place for quite a long time. However, we can see that it seems to be a more rapid process for men than for women, especially in STEM. In SSH the number of women is higher than the number of men among on-going PhDs while the opposite is the case in STEM.

4. INTERPRETATIVE ANALYSIS

The gendered aspects of SSH and STEM manifest themselves on many levels and in some cases different mechanisms are interwoven which exaggerates the gendering of the system. Women are in the majority at all levels, and the gender segregation is excessive in some fields and disciplines. Although the student body is much larger in SSH than in STEM, the financial system favours the STEM fields which get twice as much funding as the SSH fields. This translates into a more unfavorable teacher-student ratio for SSH, fewer career openings, and harder working and career conditions. Also the possibilities for research funding differs extensively; a vast majority of the large externally funded research projects at the University of Iceland are STEM related. This facilitates the funding of PhD studies which explains the higher number of PhD students in STEM, of which the majority are men. Furthermore, the STEM fields are more respected. Hence the leaky pipelines are strongly related to the issue of gender budgeting that will be in focus in WP5.

As stated in the D3.2 report Iceland has historically had a very high rate of women's labour market participation, and women in Iceland also have long working hours. They are more educated than men and the educational gender gap widens. Despite the high ratio of women's education and labour market participation women have less opportunities at the labour market and the gender pay gap remains considerable. The Icelandic labour market is highly gender segregated, vertically and horizontally,

with men in higher positions than women; women more often working in the public sector such as health care, welfare and education, and men more often in the private sector. At the same time as women in Iceland are active on the labour market, fertility rate is high, in fact among the highest in Europe. In recent years reforms have been enacted in Iceland in welfare and family issues. Hence, the parental leave was reformed in 2000, and the leave extended from six months to nine with three months' non-transferable father quota. The reform is considered to be a success leading to increased child care involvement of fathers. Furthermore, day care facilities are now available for the majority of pre-school children although there is a gap between parental leave and pre-school that has not been dealt with.

While the welfare system in Iceland is often compared with those of the other Nordic countries, studies have shown that the welfare expenditures remain below the other Nordic countries. The parental leave reform from 2000 has affected the involvement of men in child care and family life positively. The system is currently threatened though because of budget cuts. The payments were 80% of average salaries for working parents at the beginning but have been reduced considerably. Furthermore, the division of work within the family remains unequal.

Iceland reveals a contradictory picture in terms of gender equality. The rich participation of women on the labour market is often interpreted as de facto equality. Despite high gender equality ranking, gender equality laws and machinery, large gender disparities remain. Women are largely underrepresented in decision making positions, in politics and finance. Currently, unemployment rates reveal that educated women are make up the largest group of unemployed people.

If we connect the wider framework of gender and welfare regimes to the leaky pipelines, we see that the main reasons for the leaky pipeline can hardly be due to external conditions relating only to the lack of welfare measures. By this we are not implying that gender inequalities do not exists in this sphere. Nor are we saying that inequalities do not exist in the family situation, as this is documented in new research (Heijstra 2013). However, we claim that there is a variety of reasons where obstacles within the university sector should and need to be explicitly in focus.

5. CONCLUSION

When analysing data related to the leaky pipeline at the national level, it is immediately obvious that women, in terms of numbers, dominate higher education. This might appear to be a positive development at first glance, but on closer inspection it is evident that even though women are in the majority, they are so predominantly in SSH fields, which enjoy the least amount of funding, the highest teacher-to-student ratio (i.e. bigger workload), the least amount of stature, and the fewest options for a future career in academia. Oppositely, STEM fields, which are dominated by men, receive considerably more funding and enjoy a higher stature even though they attract a much lower number of students.

If we move up the academic ladder, we also find that men overwhelmingly occupy the higher academic positions with the most stature. It is therefore a distinct possibility that the leaky pipeline to some extent has its roots in broader gender and welfare regimes, where women are traditionally left with the least prestigious societal responsibilities.

Consequently, even though it is important to address the question as to why there are so few women in STEM fields and why women move away from academic careers the higher we get on the career ladder, it is equally important to address the question as why there are so many men. It is possible that, on the macro-level, men might feel a pressure to conform to masculine ideals of stature and prestige and therefore end up choosing a technical field of study in a homo-social environment that is sure to land them a well-paid future job which will confirm their role as family-providers.

In the same vein, men might opt out of certain careers in SSH fields because an overarching culture of masculinity does not connect male identity to SSH topics.

If we have been able to change science stereotypes in a way so that a woman is now more likely to choose to a line of study within STEM, is it then not possible to change masculine stereotypes so that a man may be less likely to do so and instead move into an SSH related field, which will nurture him with the socially or culturally saturated knowledge for which he craves? A point of self-reflection might be to ask ourselves whether we also fall in the trap of lending more importance to STEM fields, which we have learned to think of as more prestigious and important. Why else would we focus so much on improving the status of women within STEM and not so much men's status within SSH? After all, these fields are of equal importance.

Consequently, based on the quantitative data, we recommend implementations that seek to break down stereotypes both within SSH and STEM, not to merely provide equal attention to men in a debate on gender equality in science, but to ensure that men do not flock to STEM fields or avoid certain SSH fields because they are stuck in a rut of traditional masculine ideals.

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7. APPENDIX

Table 6. Number and Percentage of PhDs by Sex, Organizational Level (SSH)

	2010		2011		2012		2013	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
N of PhDs (ongoing)	32	44	33	64	27	63	21	65
Newly enter-ing PhDs	3	15	6	13	1	10	5	7
N of PhDs obtained	1	0	3	1	3	2	1	4
Total	***36***	***59***	***42***	***78***	***31***	***75***	***27***	***76***
N of PhDs (ongoing)	42%	58%	34%	66%	30%	70%	24%	76%
Newly enter-ing PhDs	17%	83%	32%	68%	9%	91%	42%	58%
N of PhDs obtained	100%	0%	75%	25%	60%	40%	20%	80%
Total	***38%***	***62%***	***35%***	***65%***	***29%***	***71%***	***26%***	***74%***

Table 7. Number and Percentage of PhDs by Sex, Organizational Level (STEM)

	2010		2011		2012		2013	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
N of PhDs (ongoing)	81	60	89	64	77	66	97	56
Newly ent-ering PhDs	25	17	17	9	10	5	12	17
N of PhDs obtained	14	7	15	8	8	6	11	8
Total	***120***	***84***	***121***	***81***	***95***	***77***	***120***	***81***
N of PhDs (ongoing)	57%	43%	58%	42%	54%	46%	63%	37%
Newly ent-ering PhDs	60%	40%	65%	35%	67%	33%	41%	59%
N of PhDs obtained	67%	33%	65%	35%	57%	43%	58%	42%
Total	***59%***	***41%***	***60%***	***40%***	***55%***	***45%***	***60%***	***40%***

Table 8. Students by level, type of education, degree and broad field of study, 2010-2013 (SSH)

Year	Degree and Field of Study	Males	Females	In all	%Men	%Women
	Bachelor's degree					
2010	Philosophy, economics and political science	20	14	34	58,8%	41,2%
	Psychology	223	539	762	29,3%	70,7%
	Social work	32	315	347	9,2%	90,8%
	Disability studies	3	23	26	11,5%	88,5%
	Sociology	75	155	230	32,6%	67,4%
	Anthropology	36	166	202	17,8%	82,2%
	Ethnology	17	101	118	14,4%	85,6%
	Modern studies	6	25	31	19,4%	80,6%
	Developmental studies	1	8	9	11,1%	88,9%
	Gender equality studies	1	9	10	10,0%	90,0%
	Political science	138	126	264	52,3%	47,7%
	International affairs	11	25	36	30,6%	69,4%
	Economics	151	80	231	65,4%	34,6%
	Media and Communication Studies	21	14	35	60,0%	40,0%
	Library and information science	10	61	71	14,1%	85,9%
	Business studies (not finance)	582	621	1203	48,4%	51,6%
	Marketing and export	56	82	138	40,6%	59,4%
	Language use in business	3	4	7	42,9%	57,1%
	Business with a finance specialization	48	64	112	42,9%	57,1%
	Business operation	17	27	44	38,6%	61,4%
	Industrial technology	1	1	2	50,0%	50,0%
	Industrial operation	9	0	9	100,0%	0,0%
	Business and economics, unspecified	2	1	3	66,7%	33,3%
	Law	416	472	888	46,8%	53,2%
	Commercial law	45	38	83	54,2%	45,8%
	Graphic design	46	42	88	52,3%	47,7%
	Film theory	48	37	85	56,5%	43,5%

	Product design	9	21	30	30,0%	70,0%
	Religious studies	3	1	4	75,0%	25,0%
	Theology	34	47	81	42,0%	58,0%
	Danish	8	14	22	36,4%	63,6%
	English	98	184	282	34,8%	65,2%
	French	7	35	42	16,7%	83,3%
	Greek	3	0	3	100,0%	0,0%
	Icelandic for foreign students	36	116	152	23,7%	76,3%
	Italian	4	19	23	17,4%	82,6%
	Latin	6	4	10	60,0%	40,0%
	Norwegian	1	10	11	9,1%	90,9%
	Russian	3	5	8	37,5%	62,5%
	Spanish	7	43	50	14,0%	86,0%
	Swedish	4	9	13	30,8%	69,2%
	German	7	31	38	18,4%	81,6%
	Japanese	43	28	71	60,6%	39,4%
	Chinese, language and culture	10	13	23	43,5%	56,5%
	East-Asian Studies	2	7	9	22,2%	77,8%
	General linguistics	6	19	25	24,0%	76,0%
	Icelandic general	45	121	166	27,1%	72,9%
	Sign language	1	27	28	3,6%	96,4%
	Literature	34	75	109	31,2%	68,8%
	Archaeology	12	13	25	48,0%	52,0%
	History	145	85	230	63,0%	37,0%
	Museum studies	1	4	5	20,0%	80,0%
	Culture and communication	3	4	7	42,9%	57,1%
	Philosophy	107	52	159	67,3%	32,7%
	Total	**2657**	**4037**	**6694**	**39,7%**	**60,3%**
2011	Philosophy, economics and political science	13	6	19	68,4%	31,6%
	Psychology	246	637	883	27,9%	72,1%
	Social work	33	357	390	8,5%	91,5%
	Disability studies	2	17	19	10,5%	89,5%

	Sociology	68	162	230	29,6%	70,4%
	Anthropology	44	193	237	18,6%	81,4%
	Ethnology	32	133	165	19,4%	80,6%
	Modern studies	11	33	44	25,0%	75,0%
	Developmental studies	3	4	7	42,9%	57,1%
	Political science	135	109	244	55,3%	44,7%
	International affairs	12	24	36	33,3%	66,7%
	Economics	145	79	224	64,7%	35,3%
	Social sciences, unspecific	1	8	9	11,1%	88,9%
	Media and Communication Studies	23	23	46	50,0%	50,0%
	Library and information science	15	63	78	19,2%	80,8%
	Business studies (not finance)	618	622	1240	49,8%	50,2%
	Marketing and export	59	118	177	33,3%	66,7%
	Business with a finance specialization	62	72	134	46,3%	53,7%
	Business operation	14	14	28	50,0%	50,0%
	Industrial technology	7	0	7	100,0%	0,0%
	Industrial operation	6	0	6	100,0%	0,0%
	Law	400	495	895	44,7%	55,3%
	Commercial law	36	35	71	50,7%	49,3%
	Graphic design	48	34	82	58,5%	41,5%
	Film theory	53	40	93	57,0%	43,0%
	Product design	9	22	31	29,0%	71,0%
	Theology	33	42	75	44,0%	56,0%
	Danish	9	18	27	33,3%	66,7%
	English	105	222	327	32,1%	67,9%
	French	4	44	48	8,3%	91,7%
	Greek	3	0	3	100,0%	0,0%
	Icelandic for foreign students	50	134	184	27,2%	72,8%
	Italian	6	23	29	20,7%	79,3%
	Latin	5	4	9	55,6%	44,4%
	Norwegian	1	10	11	9,1%	90,9%
	Russian	6	12	18	33,3%	66,7%
	Spanish	9	62	71	12,7%	87,3%

	Swedish	2	10	12	16,7%	83,3%
	German	13	32	45	28,9%	71,1%
	Japanese	53	40	93	57,0%	43,0%
	Chinese, language and culture	13	13	26	50,0%	50,0%
	East-Asian Studies	3	2	5	60,0%	40,0%
	General linguistics	8	11	19	42,1%	57,9%
	Icelandic general	32	105	137	23,4%	76,6%
	Sign language	1	27	28	3,6%	96,4%
	Literature	36	95	131	27,5%	72,5%
	Archaeology	17	15	32	53,1%	46,9%
	History	173	106	279	62,0%	38,0%
	Culture and communication	3	11	14	21,4%	78,6%
	Philosophy	114	52	166	68,7%	31,3%
	Total	**2794**	**4390**	**7184**	**38,9%**	**61,1%**
2012	Philosophy, economics and political science	20	20	40	50,0%	50,0%
	Psychology	262	704	966	27,1%	72,9%
	Social work	29	330	359	8,1%	91,9%
	Disability studies	2	12	14	14,3%	85,7%
	Sociology	63	133	196	32,1%	67,9%
	Anthropology	47	185	232	20,3%	79,7%
	Ethnology	22	138	160	13,8%	86,3%
	Modern studies	13	20	33	39,4%	60,6%
	Developmental studies	3	5	8	37,5%	62,5%
	Gender equality studies	1	12	13	7,7%	92,3%
	Political science	125	98	223	56,1%	43,9%
	International affairs	11	20	31	35,5%	64,5%
	Economics	113	59	172	65,7%	34,3%
	Economic sciences	3	1	4	75,0%	25,0%
	Social sciences, unspecific	8	31	39	20,5%	79,5%
	Media and Communication Studies	24	26	50	48,0%	52,0%
	Library and information science	14	59	73	19,2%	80,8%
	Business studies (not finance)	636	673	1309	48,6%	51,4%

	Marketing and export	65	122	187	34,8%	65,2%
	Business with a finance specialization	52	100	152	34,2%	65,8%
	Business operation	2	5	7	28,6%	71,4%
	Industrial technology	10	3	13	76,9%	23,1%
	Industrial operation	6	0	6	100,0%	0,0%
	Law	409	458	867	47,2%	52,8%
	Commercial law	32	27	59	54,2%	45,8%
	Graphic design	43	35	78	55,1%	44,9%
	Film theory	54	39	93	58,1%	41,9%
	Product design	9	21	30	30,0%	70,0%
	Theology	28	26	54	51,9%	48,1%
	Deacon studies	1	21	22	4,5%	95,5%
	Danish	8	17	25	32,0%	68,0%
	English	99	220	319	31,0%	69,0%
	French	8	45	53	15,1%	84,9%
	Greek	2	3	5	40,0%	60,0%
	Icelandic for foreign students	46	160	206	22,3%	77,7%
	Italian	3	18	21	14,3%	85,7%
	Latin	4	5	9	44,4%	55,6%
	Russian	2	7	9	22,2%	77,8%
	Spanish	7	52	59	11,9%	88,1%
	Swedish	3	12	15	20,0%	80,0%
	German	11	30	41	26,8%	73,2%
	Japanese	43	46	89	48,3%	51,7%
	Chinese, language and culture	17	19	36	47,2%	52,8%
	East-Asian Studies	2	3	5	40,0%	60,0%
	General linguistics	7	16	23	30,4%	69,6%
	Icelandic general	31	74	105	29,5%	70,5%
	Sign language	3	20	23	13,0%	87,0%
	Literature	26	87	113	23,0%	77,0%
	Archaeology	14	15	29	48,3%	51,7%
	History	130	78	208	62,5%	37,5%
	Museum studies	1	8	9	11,1%	88,9%

	Philosophy	77	44	121	63,6%	36,4%
	Total	**2651**	**4362**	**7013**	**37,8%**	**62,2%**
2013	Philosophy, economics and political science	20	24	44	45,5%	54,5%
	Psychology	217	740	957	22,7%	77,3%
	Social work	30	311	341	8,8%	91,2%
	Disability studies	0	10	10	0,0%	100,0%
	Sociology	64	144	208	30,8%	69,2%
	Anthropology	53	188	241	22,0%	78,0%
	Ethnology	24	118	142	16,9%	83,1%
	Modern studies	20	18	38	52,6%	47,4%
	Developmental studies	7	15	22	31,8%	68,2%
	Gender equality studies	1	29	30	3,3%	96,7%
	Political science	124	94	218	56,9%	43,1%
	International affairs	15	21	36	41,7%	58,3%
	Economics	108	66	174	62,1%	37,9%
	Economic sciences	10	6	16	62,5%	37,5%
	Social sciences, unspecific	6	33	39	15,4%	84,6%
	Media and Communication Studies	23	24	47	48,9%	51,1%
	Library and information science	14	48	62	22,6%	77,4%
	Business studies (not finance)	670	684	1354	49,5%	50,5%
	Marketing and export	73	139	212	34,4%	65,6%
	Business with a finance specialization	44	91	135	32,6%	67,4%
	Industrial technology	9	2	11	81,8%	18,2%
	Industrial operation	6	0	6	100,0%	0,0%
	Law	373	455	828	45,0%	55,0%
	Commercial law	31	24	55	56,4%	43,6%
	Graphic design	36	42	78	46,2%	53,8%
	Film theory	35	35	70	50,0%	50,0%
	Product design	7	20	27	25,9%	74,1%
	Religious studies	1	0	1	100,0%	0,0%
	Theology	24	27	51	47,1%	52,9%
	Deacon studies	1	18	19	5,3%	94,7%

	Danish	2	20	22	9,1%	90,9%
	English	88	235	323	27,2%	72,8%
	French	7	40	47	14,9%	85,1%
	Greek	1	1	2	50,0%	50,0%
	Icelandic for foreign students	38	141	179	21,2%	78,8%
	Italian	8	27	35	22,9%	77,1%
	Latin	4	7	11	36,4%	63,6%
	Norwegian	1	14	15	6,7%	93,3%
	Russian	3	12	15	20,0%	80,0%
	Spanish	6	39	45	13,3%	86,7%
	Swedish	3	10	13	23,1%	76,9%
	German	11	34	45	24,4%	75,6%
	Japanese	41	49	90	45,6%	54,4%
	Chinese, language and culture	23	25	48	47,9%	52,1%
	East-Asian Studies	1	1	2	50,0%	50,0%
	Translation studies	2	6	8	25,0%	75,0%
	General linguistics	3	19	22	13,6%	86,4%
	Icelandic general	24	75	99	24,2%	75,8%
	Sign language	2	11	13	15,4%	84,6%
	Literature	25	70	95	26,3%	73,7%
	Archaeology	14	12	26	53,8%	46,2%
	History	109	68	177	61,6%	38,4%
	Philosophy	79	47	126	62,7%	37,3%
	Creative music communication	8	7	15	53,3%	46,7%
	Conference Interpreting	1	0	1	100,0%	0,0%
	Total	**2550**	**4396**	**6946**	**36,7%**	**63,3%**
	Master's degree					
2010	Philosophy, economics and political science	1	2	3	33,3%	66,7%
	Psychology	17	65	82	20,7%	79,3%
	Social work	4	51	55	7,3%	92,7%
	Disability studies	1	18	19	5,3%	94,7%
	Sociology	5	16	21	23,8%	76,2%

	Anthropology	2	30	32	6,3%	93,8%
	Ethnology	4	19	23	17,4%	82,6%
	Gender studies	1	18	19	5,3%	94,7%
	Developmental studies	2	14	16	12,5%	87,5%
	Political science	2	2	4	50,0%	50,0%
	International affairs	24	46	70	34,3%	65,7%
	Public administration (MPA)	31	73	104	29,8%	70,2%
	Economics	50	37	87	57,5%	42,5%
	Media and Communication Studies	9	23	32	28,1%	71,9%
	Library and information science	5	27	32	15,6%	84,4%
	Business studies (not finance)	23	24	47	48,9%	51,1%
	Marketing and export	71	89	160	44,4%	55,6%
	Business with a finance specialization	87	62	149	58,4%	41,6%
	Auditing	74	66	140	52,9%	47,1%
	Business administration	126	232	358	35,2%	64,8%
	School management	27	107	134	20,1%	79,9%
	Project management	24	36	60	40,0%	60,0%
	Law	146	193	339	43,1%	56,9%
	Commercial law	26	31	57	45,6%	54,4%
	Music composition	4	2	6	66,7%	33,3%
	Theology	9	2	11	81,8%	18,2%
	English	3	13	16	18,8%	81,3%
	French	2	5	7	28,6%	71,4%
	Translation studies	7	37	44	15,9%	84,1%
	General linguistics	2	4	6	33,3%	66,7%
	Icelandic grammar	6	8	14	42,9%	57,1%
	Language technology	5	1	6	83,3%	16,7%
	Icelandic studies	4	10	14	28,6%	71,4%
	Editing and publication	4	25	29	13,8%	86,2%
	Literature	10	19	29	34,5%	65,5%
	Archaeology	6	14	20	30,0%	70,0%
	History	28	30	58	48,3%	51,7%
	Museum studies	2	12	14	14,3%	85,7%

	Culture and communication	7	47	54	13,0%	87,0%
	Philosophy	7	6	13	53,8%	46,2%
	Ethics	8	15	23	34,8%	65,2%
	Total	**876**	**1531**	**2407**	**36,4%**	**63,6%**
2011	Psychology	17	68	85	20,0%	80,0%
	Social work	5	74	79	6,3%	93,7%
	Disability studies	2	15	17	11,8%	88,2%
	Sociology	4	16	20	20,0%	80,0%
	Anthropology	8	35	43	18,6%	81,4%
	Ethnology	1	20	21	4,8%	95,2%
	Cultural studies	3	4	7	42,9%	57,1%
	Gender studies	1	13	14	7,1%	92,9%
	Developmental studies	2	8	10	20,0%	80,0%
	International affairs	14	41	55	25,5%	74,5%
	Public administration (MPA)	31	75	106	29,2%	70,8%
	Economics	48	32	80	60,0%	40,0%
	Media and Communication Studies	9	15	24	37,5%	62,5%
	Library and information science	6	26	32	18,8%	81,3%
	Business studies (not finance)	18	23	41	43,9%	56,1%
	Marketing and export	68	109	177	38,4%	61,6%
	Business with a finance specialization	90	61	151	59,6%	40,4%
	Auditing	63	64	127	49,6%	50,4%
	Business administration	120	250	370	32,4%	67,6%
	School management	25	95	120	20,8%	79,2%
	Project management	27	40	67	40,3%	59,7%
	Law	150	208	358	41,9%	58,1%
	Commercial law	29	33	62	46,8%	53,2%
	Music composition	5	2	7	71,4%	28,6%
	Theology	7	7	14	50,0%	50,0%
	English	4	10	14	28,6%	71,4%
	French	2	3	5	40,0%	60,0%
	Translation studies	5	48	53	9,4%	90,6%

	General linguistics	3	3	6	50,0%	50,0%
	Icelandic grammar	5	8	13	38,5%	61,5%
	Icelandic general	8	14	22	36,4%	63,6%
	Icelandic literature	3	6	9	33,3%	66,7%
	Language technology	2	0	2	100,0%	0,0%
	Icelandic studies	4	10	14	28,6%	71,4%
	Editing and publication	2	18	20	10,0%	90,0%
	Literature	10	26	36	27,8%	72,2%
	Archaeology	3	15	18	16,7%	83,3%
	History	29	27	56	51,8%	48,2%
	Museum studies	3	19	22	13,6%	86,4%
	Culture and communication	5	34	39	12,8%	87,2%
	Philosophy	13	6	19	68,4%	31,6%
	Ethics	7	14	21	33,3%	66,7%
	Literature, culture and media	1	4	5	20,0%	80,0%
	Total	**862**	**1599**	**2461**	**35,0%**	**65,0%**
2012	Psychology	15	54	69	21,7%	78,3%
	Social work	6	72	78	7,7%	92,3%
	Disability studies	0	16	16	0,0%	100,0%
	Sociology	5	7	12	41,7%	58,3%
	Anthropology	5	21	26	19,2%	80,8%
	Ethnology	4	30	34	11,8%	88,2%
	Gender studies	3	21	24	12,5%	87,5%
	Developmental studies	2	10	12	16,7%	83,3%
	International affairs	14	24	38	36,8%	63,2%
	Public administration (MPA)	29	60	89	32,6%	67,4%
	Economics	39	20	59	66,1%	33,9%
	Media and Communication Studies	12	21	33	36,4%	63,6%
	Library and information science	8	30	38	21,1%	78,9%
	Business studies (not finance)	22	23	45	48,9%	51,1%
	Marketing and export	79	106	185	42,7%	57,3%
	Business with a finance specialization	66	49	115	57,4%	42,6%

	Auditing	58	50	108	53,7%	46,3%
	Business administration	121	220	341	35,5%	64,5%
	School management	27	108	135	20,0%	80,0%
	Project management	29	38	67	43,3%	56,7%
	Law	153	218	371	41,2%	58,8%
	Commercial law	22	32	54	40,7%	59,3%
	Fine arts	3	5	8	37,5%	62,5%
	Art theory	1	14	15	6,7%	93,3%
	Religious studies	1	4	5	20,0%	80,0%
	Theology	9	11	20	45,0%	55,0%
	English	5	9	14	35,7%	64,3%
	French	1	5	6	16,7%	83,3%
	German	1	4	5	20,0%	80,0%
	Translation studies	1	43	44	2,3%	97,7%
	General linguistics	4	5	9	44,4%	55,6%
	Icelandic grammar	4	6	10	40,0%	60,0%
	Icelandic general	13	25	38	34,2%	65,8%
	Icelandic literature	3	3	6	50,0%	50,0%
	Language technology	1	0	1	100,0%	0,0%
	Icelandic studies	2	8	10	20,0%	80,0%
	Editing and publication	4	16	20	20,0%	80,0%
	Literature	8	31	39	20,5%	79,5%
	Archaeology	4	8	12	33,3%	66,7%
	History	32	33	65	49,2%	50,8%
	Museum studies	3	19	22	13,6%	86,4%
	Culture and communication	9	42	51	17,6%	82,4%
	Philosophy	7	3	10	70,0%	30,0%
	Ethics	4	13	17	23,5%	76,5%
	Industrial design	3	5	8	37,5%	62,5%
	Literature, culture and media	2	3	5	40,0%	60,0%
	Total	**844**	**1545**	**2389**	**35,3%**	**64,7%**
2013	Psychology	11	45	56	19,6%	80,4%

	Social work	10	81	91	11,0%	89,0%
	Disability studies	2	15	17	11,8%	88,2%
	Sociology	4	10	14	28,6%	71,4%
	Anthropology	4	22	26	15,4%	84,6%
	Ethnology	3	28	31	9,7%	90,3%
	Cultural studies	1	9	10	10,0%	90,0%
	Gender studies	2	13	15	13,3%	86,7%
	Developmental studies	2	9	11	18,2%	81,8%
	International affairs	20	23	43	46,5%	53,5%
	Public administration (MPA)	29	85	114	25,4%	74,6%
	Economics	35	22	57	61,4%	38,6%
	Media and Communication Studies	8	14	22	36,4%	63,6%
	Library and information science	3	40	43	7,0%	93,0%
	Business studies (not finance)	23	24	47	48,9%	51,1%
	Marketing and export	102	119	221	46,2%	53,8%
	Business with a finance specialization	68	56	124	54,8%	45,2%
	Auditing	50	68	118	42,4%	57,6%
	Business administration	126	231	357	35,3%	64,7%
	School management	26	117	143	18,2%	81,8%
	Project management	33	37	70	47,1%	52,9%
	Law	167	225	392	42,6%	57,4%
	Commercial law	21	30	51	41,2%	58,8%
	Fine arts	4	11	15	26,7%	73,3%
	Art theory	1	17	18	5,6%	94,4%
	Religious studies	3	5	8	37,5%	62,5%
	Theology	9	8	17	52,9%	47,1%
	English	4	9	13	30,8%	69,2%
	French	1	4	5	20,0%	80,0%
	Translation studies	3	40	43	7,0%	93,0%
	General linguistics	3	4	7	42,9%	57,1%
	Icelandic grammar	5	6	11	45,5%	54,5%
	Icelandic general	15	32	47	31,9%	68,1%
	Icelandic literature	1	7	8	12,5%	87,5%

	Language technology	7	2	9	77,8%	22,2%
	Icelandic studies	5	8	13	38,5%	61,5%
	Editing and publication	2	18	20	10,0%	90,0%
	Literature	6	21	27	22,2%	77,8%
	Archaeology	3	7	10	30,0%	70,0%
	History	42	40	82	51,2%	48,8%
	Museum studies	1	22	23	4,3%	95,7%
	Culture and communication	17	30	47	36,2%	63,8%
	Philosophy	5	3	8	62,5%	37,5%
	Ethics	4	11	15	26,7%	73,3%
	Industrial design	4	12	16	25,0%	75,0%
	Literature, culture and media	2	9	11	18,2%	81,8%
	Total	**897**	**1649**	**2546**	**35,2%**	**64,8%**
	Doctoral degree					
2010	Psychology	2	5	7	28,6%	71,4%
	Social work	0	4	4	0,0%	100,0%
	Disability studies	0	3	3	0,0%	100,0%
	Sociology	8	10	18	44,4%	55,6%
	Anthropology	5	10	15	33,3%	66,7%
	Ethnology	1	4	5	20,0%	80,0%
	Political science	3	5	8	37,5%	62,5%
	Economics	4	1	5	80,0%	20,0%
	Business studies (not finance)	6	8	14	42,9%	57,1%
	Law	4	2	6	66,7%	33,3%
	Theology	1	5	6	16,7%	83,3%
	Icelandic grammar	4	2	6	66,7%	33,3%
	Icelandic literature	4	9	13	30,8%	69,2%
	Literature	2	7	9	22,2%	77,8%
	Archaeology	5	4	9	55,6%	44,4%
	History	10	5	15	66,7%	33,3%
	Philosophy	4	3	7	57,1%	42,9%
	Total	**63**	**87**	**150**	**42,0%**	**58,0%**

2011	Psychology	4	6	10	40,0%	60,0%
	Social work	0	4	4	0,0%	100,0%
	Disability studies	1	4	5	20,0%	80,0%
	Sociology	3	10	13	23,1%	76,9%
	Anthropology	4	12	16	25,0%	75,0%
	Ethnology	2	3	5	40,0%	60,0%
	Political science	3	5	8	37,5%	62,5%
	Economics	4	2	6	66,7%	33,3%
	Business studies (not finance)	7	7	14	50,0%	50,0%
	Law	5	5	10	50,0%	50,0%
	Icelandic grammar	4	4	8	50,0%	50,0%
	Icelandic literature	3	9	12	25,0%	75,0%
	Literature	3	7	10	30,0%	70,0%
	Archaeology	5	5	10	50,0%	50,0%
	History	10	4	14	71,4%	28,6%
	Philosophy	4	4	8	50,0%	50,0%
	Total	**62**	**91**	**153**	**40,5%**	**59,5%**
2012	Psychology	3	6	9	33,3%	66,7%
	Social work	0	4	4	0,0%	100,0%
	Disability studies	1	3	4	25,0%	75,0%
	Sociology	4	11	15	26,7%	73,3%
	Anthropology	4	11	15	26,7%	73,3%
	Ethnology	2	1	3	66,7%	33,3%
	Political science	0	6	6	0,0%	100,0%
	Economics	3	2	5	60,0%	40,0%
	Business studies (not finance)	8	9	17	47,1%	52,9%
	Law	4	5	9	44,4%	55,6%
	Theology	1	4	5	20,0%	80,0%
	English	1	4	5	20,0%	80,0%
	Spanish	1	0	1	100,0%	0,0%
	Translation studies	1	1	2	50,0%	50,0%

	Icelandic grammar	6	4	10	60,0%	40,0%
	Icelandic literature	5	10	15	33,3%	66,7%
	Literature	4	5	9	44,4%	55,6%
	Archaeology	6	3	9	66,7%	33,3%
	History	8	5	13	61,5%	38,5%
	Philosophy	7	5	12	58,3%	41,7%
	Total	**69**	**99**	**168**	**41,1%**	**58,9%**
2013	Psychology	4	6	10	40,0%	60,0%
	Social work	0	5	5	0,0%	100,0%
	Disability studies	1	3	4	25,0%	75,0%
	Sociology	3	10	13	23,1%	76,9%
	Anthropology	4	12	16	25,0%	75,0%
	Ethnology	2	1	3	66,7%	33,3%
	Developmental studies	1	2	3	33,3%	66,7%
	Political science	1	5	6	16,7%	83,3%
	Economics	6	1	7	85,7%	14,3%
	Business studies (not finance)	9	6	15	60,0%	40,0%
	Law	4	5	9	44,4%	55,6%
	Theology	3	5	8	37,5%	62,5%
	English	1	2	3	33,3%	66,7%
	Spanish	1	1	2	50,0%	50,0%
	Translation studies	1	1	2	50,0%	50,0%
	Icelandic grammar	6	4	10	60,0%	40,0%
	Icelandic literature	4	15	19	21,1%	78,9%
	Literature	2	4	6	33,3%	66,7%
	Archaeology	3	3	6	50,0%	50,0%
	History	6	5	11	54,5%	45,5%
	Philosophy	3	3	6	50,0%	50,0%
	Ethics	1	0	1	100,0%	0,0%
	Total	**66**	**99**	**165**	**40,0%**	**60,0%**

Table 9. Students by level, type of education, degree and broad field of study, 2010-2013 (STEM)

Year	**Degree and and field of study**	Men	Women	In all	%Men	%Women
	Bachelor's degree					
2010	Biology	70	83	153	45,8%	54,2%
	Biochemistry	44	81	125	35,2%	64,8%
	Biotechnology	16	25	41	39,0%	61,0%
	Environmental science	21	5	26	80,8%	19,2%
	Nature and environment	8	31	39	20,5%	79,5%
	Physics	64	9	73	87,7%	12,3%
	Chemistry	25	13	38	65,8%	34,2%
	Geography	44	44	88	50,0%	50,0%
	Geology	56	58	114	49,1%	50,9%
	Geophysics	10	2	12	83,3%	16,7%
	Mathematics	49	22	71	69,0%	31,0%
	Computer sciences	429	63	492	87,2%	12,8%
	Financial engineering	85	64	149	57,0%	43,0%
	Biomedical engineering	33	51	84	39,3%	60,7%
	Mechanical and industrial engineering	295	101	396	74,5%	25,5%
	Mechanical technology	61	1	62	98,4%	1,6%
	Electrical and computer engineering	87	15	102	85,3%	14,7%
	Energy engineering	16	7	23	69,6%	30,4%
	Electrical engineering technology	32	2	34	94,1%	5,9%
	Software engineering	74	6	80	92,5%	7,5%
	Chemical engineering	12	18	30	40,0%	60,0%
	Engineering, not specified	7	1	8	87,5%	12,5%
	Food science	4	11	15	26,7%	73,3%
	Architecture	18	31	49	36,7%	63,3%
	Environmental and landscape planning	22	38	60	36,7%	63,3%
	Civil and environmental engineering	114	49	163	69,9%	30,1%
	Building technology	93	15	108	86,1%	13,9%
	Total	**1789**	**846**	**2635**	**67,9%**	**32,1%**

2011	Biology	70	88	158	44,3%	55,7%
	Biochemistry	17	28	45	37,8%	62,2%
	Biotechnology	16	34	50	32,0%	68,0%
	Environmental science	14	6	20	70,0%	30,0%
	Nature and environment	9	27	36	25,0%	75,0%
	Physics	66	8	74	89,2%	10,8%
	Chemistry	44	32	76	57,9%	42,1%
	Geography	27	40	67	40,3%	59,7%
	Geology	79	71	150	52,7%	47,3%
	Geophysics	15	8	23	65,2%	34,8%
	Mathematics	44	23	67	65,7%	34,3%
	Computer sciences	515	92	607	84,8%	15,2%
	Computer-mathematics	7	1	8	87,5%	12,5%
	Molecular biology and biochemistry	44	55	99	44,4%	55,6%
	Financial engineering	78	48	126	61,9%	38,1%
	Biomedical engineering	29	63	92	31,5%	68,5%
	Mechanical and industrial engineering	294	110	404	72,8%	27,2%
	Mechanical technology	65	1	66	98,5%	1,5%
	Electrical and computer engineering	77	9	86	89,5%	10,5%
	Energy engineering	21	6	27	77,8%	22,2%
	Electrical engineering technology	33	5	38	86,8%	13,2%
	Software engineering	104	13	117	88,9%	11,1%
	Chemical engineering	6	13	19	31,6%	68,4%
	Food science	6	8	14	42,9%	57,1%
	Architecture	20	24	44	45,5%	54,5%
	Environmental and landscape planning	16	31	47	34,0%	66,0%
	Civil and environmental engineering	93	48	141	66,0%	34,0%
	Building technology	69	10	79	87,3%	12,7%
	Total	**1878**	**902**	**2780**	**67,6%**	**32,4%**
2012	Biology	62	91	153	40,5%	59,5%
	Biochemistry	10	13	23	43,5%	56,5%

	Biotechnology	13	29	42	31,0%	69,0%
	Environmental science	4	5	9	44,4%	55,6%
	Nature and environment	5	31	36	13,9%	86,1%
	Physics	51	8	59	86,4%	13,6%
	Chemistry	49	34	83	59,0%	41,0%
	Geography	26	28	54	48,1%	51,9%
	Geology	80	73	153	52,3%	47,7%
	Geophysics	20	12	32	62,5%	37,5%
	Mathematics	44	18	62	71,0%	29,0%
	Computer sciences	638	132	770	82,9%	17,1%
	Computer-mathematics	10	3	13	76,9%	23,1%
	Molecular biology and biochemistry	49	78	127	38,6%	61,4%
	Financial engineering	67	46	113	59,3%	40,7%
	Biomedical engineering	31	72	103	30,1%	69,9%
	Mechanical and industrial engineering	305	112	417	73,1%	26,9%
	Mechanical technology	61	2	63	96,8%	3,2%
	Electrical and computer engineering	83	7	90	92,2%	7,8%
	Energy engineering	24	3	27	88,9%	11,1%
	Electrical engineering technology	37	5	42	88,1%	11,9%
	Software engineering	141	33	174	81,0%	19,0%
	Chemical engineering	2	7	9	22,2%	77,8%
	Food science	18	8	26	69,2%	30,8%
	Architecture	24	27	51	47,1%	52,9%
	Environmental and landscape planning	10	23	33	30,3%	69,7%
	Civil and environmental engineering	80	37	117	68,4%	31,6%
	Building technology	59	5	64	92,2%	7,8%
	Total	**2003**	**942**	**2945**	**68,0%**	**32,0%**
2013	Biology	48	106	154	31,2%	68,8%
	Biochemistry	3	4	7	42,9%	57,1%
	Biotechnology	6	46	52	11,5%	88,5%
	Physics	36	8	44	81,8%	18,2%
	Chemistry	48	32	80	60,0%	40,0%

	Geography	24	22	46	52,2%	47,8%
	Geology	98	72	170	57,6%	42,4%
	Geophysics	15	11	26	57,7%	42,3%
	Mathematics	47	18	65	72,3%	27,7%
	Computer sciences	827	203	1030	80,3%	19,7%
	Computer-mathematics	20	2	22	90,9%	9,1%
	Molecular biology and biochemistry	50	74	124	40,3%	59,7%
	Financial engineering	79	75	154	51,3%	48,7%
	Biomedical engineering	30	105	135	22,2%	77,8%
	Mechanical and industrial engineering	299	108	407	73,5%	26,5%
	Mechanical technology	49	1	50	98,0%	2,0%
	Electrical and computer engineering	82	9	91	90,1%	9,9%
	Energy engineering	20	4	24	83,3%	16,7%
	Electrical engineering technology	44	5	49	89,8%	10,2%
	Software engineering	200	42	242	82,6%	17,4%
	Chemical engineering	1	2	3	33,3%	66,7%
	Food science	13	16	29	44,8%	55,2%
	Architecture	23	20	43	53,5%	46,5%
	Environmental and landscape planning	10	26	36	27,8%	72,2%
	Civil and environmental engineering	65	50	115	56,5%	43,5%
	Building technology	52	6	58	89,7%	10,3%
	Total	**2189**	**1067**	**3256**	**67,2%**	**32,8%**
	Master's degree					
2010	Biology	9	11	20	45,0%	55,0%
	Biochemistry	5	3	8	62,5%	37,5%
	Environmental science	17	51	68	25,0%	75,0%
	Nature and environment	1	7	8	12,5%	87,5%
	Physics	7	0	7	100,0%	0,0%
	Chemistry	4	3	7	57,1%	42,9%
	Geography	9	3	12	75,0%	25,0%
	Geology	11	15	26	42,3%	57,7%
	Geophysics	5	3	8	62,5%	37,5%

	Mathematics	7	2	9	77,8%	22,2%
	Computer sciences	41	4	45	91,1%	8,9%
	Computational engineering	3	0	3	100,0%	0,0%
	Financial engineering	37	12	49	75,5%	24,5%
	Biomedical engineering	2	3	5	40,0%	60,0%
	Mechanical and industrial engineering	43	30	73	58,9%	41,1%
	Electrical and computer engineering	3	2	5	60,0%	40,0%
	Energetics	40	22	62	64,5%	35,5%
	Software engineering	18	0	18	100,0%	0,0%
	Food science	4	3	7	57,1%	42,9%
	Civil and environmental engineering	25	16	41	61,0%	39,0%
	Building technology	32	10	42	76,2%	23,8%
	Total	323	200	523	61,8%	38,2%
2011	Biology	2	9	11	18,2%	81,8%
	Biochemistry	2	2	4	50,0%	50,0%
	Environmental science	24	54	78	30,8%	69,2%
	Nature and environment	2	9	11	18,2%	81,8%
	Physics	4	1	5	80,0%	20,0%
	Chemistry	3	2	5	60,0%	40,0%
	Geography	6	6	12	50,0%	50,0%
	Geology	9	14	23	39,1%	60,9%
	Geophysics	5	3	8	62,5%	37,5%
	Mathematics	8	1	9	88,9%	11,1%
	Computer sciences	41	4	45	91,1%	8,9%
	Computational engineering	3	0	3	100,0%	0,0%
	Bioinformatics	1	1	2	50,0%	50,0%
	Financial engineering	23	13	36	63,9%	36,1%
	Biomedical engineering	1	6	7	14,3%	85,7%
	Mechanical and industrial engineering	37	26	63	58,7%	41,3%
	Electrical and computer engineering	5	2	7	71,4%	28,6%
	Energetics	8	1	9	88,9%	11,1%
	Software engineering	12	2	14	85,7%	14,3%

	Food science	2	1	3	66,7%	33,3%
	Civil and environmental engineering	24	22	46	52,2%	47,8%
	Building technology	29	18	47	61,7%	38,3%
	Total	**251**	**197**	**448**	**56,0%**	**44,0%**
2012	Biology	10	16	26	38,5%	61,5%
	Biochemistry	1	2	3	33,3%	66,7%
	Environmental science	23	51	74	31,1%	68,9%
	Nature and environment	4	8	12	33,3%	66,7%
	Physics	1	1	2	50,0%	50,0%
	Chemistry	3	3	6	50,0%	50,0%
	Geography	6	8	14	42,9%	57,1%
	Geology	11	21	32	34,4%	65,6%
	Geophysics	2	3	5	40,0%	60,0%
	Mathematics	8	0	8	100,0%	0,0%
	Computer sciences	43	6	49	87,8%	12,2%
	Computational engineering	2	0	2	100,0%	0,0%
	Financial engineering	15	17	32	46,9%	53,1%
	Biomedical engineering	7	6	13	53,8%	46,2%
	Mechanical and industrial engineering	45	20	65	69,2%	30,8%
	Electrical and computer engineering	5	2	7	71,4%	28,6%
	Energetics	12	3	15	80,0%	20,0%
	Software engineering	13	2	15	86,7%	13,3%
	Food science	1	14	15	6,7%	93,3%
	Civil and environmental engineering	24	19	43	55,8%	44,2%
	Building technology	14	7	21	66,7%	33,3%
	Electrical engineering	5	0	5	100,0%	0,0%
	Civil engingeering	4	1	5	80,0%	20,0%
	Total	**259**	**210**	**469**	**55,2%**	**44,8%**
2013	Biology	12	14	26	46,2%	53,8%
	Biochemistry	2	2	4	50,0%	50,0%
	Environmental science	28	64	92	30,4%	69,6%

	Nature and environment	8	36	44	18,2%	81,8%
	Physics	4	0	4	100,0%	0,0%
	Chemistry	4	4	8	50,0%	50,0%
	Geography	12	9	21	57,1%	42,9%
	Geology	14	21	35	40,0%	60,0%
	Geophysics	3	1	4	75,0%	25,0%
	Mathematics	7	0	7	100,0%	0,0%
	Computer sciences	42	7	49	85,7%	14,3%
	Computational engineering	4	0	4	100,0%	0,0%
	Financial engineering	21	21	42	50,0%	50,0%
	Biomedical engineering	4	9	13	30,8%	69,2%
	Mechanical and industrial engineering	56	15	71	78,9%	21,1%
	Electrical and computer engineering	6	1	7	85,7%	14,3%
	Energetics	18	7	25	72,0%	28,0%
	Software engineering	10	3	13	76,9%	23,1%
	Food science	2	20	22	9,1%	90,9%
	Civil and environmental engineering	33	22	55	60,0%	40,0%
	Building technology	17	5	22	77,3%	22,7%
	Electrical engineering	2	0	2	100,0%	0,0%
	Total	**309**	**261**	**570**	**54,2%**	**45,8%**
	Doctoral degree					
2010	Biology	21	22	43	48,8%	51,2%
	Physics	14	2	16	87,5%	12,5%
	Chemistry	12	4	16	75,0%	25,0%
	Geography	3	3	6	50,0%	50,0%
	Geology	7	7	14	50,0%	50,0%
	Geophysics	4	2	6	66,7%	33,3%
	Mathematics	5	3	8	62,5%	37,5%
	Computer sciences	10	2	12	83,3%	16,7%
	Mechanical and industrial engineering	8	3	11	72,7%	27,3%
	Electrical and computer engineering	3	2	5	60,0%	40,0%
	Software engineering	1	0	1	100,0%	0,0%

	Food science	1	2	3	33,3%	66,7%
	Civil and environmental engineering	3	4	7	42,9%	57,1%
	Total	**92**	**56**	**148**	**62,2%**	**37,8%**
2011	Biology	22	25	47	46,8%	46,8%
	Physics	8	2	10	80,0%	20,0%
	Chemistry	13	2	15	86,7%	13,3%
	Geography	3	3	6	50,0%	50,0%
	Geology	7	6	13	53,8%	46,2%
	Geophysics	4	4	8	50,0%	50,0%
	Mathematics	1	3	4	25,0%	75,0%
	Computer sciences	5	3	8	62,5%	37,5%
	Mechanical and industrial engineering	5	4	9	55,6%	44,4%
	Electrical and computer engineering	3	1	4	75,0%	25,0%
	Engineering, not specified	3	5	8	37,5%	62,5%
	Civil and environmental engineering	3	4	7	42,9%	57,1%
	Total	**77**	**62**	**139**	**55,4%**	**46,8%**
2012	Biology	17	21	38	44,7%	55,3%
	Environmental science	1	4	5	20,0%	80,0%
	Physics	4	1	5	80,0%	20,0%
	Chemistry	11	1	12	91,7%	8,3%
	Geography	3	3	6	50,0%	50,0%
	Geology	9	5	14	64,3%	35,7%
	Geophysics	4	1	5	80,0%	20,0%
	Mathematics	2	3	5	40,0%	60,0%
	Computer sciences	8	3	11	72,7%	27,3%
	Mechanical and industrial engineering	3	4	7	42,9%	57,1%
	Electrical and computer engineering	5	0	5	100,0%	0,0%
	Engineering, not specified	4	4	8	50,0%	50,0%
	Food science	1	4	5	20,0%	80,0%
	Civil and environmental engineering	2	4	6	33,3%	66,7%
	Total	**74**	**58**	**132**	**56,1%**	**43,9%**

2013	Biology	19	17	36	52,8%	47,2%
	Environmental science	2	4	6	33,3%	66,7%
	Physics	5	4	9	55,6%	44,4%
	Chemistry	9	3	12	75,0%	25,0%
	Geography	3	3	6	50,0%	50,0%
	Geology	9	6	15	60,0%	40,0%
	Geophysics	4	6	10	40,0%	60,0%
	Mathematics	1	2	3	33,3%	66,7%
	Computer sciences	7	3	10	70,0%	30,0%
	Mechanical and industrial engineering	2	3	5	40,0%	60,0%
	Electrical and computer engineering	7	0	7	100,0%	0,0%
	Engineering, not specified	6	3	9	66,7%	33,3%
	Food science	2	3	5	40,0%	60,0%
	Civil and environmental engineering	3	4	7	42,9%	57,1%
	Total	**79**	**61**	**140**	**56,4%**	**43,6%**

5. Switzerland

By Sabine Kradolfer

1. INTRODUCTION

1.1. National context of academic careers

One of the most challenging aspects of mapping academic careers in Switzerland is the internal variation due to federalism - Switzerland is a confederation of 26 states, known as Cantons - and the decentralisation of the education system. Each of the ten university cantons is responsible for its own university, and academic institutions are therefore organised differently from one canton to another. Cantonal universities receive financial support from the Confederation and from those cantons which do not have their own university. For some areas (among which are cooperation between the Confederation and cantons in the higher education sector) the Federal Constitution lays down an obligation for the cantons to coordinate their action. The Confederation runs the two federal institutes of technology in Zurich (ETHZ) and Lausanne (EPFL).

There are some differences between the French-speaking cantons, but even larger between them and those in the German-speaking part of the country. For example, in German-speaking Switzerland, it was usual until 2011[24] to have (as in Germany) a postdoctoral qualification ("*Habilitation*" with the writing and defence of a "habilitation dissertation") bearing witness to several years of postdoctoral research in order to apply for a professorial position. This qualification was not expected from people holding a PhD degree from a French-speaking university. Nowadays, even if the *Habilitation* is no longer obligatory, it is still considered an advantage for the application procedure.

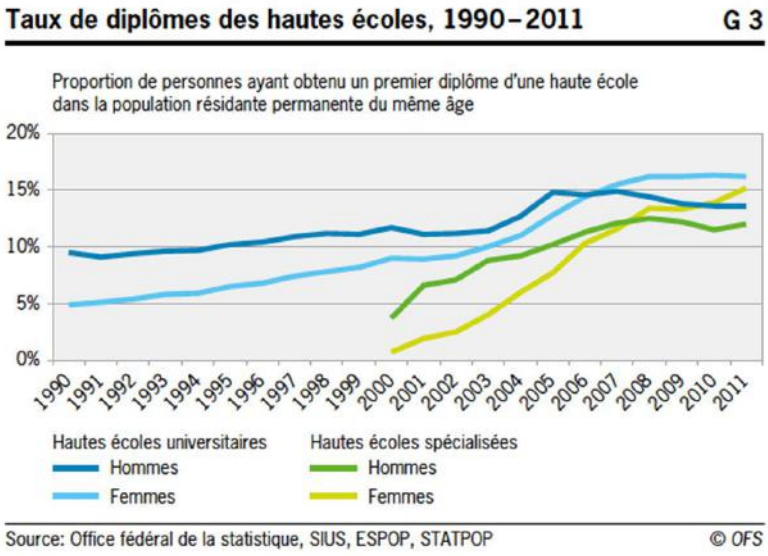
In addition to the ten cantonal universities and two federal institutes of technology which offer theoretically-oriented, scientific bachelor's, master's and doctoral programmes, there are also academic positions (including full professorships) in the institutions called *Hautes Écoles Spécialisées* (HES). These are vocational higher education institutions, also called Universities for Applied Studies, offering Bachelor and Master Degrees, but not (as yet) PhDs. Since the Bologna Agreement, they have been actively encouraged to develop their own research activities. In this report, the HES are not taken in account due to their vocational dimension, but sometimes statistics on academic careers do also include them in their figures (this was the case for example in the She Figures reports, thereby giving a higher proportion of women

[24] Following the statement issued by the CRUS (Rectors' Conference of the Swiss Universities) on May 6th, 2011, the habilitation as a qualification subsequent to the doctoral degree is not anymore considered as a prerequisite for the academic careers in Switzerland. [see http://www.unifr.ch/phd/en/postdoc/during-postdoc/habilitation].

share among professors than is the case in universities). In this report we will normally not include figures from the HES; any exceptions to this are specifically indicated.

In comparison to many neighbouring countries, Switzerland is confronted with a structural shortage of highly qualified workers in many domains. This explains the large number of foreign (immigrant or transnational) workers in the Swiss labour market, including the academic sector. Although women's share of tertiary qualifications has increased significantly in recent years, it is important to stress that the Swiss higher education system remains relatively elitist. As indicated in Fig. 1, only a small proportion (between 10 and 15%) of contemporary age cohorts are university-educated.

Figure 1 – Evolution of the proportion of tertiary-level qualifications in the Swiss population, by sex, 1990 – 2011.



1.2 Particularities of women's labour

Structural characteristics of the Swiss gender regime have strong impacts on women's careers, not only in the scientific field, but also in the economic and political domains. Among them, we can cite, for example, very low levels of childcare provision, extremely high childcare costs, high levels of horizontal and vertical segregation, a relatively large gender pay gap, particularly at the upper reaches of the occupational hierarchy. This gender regime has been defined as "modified male breadwinner" because men are still breadwinners but women are increasing their activity rates across all age and educational groups with some of the highest levels of women's part-time working, particularly amongst mothers of young children. Therefore the division of domestic labour and unpaid care activities remains unequal, with women taking responsibility for almost 80% of daily household chores.

1.3 Data obtained

For the University of Lausanne (UNIL), we took the data we obtained for deliverable 4.1.1. from the Statistical Office of UNIL. Several data are missing, in particular regarding the number of exits and entrances in almost all positions. The mapping of indicators at national level was done on the basis of other studies on academic careers and paths and detailed statistical data available on the website of the Swiss Federal Statistical Office (FSO).[25]

2. MAPPING THE INDICATORS AT THE NATIONAL LEVEL

2.1 University degree holders in relation to the population

On a general level, and as was made explicit by the CDH data for 2009, Switzerland has the highest workforce share of doctorates, close to 2.8%. As shown in Fig. 2, 3.4% of individuals in a comparable age cohort received a doctoral degree in Switzerland in 2009. Among them 41% are women.

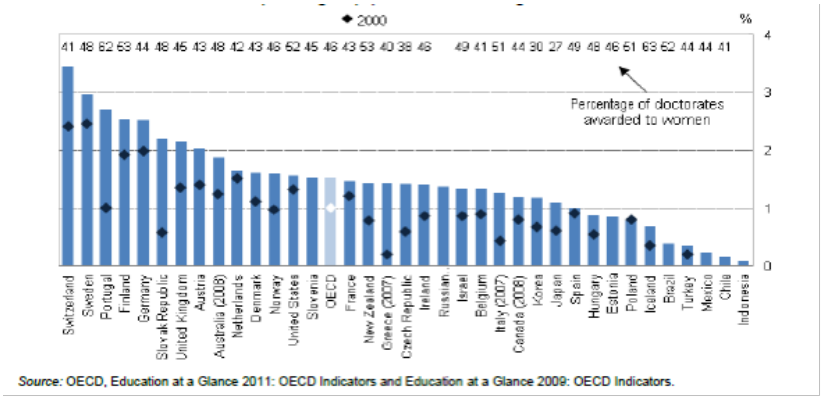
This high qualification level has to be moderated by another indicator already mentioned (see Fig. 1), which is the fact that only a small proportion (between 10 and 15%) of contemporary age cohorts is university-educated. And even if we add the graduates of the Universities for Applied Studies (see Fig. 3), in comparison with other OECD countries the Swiss population shows a much lower share of university degree holders than other industrialised countries.

As there are no detailed data for Switzerland in the CDH survey, the following statistics for the national level indicators are taken from the FSO website and from various reports on academic careers.

As indicated in the higher education institution scenarios of the FSO for 2014-2023, this situation will not change in future as the number of students at universities and institutes of technology will show a far more moderate growth over the next years in comparison with previous years, due to the expected population decline in the relevant age groups. Therefore, the share of university degree holders among the population should stay around 15% over the ten next years.

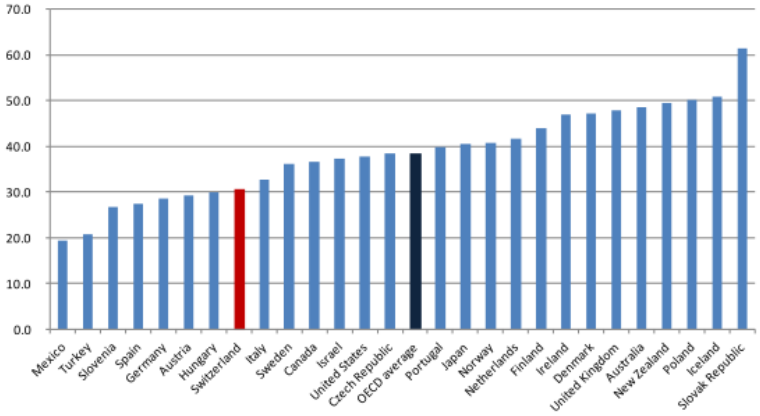
[25] http://www.bfs.admin.ch/bfs/portal/en/index/themen/15.html

Figure 2 - Graduation rates at doctoral level, 2000 and 2009 as a percentage of population in reference age cohort



Source: www.oecd.org/sti/inno/CDH%20FINAL%20REPORT-.pdf (retrieved 25/05/2015)

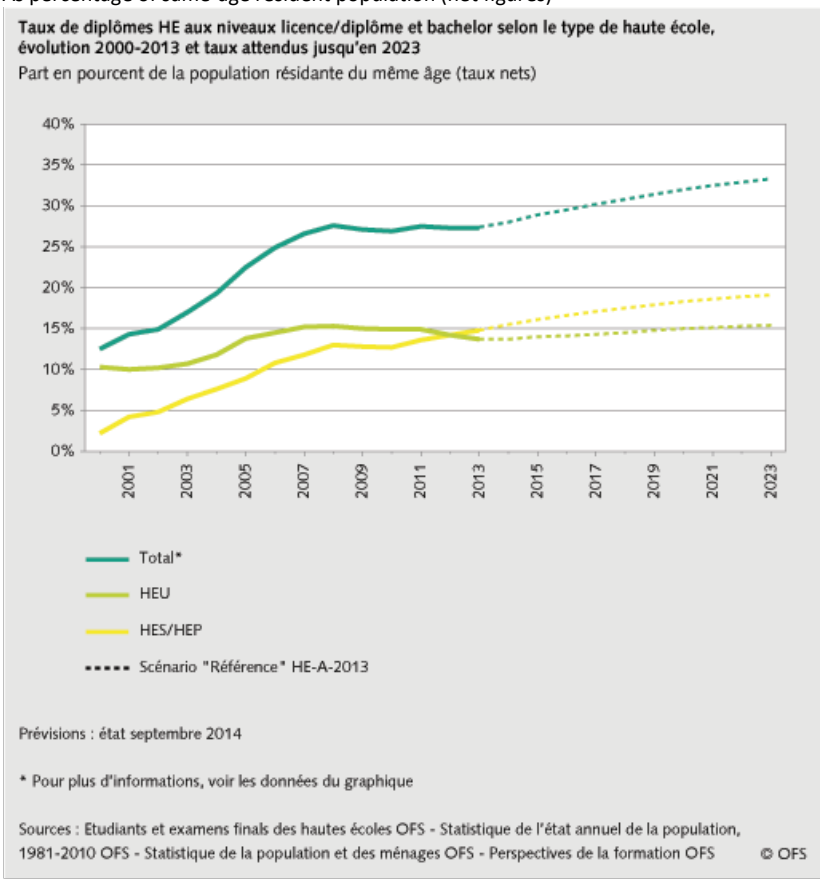
Figure 3 – Proportion of university degree holders in the OECD countries in 2009



Source: SER 2012: 19

Figure 4 – Proportion of higher education graduates with licence/diplôme and Bachelor degree by type of HE institution – trend 2000-2013 and expected rates to 2023

As percentage of same-age resident population (net figures)



Source:
http://www.bfs.admin.ch/bfs/portal/fr/index/themen/15/17/blank/01.indicator.405105.4085.html?open=9#9

2.2 Number/percentage of women and men for the national level indicators

Bachelor, Master and PhD students by sex

The first stage in the general leaky pipeline at student level (Bachelor – Master – PhD) is clearly illustrated in Fig. 5, where it can be observed that the proportion of women decreases by ten points between Bachelor and Doctorate level. By contrast, the loss of women is relatively small between the Bachelor and the Master (1 to 2.5 points).

Figure 5 – Overview of degrees awarded by universities

	2000	2005	2010	2011	2012	2013
Hautes écoles universitaires (HEU)						
Bachelor	0	2 926	11 536	12 519	13 309	13 713
% Femmes	*	40,4	51,8	52,5	52,0	53,1
% Etrangers	*	16,4	14,9	16,0	15,7	16,8
% Etrangers scolarisés à l'étranger	*	11,3	10,2	11,0	10,9	11,7
Master	0	1 290	7 961	9 478	10 855	11 865
% Femmes	*	29,9	49,2	50,3	51,0	51,4
% Etrangers	*	18,8	26,1	26,3	27,0	27,0
% Etrangers scolarisés à l'étranger	*	14,7	22,3	22,4	23,5	23,6
Licences/Diplômes	9 575	9 187	3 326	2 207	1 011	387
% Femmes	43,8	50,9	61,0	61,3	65,0	67,7
% Etrangers	12,4	12,6	8,2	8,6	9,0	11,1
% Etrangers scolarisés à l'étranger	6,9	7,7	4,4	4,6	4,0	4,9
Doctorats	2 822	3 097	3 586	3 488	3 639	3 631
% Femmes	34,6	37,1	43,4	43,2	43,1	43,8
% Etrangers	31,2	39,5	45,4	47,6	47,3	51,0
% Etrangers scolarisés à l'étranger	28,8	37,4	43,2	46,0	45,5	49,0

Source: Babel et al. 2014: 30

In Fig. 5, we can observe the changes in the structure of studies due to the Bologna reform (implemented from 2001 to 2005), which profoundly impacted all Swiss universities. Formerly, the first academic degree was the "*licence*" or "*diplôme*", which were obtained after a minimum of five years of studies. The Bologna reform led to harmonising the degree structure on the 3+2 model. Therefore, we can observe the decrease of *licence/diplômes* students in 2005/06 and the appearance of Bachelor and Master programmes.

Another important change in the structure of the student population at the level of the PhD is the number of foreign students obtaining a PhD since 2010, who represent 50% of this population. A difference is made between foreign students and students having previously studied abroad, because Swiss legislation is restrictive for naturalising the migrant population and even people belonging to the third generation (i.e. their grandparent having migrated to Switzerland) may not apply for Swiss citizenship. Therefore, statistical data about the foreign population always has to be analysed with care.

It can nonetheless be seen that PhD degrees are the ones which attract a large proportion of the foreign students coming from abroad and, in 2013, the latter represented half of the newly awarded PhDs. The number of PhDs awarded to this population, who came to Switzerland specifically to obtain a doctorate, rose from 1,158 to 1,779 between 2005 and 2013 (54%) and from 812 to 1,779 between 2000 and 2013 (114%).

In Fig. 6, we can see the average rates of progression to doctoral studies for Master students. Overall, fewer women (16%) than men (22%) holding a Master decide to start a PhD and, surprisingly, they are also fewer in social sciences and humanities (14% women as against 22% men), which are disciplines where the number of women is higher. The SFO notices that "Allowing for the effects of heterogeneity [logit analyses], there appears to be a real difference between women and men, with a lower probability for women of proceeding towards the doctorate, with an odds ratio of 0.71 ± 0.05".[26]

[26] http://www.bfs.admin.ch/bfs/portal/fr/index/themen/15/06/dos/blank/03/02.html

Figure 6 – Average rates of progression from Master to start of doctoral studies for students who obtained Master between 2003 and 2010

	Total	Sciences humaines et sociales	Sciences économiques	Droit	Sciences exactes et naturelles	Sciences techniques	Interdisciplinaire et autres
Hommes	22%	22%	11%	16%	39%	20%	12%
Femmes	16%	14%	8%	9%	35%	17%	13%
Total	20%	16%	10%	12%	38%	19%	13%

Source: http://www.bfs.admin.ch/bfs/portal/fr/index/themen/15/06/dos/blank/03/02.html

Proportion of women amongst academic staff

Due to the lack of information on postdocs and other kinds of non-permanent positions, we have decided here to present an overview including all academic positions. Like other scientists and activists from research organisations working on academic careers, we faced major problems in identifying the shares of non-permanent versus permanent positions as no statistical data with this kind of distinction are currently available.

To clarify the data and figure that follow, we have first to describe the categorisation used in Switzerland.

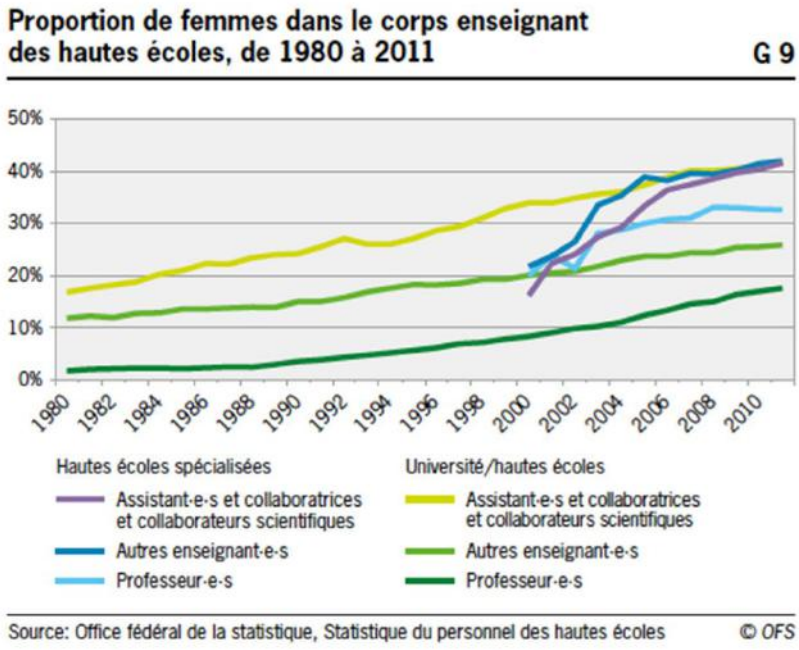
The SFO collects data aggregated in four categories, known as the SIUS (*Système d'information universitaire suisse*) categories:

1. Professors:
    - Full professor (permanent)
    - Associate professor (permanent)
    - Assistant professor in tenure track (tenure track)
    - Assistant professor (non-permanent)
2. Other teachers:
    - Senior lecturer (permanent)
    - Privat-Docent (permanent, but it is only an academic title for someone who holds certain formal qualifications that denote an ability to teach independently at university level; when PDs teach, they do so part-time)
    - *Chargé de cours* is a kind of visiting lecturer (non-permanent part-time position)
    - Invited professor (non-permanent part-time position)
    - Substitute professor (non-permanent part-time position)
    - Substitute senior lecturer (non-permanent part-time position)
3. Assistants and scientific collaborators:
    - Junior lecturer (non-permanent position; in the SSP faculty it can be a tenure track position)
    - PhD assistant (non-permanent position)

- Junior or senior researcher (non-permanent position)
- Doctoral assistant (non-permanent position)
- Student assistant holding a BA or even not (non-permanent position)

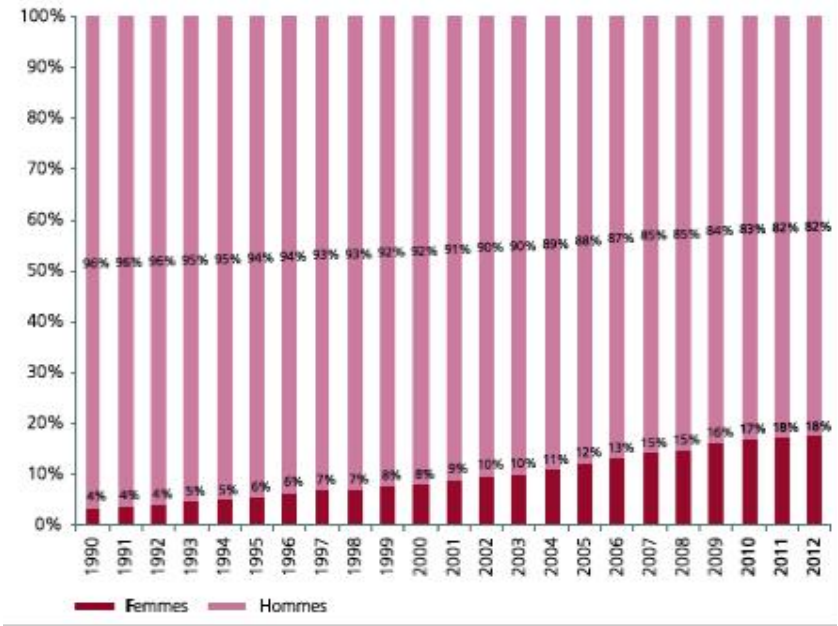
4. Rectors, Deans and administrative and technical staff.

Figure 7 – Proportion of women amongst academic staff in different types of higher education institutions, 1980 to 2011.



In Fig. 7, we can see that the proportion of women academics in tertiary education varies considerably by type of higher education institution and by the type of function they occupy. The national rate of feminisation of the permanent professorial staff currently stands at 18% and, even if this is not a large proportion of women, we can observe that it has increased greatly compared to the just 2% of women professors in 1980 (see Fig. 8 for the evolution from 1990 to 2012). Regarding the variations by type of higher education institution, the UNIL has about a quarter of female academics, the Applied Science Schools about a third, and the EPFL has fewer than 10% female professors (BEFH, 2014: 9).

Figure 8 – Proportion of women amongst professors in universities, 1990 to 2012.



Source: SEFR, 2014: 88

The increase in the proportion of women professors has been supported since the beginning of the 2000s by four successive Swiss Government federal "Equal opportunity in Universities" programmes. These demonstrated a tangible political will to promote women's access to all levels of academic institutions. The actions and recommendations of the Swiss National Science Foundation (FNS), the Swiss University Conference (CUS) and the Rectors' Conference of Swiss Universities (CRUS) have all contributed to different aspects of these programmes. Defining specific targets (doubling the proportion of women professors from 7% in 1998 to 14% in 2006 – which was achieved - and then to 25% in 2012 – a figure that has still not been reached in any Swiss university) only constitutes part of the philosophy underlying the programmes, which primarily aim to integrate the principle of equality in all academic structures (in line with the aims of gender mainstreaming). The goals of the current federal programme (2013-2016) are to achieve 25% women among full professors in Swiss universities and 40% at the assistant professorship level, as well as an increased proportion of women in leading academic positions and decision-making bodies in universities and related institutions.

Although the 25% women professors target has yet to be reached, there has been a significant increase in the feminisation of intermediate levels of the academic hierarchy. The proportion of women among funded PhD students and postdoc (non-tenured) research positions increased from 27% to 40% between 1998 and 2007 (OFS, 2008: 9-10). In addition, women now represent over 40% of non-tenured scientific collaborators and non-professorial teaching staff in universities.

However, one of the fundamental characteristics of this feminisation process is the fact that it has not always been to the sole benefit of Swiss women. Whilst women

have increased their share of university professorships, from 9.1% in 2006 to 17% in 2010, the proportion of foreigners amongst the female academic population has increased from 46% to almost 56.4% over the same period (Fassa, 2013-2014: 164). This would seem to suggest that the Swiss gender regime continues to place material and symbolic constraints on women who have been brought up in that particular context, even when wide-reaching equal opportunity measures are introduced within academic institutions.

2.3 Number/percentage of women and men in the different SSH/STEM scientific fields

Regarding the number of students, we can see in Fig. 9 that women have been slightly more numerous than men since 2010 and that they outweigh men in SSH, in medicine and pharmacy and in law.

Figure 9 - Students in the different domains since 1990/91

	1990/91	1995/96	2000/01	2005/06	2010/11	2013/14	2014/15
Total	85 940	88 243	96 673	112 375	131 497	142 164	143 961
%Women	38.8	41.8	45.6	49.1	50.3	50.2	50.4
Social Sciences and Humanities	28 169	28 738	34 728	41 651	43 874	44 748	44 766
%Women	58.0	60.6	62.5	64.0	66.4	67.6	67.8
Economics	13 011	12 036	13 141	14 261	19 041	21 648	21 814
%Women	23.3	25.0	27.5	30.3	33.2	34.1	34.3
Law	10 046	10 792	10 763	13 310	14 856	15 651	15 908
%Women	40.1	43.3	47.5	52.3	55.9	56.9	57.3
Exact and natural sciences	14 281	15 265	15 817	18 755	22 197	24 560	25 049
%Women	24.8	28.2	31.7	35.6	38.3	38.4	38.4
Medicine and pharmacy	10 177	10 478	10 152	10 707	13 256	14 493	15 047
%Women	45.8	50.4	54.9	60.9	61.0	60.6	60.9
Technical sciences	9 563	9 929	10 061	10 877	14 185	16 858	17 235
%Women	16.0	18.9	22.1	25.4	27.2	28.1	28.7
Interdisciplinary and other fields	693	1 005	2 011	2 814	4 088	4 206	4 142
%Women	35.4	32.4	40.2	45.6	47.5	44.8	44.3

Status: 31.03.2015

Source: OFS / SIUS, Etudiants et examens finals des hautes écoles suisses
http://www.bfs.admin.ch/bfs/portal/fr/index/themen/15/06/data/blank/01.html#CubesHEU
[retrieved 25/05/2015]

The presence of women in the fields of SSH, medicine & pharmacy and law can also be identified among the different academic staffs of the Swiss universities (see Fig. 10). The effects of vertical segregation are visible in all fields. For example, in SSH, women represent 30.8% of professors, 45.9 of other teachers and 57.7% of assistants and other collaborators.

Figure 10 – Academic staff by staff category, group of domains, sex and institution (in FTE)

	BS	BE	FR	GE	LS	LU	NE	SG	UZH	USI	EPFL	ETHZ	Aut IU	Total
Professors	304	389	224	513	483	57	112	144	535	82	298	457	9	3609
%Women	***19.9***	***21.2***	***21.3***	***21.9***	***22.5***	***27.3***	***25.0***	***14.4***	***19.4***	***14.7***	***11.3***	***12.7***	***8.9***	***19.0***
1 Social Sciences and Humanities	77	112	97	212	134	31	56	29	154	19	2	17	4	945
%Women	*31.6*	*39.0*	*29.2*	*25.6*	*35.4*	*33.4*	*34.9*	*19.8*	*32.6*	*24.8*		*11.8*	*5.0*	*30.8*
2 Economics	19	31	24	37	73	3	10	97	65	28		5	3	396
%Women	*7.0*	*10.8*	*8.2*	*26.4*	*26.0*		*10.4*	*13.5*	*7.7*	*6.4*		*40.7*	*12.2*	*14.9*
3 Law	18	27	31	34	24	23	16	14	45			3	3	238
%Women	*45.4*	*25.9*	*24.5*	*28.2*	*21.2*	*22.6*	*20.7*	*13.1*	*27.3*				*10.5*	*25.4*
4 Exact and natural sciences	92	90	55	127	73		30	4	96	22	147	210		945
%Women	*9.7*	*9.6*	*12.5*	*15.4*	*11.7*		*13.3*		*15.9*	*12.1*	*9.3*	*12.2*		*12.0*
5 Medicine and pharmacy	91	122	17	100	172				175	2		10		689
%Women	*16.4*	*14.5*	*17.6*	*18.1*	*16.0*				*12.2*			*20.0*		*15.2*
6 Technical sciences										12	144	212		367
%Women										*25.9*	*13.3*	*12.3*		*13.1*
7 Interdisciplinar and other fields	8	6		3	4	1					6	0		27
%Women	*36.7*	*32.8*		*37.0*							*17.9*			*25.5*
Other teachers	165	281	142	367	369	35	41	88	513	51	182	413	5	2651
%Women	***29.9***	***27.6***	***37.0***	***43.2***	***30.7***	***29.0***	***35.5***	***26.4***	***35.7***	***19.6***	***14.7***	***15.4***	***55.9***	***29.6***
1 Social Sciences and Humanities	55	51	88	215	116	21	20	22	98	16	3	10	2	717
%Women	*42.9*	*35.3*	*40.1*	*56.2*	*38.7*	*29.4*	*46.5*	*52.9*	*49.9*	*31.9*	*51.0*	*29.5*	*57.6*	*45.9*
2 Economics	6	8	5	16	16	1	5	54	23	10		7	1	151
%Women	*11.5*	*18.8*	*3.5*	*17.6*	*18.4*	*9.7*	*10.3*	*17.7*	*21.8*	*18.4*		*9.0*	*8.4*	*17.1*
3 Law	8	12	12	9	7	11	3	12	13				2	88
%Women	*22.8*	*18.0*	*29.0*	*45.5*	*33.7*	*31.5*	*27.7*	*17.8*	*21.4*				*82.0*	*27.7*
4 Exact and natural sciences	22	54	14	66	27		11	0	46	6	70	206	0	523
%Women	*18.5*	*10.0*	*23.7*	*13.0*	*26.3*		*28.3*		*17.1*	*10.2*	*13.8*	*14.4*		*15.2*
5 Medicine and pharmacy	64	124	7	52	199		1		334	2		6		790
%Women	*20.5*	*32.0*	*14.9*	*39.8*	*27.3*		*26.5*		*35.5*			*43.8*		*31.7*
6 Technical sciences										17	102	171		291
%Women										*14.3*	*13.8*	*14.6*		*14.3*
7 Interdisciplinar and other fields	5	22	4	8	4	2					7	12		63
%Women	*48.0*	*29.2*	*4.3*	*17.0*	*46.2*	*16.0*					*22.2*	*19.2*		*25.7*
Assistants and scientific collabor	1996	1633	856	2092	1299	113	352	446	2864	380	3066	4569	34	19699
%Women	***44.3***	***48.3***	***47.3***	***49.8***	***49.9***	***49.6***	***46.4***	***38.6***	***48.7***	***41.0***	***26.3***	***28.1***	***46.4***	***39.7***
1 Social Sciences and Humanities	354	354	284	625	441	56	141	74	713	63	7	168	13	3293
%Women	*57.0*	*61.8*	*58.1*	*61.7*	*56.7*	*40.9*	*59.1*	*62.0*	*56.0*	*70.9*	*59.5*	*41.2*	*64.4*	*57.7*
2 Economics	47	85	67	101	168	3	27	326	252	68		45	7	1196
%Women	*31.2*	*45.6*	*37.4*	*35.9*	*41.1*	*20.0*	*38.3*	*33.3*	*29.6*	*43.7*		*24.9*	*15.5*	*35.1*
3 Law	55	80	105	87	57	50	43	40	166			10	8	701
%Women	*57.2*	*52.8*	*52.4*	*59.6*	*41.7*	*57.9*	*53.1*	*39.2*	*47.2*			*45.0*	*42.0*	*51.1*
4 Exact and natural sciences	873	498	285	742	405		139	6	672	115	1429	1888	1	7052
%Women	*32.4*	*31.8*	*36.5*	*36.0*	*46.2*		*33.0*	*38.8*	*38.0*	*15.6*	*28.0*	*28.2*	*40.0*	*32.0*
5 Medicine and pharmacy	547	559	84	500	208		1		1061	62		80		3102
%Women	*54.2*	*53.1*	*46.0*	*56.4*	*53.0*				*55.2*	*59.4*		*41.3*		*54.2*
6 Technical sciences										63	1530	2365		3958
%Women										*35.0*	*23.6*	*26.5*		*25.5*
7 Interdisciplinar and other fields	59	39	7	31	13	2					101	10	1	262
%Women	*53.3*	*61.6*	*55.9*	*52.1*	*38.8*	*82.8*					*40.6*	*42.6*	*100.0*	*48.7*

Source : OFS / SIUS, personnel des hautes écoles suisses
© OFS - Encyclopédie statistique de la Suisse
http://www.bfs.admin.ch/bfs/portal/fr/index/themen/15/06/data/blank/03.html
Status: 31.12.2013

3. MAPPING ORGANIZATIONAL INDICATORS

We choose to investigate two faculties of the University of Lausanne (UNIL) for the GARCIA project; namely our STEM department – the Section of Basic Sciences (*Section des sciences fondamentales* - SSF) of the Faculty of Biology and Medicine (*Faculté de biologie et médecine*, hereafter FBM)[27] – and also the SSH department – the Faculty of Social and Political Sciences (*Faculté des sciences sociales et politiques*, hereafter SSP). These faculties cover teaching and research activities and train Bachelor, Master and PhD students.

[27] This choice was motivated by the fact that SSF is fully integrated into the UNIL organisational structure, whilst the Section of Clinical Sciences (*Section des sciences cliniques* - SSC) operates in collaboration with the Vaud Canton University Teaching Hospital (*Centre Hospitalier Universitaire Vaudois* - CHUV), and research and careers in SSC mainly focus on medicine (researchers write an MD – medical doctor –not a PhD thesis) and clinical (more applied) aspects of research. Moreover, the CHUV and part of the SSC have very specific administrative structures (Board of Directors, HR office, etc.).

3.1 Organisation of careers and academic employment at the UNIL

Figure 11 – Categories and bodies of academic employees at the UNIL in relation with the She Figures grades

She Figures Grades	UNIL	
	Bodies	Categories of academic employees
A	*Corps professoral*	Full professor
		Associate professor
		Assistant professor with or without tenure track
B	*Corps intermédiaire*	Senior lecturer
C		Junior lecturer
		PhD assistant
		Doctoral assistant
D	Student	Student assistant
N/A	PAT	Senior researcher
		Postdoc
		Junior researcher

As in other Swiss universities, faculty members are subdivided into four different "bodies": 1) the "*Corps professoral*" (CP), which includes all professors (both tenured and not); 2) the "*Corps intermédiaire*" (CI), who are non-professorial staff, but who are responsible for a large proportion of supervisory/research activities – basically senior lecturers, junior lecturers and (funded) PhD students who work as assistants; 3) students; and 4) technical and administrative staff (PAT). Fig. 11 shows how the different categories of academic employees at the UNIL are distributed among the different bodies. The "She Figures" grades are presented for comparison.

As all positions in the CP and the CI are teaching and research posts, when a person is hired only as a researcher (senior researcher, postdoc or junior researcher) he/she belongs to the PAT by default. This situation shows clearly the evolution of the academic personnel with the increase in researcher positions due to the development of contract research financed by funding agencies external to the universities (Swiss National Science Foundation – SNSF; European Commission – EC; etc.) without any adaptation to this situation in the organisation of the different bodies. Because of the very hierarchical structure in Swiss universities, only professors and senior lecturers are authorised to run research projects and there is no public institution that offers statutory research posts as in other countries.

For GARCIA, we consider as "permanent positions" those of full professor, associate professor and senior lecturer (*Maître/maîtresse d'enseignement et de recherché*, MER) but in fact they are renewable every 6 years, after an internal evaluation procedure. Although it is formally possible for the University not to renew these contracts, such cases are extremely rare.

At UNIL there are also some "semi-permanent" positions, which are in fact for (usually quite senior) teaching staff who hold full- or part-time jobs outside the University (particularly attractive to medical doctors, lawyers, accountants, etc.): privat-docents; *professeurs titulaires* (titular professors); *ad personam* professors; *chargé-e de cours* (lecturer[28] with a very temporary teaching position, with no time for research). Most of these positions are not paid at all or are remunerated on an hourly basis. They exist in parallel to a standard academic career, but may sometimes provide postdocs with resources / contacts to remain in academia and continue their research / publications until they manage to find a permanent position (for a detailed presentation of all positions, see Appendix).

At UNIL as in general in the Swiss system there is no transparent and institutionalised succession of posts that would allow young researchers to advance step by step or "become established" in an intermediary position. There is therefore no automatic "promotion" from one academic position to another (e.g. there is no clear procedure for "normal" progression from MER to a professorship, other than from waiting for a professorial position to become available and applying, in competition with all applicants from outside the institution). The Cantonal Law states that promotions are exceptional (i.e. maximum once in a lifetime) and are based on recommendations from the Dean to the Rector. From this point of view, it is difficult to speak of academic "careers" as positions below professorship level are offered on a fixed-term basis and people have to go through selections procedures based on the "up or out" principle every 2 to 5 years if they want to stay in universities. At this level, there is thus no guarantee of a job within the UNIL.

Mobility is very important and almost unavoidable as PhD students who have gained their PhD from the UNIL (particularly if they were employed as assistants or PhD students funded by the SNSF - which means that they have an employment contract within the UNIL), it is usually necessary to spend at least 12 months out of the institution (e.g. on a funded postdoc, preferably abroad) before they can apply for a temporary / fixed-term or permanent position at the UNIL.

3.2 Organisational data for positions in GARCIA departments

The vertical segregation in both GARCIA departments can easily be identified in Figure 12, with women being less represented in permanent positions than men, but showing a higher presence in temporary positions. In proportion to men, they are in general less numerous in FBM than in SSP.

[28] When we speak of lecturer elsewhere in this report, the *chargé-e-s de cours* are not taken in account due to their very precarious position (teaching 2 to 4 hours/week for 6 months).

Figure 12 – Organisational data table for 2013 (adapted from WP4.1.1.)

			SSP			FBM - SSF	
			Male	Female		Male	Female
Positions' na	**Permanent** position:		**61**	**40**		**75**	**13**
PO	N of full professors		21	8		30	2
Prof. associé	N of associate professors		13	8		22	4
MER	N of senior lecturer		27	24		23	7
	Tenure track position:		**11**	**5**		**2**	**3**
Prof assistan	N of assistant professors		5	3		2	3
MA	N of junior lecturer		6	2		N/A	N/A
	Temporary position:		**114**	**166**		**295**	**305**
Prof assistan	N of assistant professors		0	1		10	2
MA	N of junior lecturer		N/A	N/A		6	5
Chargé/resp	N of researchers		23	42		31	32
Premiers ass	N of assistants with PhD		5	9		102	104
Post-doc FN	N of postdocs		10	10		17	13
Assistants	N of assistants		63	79		88	92
Doctorant-e	N of funded PhD students		13	25		41	57

3.3 Data on PhDs

Looking at the proportion of women who graduated with a PhD from 2012 to 2013, the "production" of PhDs seems to be gender-balanced in both departments. In SSP, as in FBM, 50% of the PhD students who graduated during these two years were women. However, we must keep in mind that in the lower levels of qualification, women are often overrepresented: Among students who obtained a Master degree in 2013, 67% were women in SSP and 53% were women in FBM.

Figure 13 – PhD graduations in the two departments by sex 2010–2013

		2012	2013
SSP	All PhD graduations	22	27
	Women	14	18
FBM	All PhD graduations	123	133
	Women	68	65

4. INTERPRETATIVE ANALYSIS

4.1 The gender regime as a barrier to women's academic career in Switzerland

In UNIL as in general in Switzerland, the academic occupational hierarchy continues to manifest a clear "glass ceiling", although there has been a considerable improvement in women's access to higher education over the past 15 years. Women are now well represented amongst doctoral students and make up a significant

proportion of temporary scientific research positions, but they are much less likely than their male counterparts to reach permanent professorships.

Increasing women's access to scientific occupations is a concerted policy objective and there are signs of quite strong institutional commitment to the fight against the horizontal and vertical segregation. But in a country with a low unemployment rate, a small university-educated population and relatively well-paid job opportunities in the private and public sectors, Swiss higher education institutions do not necessarily represent a particularly attractive employer (Studer, 2012), notably because of the large proportion of temporary, fixed-term contracts that characterise the early stages of an academic career.

Although women's underrepresentation in universities was already being discussed in feminist circles by the late 1970s, this issue only appeared on the political agenda in the early 1990s. The data produced by a number of institutions and individual researchers was important in revealing the discriminatory nature of what was presumed to be a "neutral" meritocratic selection process (Fassa and Gauthier 2010, Fassa and Kradolfer, 2010).

Part-time employment

In 1980, only half (52%) of Swiss women aged 25-49 were economically active. By 1990, this figure had risen to 72%, increasing further, to 80% in 2010. However, although more and more Swiss women are entering the labour market, they are increasingly unlikely to be working full-time. Over the past twenty years, Switzerland has evolved from a gender perspective towards the widespread adoption of a "modified male breadwinner" normative model of gender relations. Thus, Swiss women have relatively high economic activity rates. For women aged 25-49, there is a 16% difference between the economic activity rates of women with the lowest educational credentials (ISCED 0-2 = 69%) and those with some form of tertiary qualification (ISCED 5-8 = 85%).

Figure 14 – Employment rates of men and women aged 25-49, by highest level of education attained, 2000-2013 (adapted from Table II.2, D.3.2.)

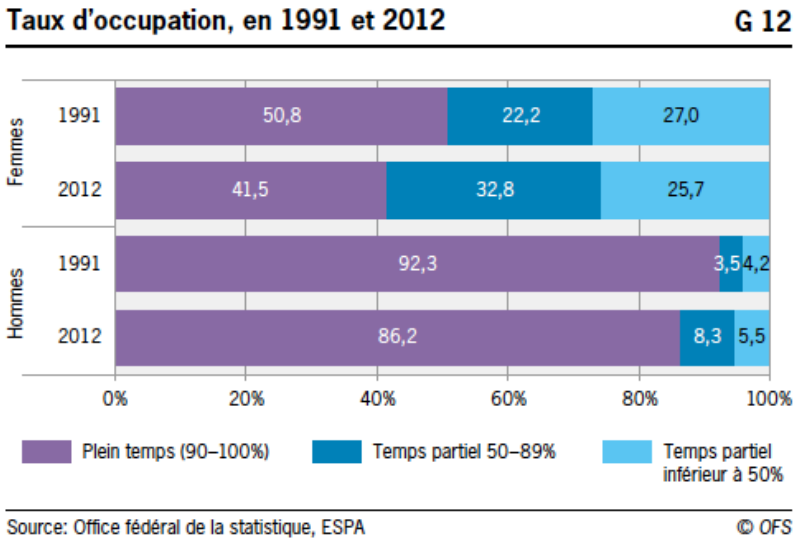
Women	2000	2005	2010	2013
All ISCED 2011 levels	75.9	77.7	79.2	80.6
ISCED 0-2	63.8	66.8	69.1	69.2
ISCED 3-4	77.3	78.0	79.4	80.3
ISCED 5-8	83.5	85.4	83.7	85.0

Men	2000	2005	2010	2013
All ISCED 2011 levels	95.2	92.9	92.2	92.0
ISCED 0-2	88.1	83.6	84.7	82.6
ISCED 3-4	95.2	92.7	91.6	91.4
ISCED 5-8	97.6	95.9	94.8	94.5

Source: Eurostat
ISCED 0-2 : Less than primary, primary and lower secondary
ISCED 3-4 : Upper secondary and post-secondary non-tertiary
ISCED 5-8 : Short-cycle tertiary, bachelor, master and doctoral or equivalent

Women also tend to work part-time (with a large proportion of female part-timers at less than a half-time position) and/or to take extended breaks from the labour market when their children are young. As Fig. 15 shows, over 50% of women worked full-time in the early 1990s, as against barely 42% in 2012. Nowadays, about a quarter of working women have jobs that are less than half-time and the remainder occupy jobs with a duration ranging from 50%-90% of a full-time position.

Figure15 – Full and part-time activity rates, by sex, 1991 and 2012

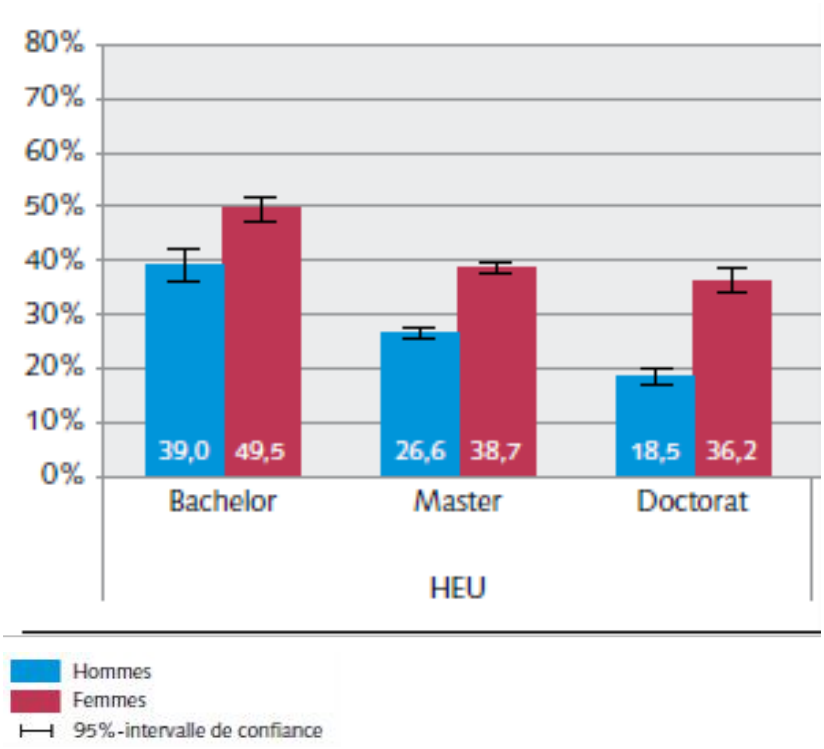


Several recent studies have shown that this particular pattern of female activity rates and family organisation are explained by a combination of tax policies that are unfavourable to dual-earner households, the lack of affordable childcare, both for pre-school children and for extra-curricular activities for older children (most junior schools do not provide a canteen service at lunch-time, for example), long working hours for full-timers and a low male unemployment rate.

The same observation can be made for university graduate women (as shown in the Swiss Graduate Survey of the SFO which focuses on graduates' employment and education situation and follows their career paths for the first five years after graduation): "Wide disparities are observed between the sexes regarding the part-time professional activities of university [and HES] graduates. Women who graduated in 2012 and 2008 more often work part-time than their male counterparts, regardless of the type of institution and type of diploma. Moreover, the gender disparities within the different types of institution are even greater five years after graduation, with women much more often reducing their rate of activity than men in order to attend to family responsibilities"[29] .

[29] http://www.bfs.admin.ch/bfs/portal/fr/index/news/medienmitteilungen.html?pressID=9528

Figure 16 – University graduates working part time by level of degree and sex, 2013

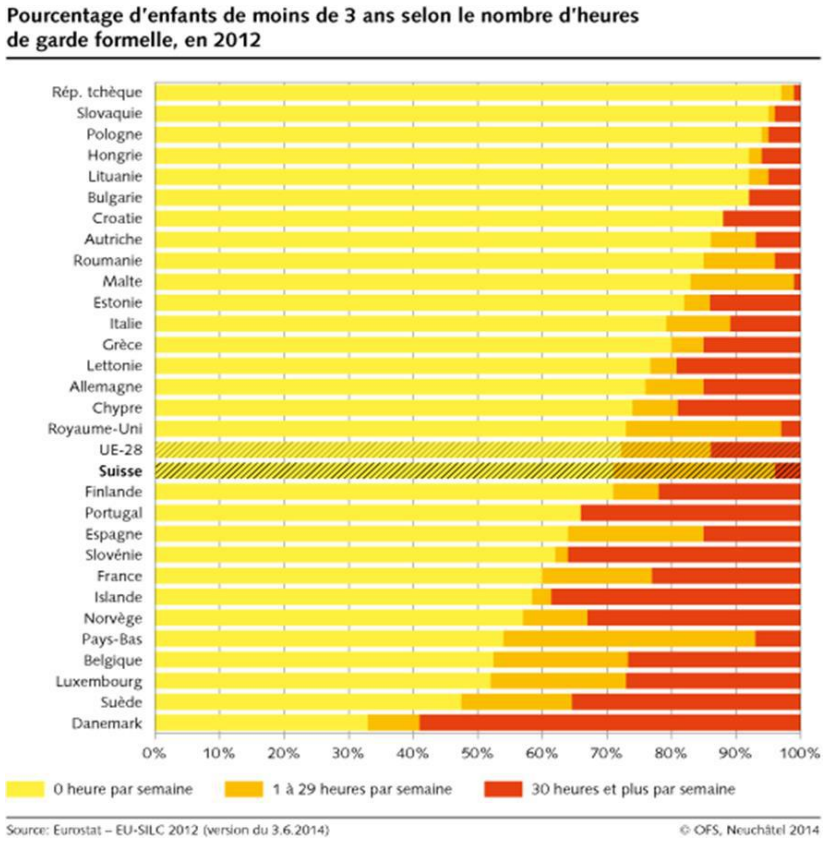


Source: Koller and Rüber, 2014: 34.

Lack of childcare facilities

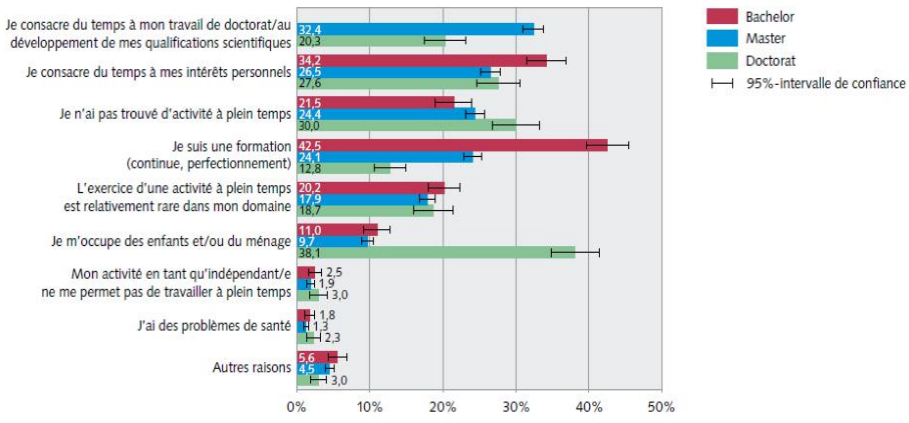
In a cross-national comparative perspective, Switzerland appears in the group of countries where pre-school childcare facilities are the least developed. In 2014, almost two-thirds of under 3 year-olds did not spend any time at all in institutional care structures, and only 5% of this age-group were taken care of in crèches or day-care centres for more than 30 hours a week (see Fig. 17). Koller and Rüber observe that: "Clear differences linked to gender nonetheless persist among holders of a doctorate when account is taken of the group of domains of study: women with a PhD more often work part-time than men in the same category. The gaps range from 10 percentage points in the Exact and Natural Sciences to 19 points in the Technical Sciences" (2014: 33). While there are several reasons for not working full-time (see Fig. 18), "among PhDs the main reason given was the time devoted to raising children or managing the household (38%), which were more often mentioned by women. Almost all the other reasons were mentioned as often by male as by female PhDs" (2014: 35).

Figure 17 – Number of hours of formal childcare for the under 3 years, by country, 2012



Source: OFS (2013)

Figure 18 – Reasons for working part-time among university graduates by level of degree, 2013

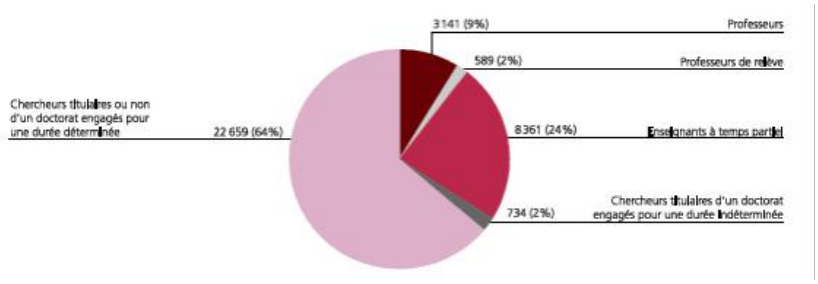


Source: Koller and Rüber, 2014: 35.

4.2 What about postdocs?

Although this field of study is relatively new, Swiss institutions have produced a considerable amount of statistical data and reports on the low representation of women at the top of the academic hierarchy and on junior researchers. But, surprisingly, when we try to identify how many researchers are on postdoctoral positions, we find a serious lack of information on the positions they occupy and their numbers. While we know that in 2011, 35,000 persons were employed by universities (from professors to assistants), with professors representing less than 10% (3141) and tenure track professorships 2% (589), we are unable to find data on persons holding a PhD without permanent or tenure track position who are working in Swiss universities, as the SFO aggregates data on doctoral students and postdocs into one single category (see Fig. 19). We therefore have to work on evaluations that lead us to situate the number of postdocs between 5,000 and 8,000.

Figure 19 – Number of researchers in Swiss universities (no. of persons and %)



Source: SEFRI, 2014: 24

In 2012 a group of young researchers criticised the very hierarchical structure of academic work and in their position statement asked "Vision 2020" for the creation of 1000 new positions as tenure track assistant professors. In response to this document, the Federal Council mandated the State Secretariat for Education, Research, and Innovation to draw up a report entitled: "Mesures pour encourager la relève scientifique Suisse" (New blood measures for Swiss research). The lack of data is also mentioned in this document: "The data available on new blood [*la relève*] in the universities […] are incomplete and have gaps. Only a very limited quantity of information is available and only a very few data are regularly and uniformly collected. […] The lack of sufficiently detailed and complete data on researchers in Switzerland makes it difficult not only to assess the new blood situation but also to evaluate the measures already taken to promote it" (SEFRI, 2014: 17).

5. CONCLUSION

Our first conclusion relates to the difficulty of finding reliable data on the different various positions in academic careers. Since a number of actors in the university landscape (SEFRI, SNSF, universities, etc.) are fully aware of this problem through the different documents written on academic careers that highlight this question, the

SFO is now trying to design new categories to collect desegregated and useful data on PhD and postdocs in order to devise new indicators. At UNIL, the Equality Office, in collaboration with the Statistics Office of UNIL and several other services like Human Resources, is drawing up data sets to establish a monitoring of gender equality between men and women for all the various bodies. We are convinced that this kind of instrument will be of great importance in our understanding of where women drop out of academic careers.

Regarding support for the women of the young generation, the UNIL Rectorate is committed to "supporting young women academics" (Canton de Vaud, 2013). To do so, the UNIL has adopted a Gender Equality Action Plan 2013–2016 which sets an objective of hiring "at least one women for every four men" when recruiting for professorial positions until 2017 (Canton de Vaud, 2013). This action plan was validated in 2014 and allows the university to take part in the Swiss Government's new federal programme entitled "Equal opportunity of women and men at universities/gender studies" for 2013-2016 (Swiss University Conference – Programme P-4)[30]. The general goal of this programme is to achieve 25% women among full professors at Swiss universities and 40% at the assistant professor level, as well as an increased proportion of women in leading academic positions and decision-making bodies at universities and related institutions.

More specifically in the UNIL, the Gender Equality Action Plan defines the following domains of action:

1. The establishment of gender equality in the university's structures as part of quality management.
2. Increasing the proportions of women professors (including assistant professors) and of women in academic decision-making positions.
3. Support for young academics.
4. Work-life balance, with respect to studying at the university or pursuing an academic career, in combination with family and personal responsibilities.
5. Promoting gender equality among undergraduate students and enlarging their choice of study fields (to combat horizontal gender segregation).
6. Gender equality in human resources management and organizational development.

It is important to point out that one of the main instruments to institutionalize equality is the Vision 50/50 project. Under this heading, the Rectorate has asked all Deans to develop gender equality action plans for their faculties. They were asked to develop a faculty policy and to present targets and measures that would take into account the specific situation of the faculty. This shows the numerous equality policy measures that the UNIL has already introduced. It also explains the commitment given by the Rectorate to implementing changes resulting from the GARCIA research in the evaluation and the follow-up to the University Gender Equality Action Plan 2013-2016.

30 http://www.unil.ch/webdav/site/egalite/shared/Jahia_6_6/Promouvoir_Egalite/Plan_Action/Plan_d_action_PFEC_2013_version_sitewebEN.pdf [retrieved 15.06.2015].

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7. APPENDIX – TABLE OF POSITION IN THE UNIL

http://www.google.ch/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CB4QFjAA&url=http%3A%2F%2Fwww.unil.ch%2Fsrh%2Ffiles%2Flive%2Fsites%2Fsrh%2Ffiles%2FInformations%2520administratives%2FRe%25CC%2581sume%25CC%2581%2520Fonctions%252202015.xls&ei=NbiCVZvMHsOYsAHiwICQAw&usg=AFQjCNFbyKr_AJBCKDp2GWhdu6Syo7lzfg&bvm=bv.96041959,d.bGg&cad=rja [retrieved 19.05.2015]

Pour rappel : seules les directives de la Direction font foi

POSTE	FONCTION	BAREME	DUREE DU CONTRAT	DROIT APPLICABLE	COMMENTAIRES 1	COMMENTAIRES 2
Doctorant	Doctorant FNS	Doctorant FNS	Min. 1 an pour 1er contrat, durée max. 5 ans	Règlement du FNS, CO	3 renouvell. max.	100% du temps pourthèse, sous réserve d'activ. compl. d'enseign. et de recherche
	Doctorant FE	Doctorant FNS	Min. 1 an pour 1er contrat, durée max. 5 ans	Directive 1.31., CO	3 renouvell. max.	
	Assistant diplômé	Assistant	1an 2ans 2ans, durée max. 5	Règlement des assistants, Directive 1.34	Taux d'activ. min. 60%	50% pour these/50% pour activ. institut
Post doctorant	Premier assistant E.V.	Premier assistant	1 an 2ans 2ans, durée max. 5 ans	Règlement des assistants	Taux d'activ. min. 60%	50% recherches person./50% activ. institut
	Premier assistant FE	Premier assistant	1 an min pour 1er contrat, durée max. 5 ans	Règlement des assistants, Directive 1.34	3 renouvell. max. min. 1 an	50% recherches person./50% activ. institut
Maître assistant	Maître assistant	cl. 28-31	CDD de 2 ans, durée max. 4 ans	Directive 1.6., Lul, Lpers, RLpers	Taux d'activ. min. 50%	les années de suppl. comptent dans durée
Suppléance	Maître assistant suppléant	cl. 28-31	CDD, durée max. 4 ans	Directive 1.11., Lul, Lpers, RLpers	3 renouvell. max. Taux d'activ. min. 50%	max. de 4 ans
MER 1	MER 1	cl. 29-32	6 ans, renouvelable	Directive 1.5., Lul, Rlul, Lpers, RLpers	Taux d'activ. min 20%	Chercheur confirmé, Doctorat
MER 2	MER 2	cl. 28-31	6 ans, renouvelable	Directive 1.5., Lul, Rlul, Lpers, RLpers	Taux d'activ. min 20%	Diplôme de fin d'études universitaires pour essentiel tâches d'enseignement
Suppléance	MER 1 ou 2	cl. 29-32 ou 28-31	CDD, durée max. 4 ans	Directive 1.11., Lul, Rlul, Lpers, RLpers	3 renouvell. max. Taux d'activ. min 20%	
Professeur ordinaire	Professeur assistant	cl. 29-32	CDD de 2 ans, durée max. 6 ans	Directive 1.11., Lul, Rlul, Lpers, RLpers	2 renouvell. max.	les années de suppl. comptent dans durée
Suppléance	Professeur assistant suppl.	cl. 29-32	CDD, durée max. 4 ans	Directive 1.11., Lul, Lpers, RLpers	3 renouvell. max.	max. de 6 ans
Professeur assistant en PTC	Professeur assistant en PTC	cl. 29-32	CDD de 2 ans, durée max. 6 ans	Directive 1.4., Lul, Rlul, Lpers, RLpers	2 renouvell. max.	
Professeur ordinaire	Professeur ordinaire	HC	6 ans, renouvelable	Directive 1.34., Lul, Rlul, Lpers, RLpers	Taux d'activ. min. 80 %	
Professeur associé	Professeur associé	HC	6 ans, renouvelable	Directive 1.34., Lul, Rlul, Lpers, RLpers	Taux d'activ. min. 20 %	
Suppléance	Professeur remplaçant	HC	CDD	Directive 1.11., Lul, Lpers, RLpers	3 renouvell. max.	
Professeur invité	Professeur invité	HC si taux d'activ.	CDD	Directive 1.8., Lul, Rlul, Lpers, RLpers	3 renouvell. max.	Ne peut pas être à 100% dans autre université
Professeur invité	Professeur invité	Indemnité	CDD	Directive 1.8., Lul, Rlul, Lpers, RLpers		Pas plus de 4 heures hebdomadaires enseig.
Chargé de cours	Chargé de cours	Indemnité	CDD	Directive 1.9., Lul, Rlul		
Privat-docent	Privat-docent	Indemnité	CDD	Directive 1.10., Lul, Rlul		
Assistant-étudiant	Assistant-étudiant	Assistant-étudiant	CDD, pendant durée études bachelor et master uniquement	Règlement des assistants	Taux d'activ. max. 40% pendant cours, 100%	Licence, diplôme ayant un master et ne préparant pas de
Projet de recherche E.V.	Collabo. / chargé / responsable de	PAT. fsi	CDD, durée max. 4 ans	Lpers, RLpers	3 renouvell. max.	licence, diplôme, ayant un master et ne préparant pas de
Projet de recherche FE	recherche	PAT. fsi	CDD	CO	2 renouvell. max.	licence, diplôme, ayant une master
Projet de recherche FNS	Chercheur FNS junior	Chercheur FNS junior	CDD	Note interne de la Direction du 7.4.2008; CO	2 renouvell. max.	Doctorat
Projet de recherche FNS	Chercheurs FNS senior	Chercheur FNS senior	CDD		2 renouvell. max.	

SRH janvier 2015
valide par la Direction le

Remarques:

CO = Code des obligations
Lpers = Loi sur le Personnel de l'Etat de Vaud
RIpers = Règlement d'application de la Lpers
Lul = Loi sur l'Université de Lausanne
Rlul = Règlement d'application de la Lul
FNS = Fonds National Suisse de la Recherche
Directives internes de l'Université de Lausanne

CDD = Contrat de durée déterminée
E.V. = Etat de Vaud
FE = Fonds externes
FSI = Fixation de salaire individuel
HC = Hors classe
Rlul / Lul = Règlement d'enseignement et de recherche / Loi
PAT = Personnel administratif et technique

6. Slovenia

By Majda Černič Istenič

1. INTRODUCTION

In recent decades, women in Slovenia have massively entered into higher education and science. Among the graduates, 60 percent are women and among the PhD graduates almost half are women (SURS 2015). However, their career is usually completed at the level of Assistant or Assistant Professor; 40 percent of women reach this position, while only 20 percent of women with completed PhD studies reach the full professorship (SURS 2015). Despite the Slovenian Constitution proclaimed formal equality of both genders, a question of equal opportunities for women and men in science is therefore still a relevant issue similarly as in other parts of the world. The Slovenian National Commission for UNESCO, which also sponsored the first survey on the situation of female scientists in Slovenia, publicly problematized the discrepancy between formal equality and actual position of women in science in Slovenia already in the 1990s. This survey (Jogan, 1996), which in its sample included Full Professors, Associate Professors, Assistant Professors and Assistants at the University Ljubljana and the University of Maribor uncover the following barriers of the academic career of female PhD holders:

- hidden discrimination,
- the lack of support of the working organization,
- prejudices about women, overload with (especially administrative) duties,
- austere way of life of women in science as a prerequisite for equal work efficiency,
- overburdens with family/household work and low awareness of possible changes.

According to data in this report, since then the situation has not changed significantly in spite of massivisation of women in science, because the main contours of gender discrimination and segregation still remains largely in place.

The data for this report were obtained from various sources: Statistical Yearbooks of the Republic of Slovenia (2011-2014), the web portal of the Statistical Office of the Republic of Slovenia (SORS), personal communication with the officers from the SORS, the publications (articles, reports) which present the results of studies on PhD holders, and the data from HR offices from two test departments.

2. MAPPING THE INDICATORS AT THE NATIONAL LEVEL

Table 1 presents the data pertaining to Bachelor, Master and PhD students desegregated by gender for the period 2010-2013 in Slovenia. Alongside this

information, the data on research staff encompassing postdoctoral and non-permanent researchers, as well as permanent researchers is presented in the same manner. The Statistical Office of the Republic of Slovenia does not arrange the data on abovementioned researchers' employment status separately on a yearly basis. However, in Section 2.3 some partial information on non-permanent employment of research staff is provided.

According to data in Table 1 and Graph 1 in Appendix, the presence of women is prevailing at all three study levels in the period of 2010-2013. They are particularly strongly represented among Master students with the share of 64 percent. However, throughout this period, the share of women in research staff[31] ranging from 36 to 39 percent is considerably lower in comparison to men.

Table 1: Bachelor students, Master students, PhD students and research staff by sex (2010-2013)

	2010		2011		2012		2013	
	M	F	M	F	M	F	M	F
Bachelor students N	23767	34606	18587	30529	24263	33691	22951	31912
Bachelor students %	40.7	59.3	37.8	62.2	41.9	58.1	41.8	58.2
Masters students N	11787	17771	9382	19271	9798	17740	9249	16580
Masters students %	39.9	60.1	33.2	66.6	35.6	64.4	35.8	64.2
PhD students N	1679	1730	1866	2119	1898	2200	1677	1927
PhD students N	49.3	50.7	46.8	53.2	46.3	53.7	46.5	53.5
Research staff N	8083	4987	9008	5592	8911	5442	8669	5321
Research staff %	61.4	38.6	61.7	38.3	62.1	37.9	63.6	36.4

Below is presented the distribution of men and women at different levels of study and in research referring to different SSH/STEM scientific fields.

The data on Bachelor students (Table 2 and Graph 2 in Appendix) shows that in the observed period differences among women and men remain more or less constant. Women strongly prevail among students in education (shares ranging from 83 to 92 percent), health and welfare (shares ranging from 78 to 81 percent) and humanities and arts, social sciences, business and law (shares ranging from 63 to 76 percent).

[31] In this report the term research staff refers to PhD holders engaged in research and/or experimental work, i.e. creating new knowledge, products, procedures, methods or systems, or leading such projects (SORS 2015). They are employed both in academic as well as in non-academic sectors: higher education (58.7 percent), government (22.7 percent), business (18.5 percent) and private non-profit sector (0.1 percent) (SOSR 2013).

Men largely prevail in science (shares ranging from 43 to 65 percent) and particularly in engineering, manufacturing and construction (shares ranging from 73 to 77 percent). The differences among men and women are the smallest in the field of services and particularly in agriculture where through time their shares tend to equalise.

Table 2: Bachelor students by field of study and sex

	2010		2011		2012		2013	
	M	F	M	F	M	F	M	F
	N							
Education	1157	5550	334	3650	789	4113	531	4520
Humanities and Arts	1335	3743	1058	3367	1500	3628	1785	3928
Social sciences. Business and Law	5298	11090	7467	14389	7239	13372	6780	12603
Science. Mathematics and Computing	1989	1056	1761	2315	2468	1960	3303	2305
Engineering. Manufacturing and Construction	9187	2927	8242	3059	8281	2463	6843	1997
Agriculture	874	1070	717	817	745	711	721	748
Health and Welfare	1707	6128	921	3971	1086	4544	773	3191
Services	2220	3042	227	1510	2155	2900	2215	2620
	%							
Education	17.25	82.75	8.38	91.62	16.1	83.9	10.51	89.49
Humanities and Arts	26.28	73.72	23.9	76.1	29.25	70.75	36.99	63.01
Social sciences. Business and Law	47.77	52.23	34.16	65.84	35.12	64.88	34.98	65.02
Science. Mathematics and Computing	65.32	34.68	43.2	56.8	55.74	44.26	58.9	41.1
Engineering. Manufacturing a nd Construction	75.83	24.17	72.9	27.1	77.08	22.92	77.41	22.59
Agriculture	44.95	55.05	46.7	53.3	51.17	48.83	49.08	50.92
Health and Welfare	21.78	78.22	23.19	76.81	19.29	80.71	19.5	80.5
Services	42.18	57.82	39.2	60.8	42.63	57.37	45.81	54.19

Data in Table 3 and Graph 3 in Appendix shows that gender unbalanced proportions already identified among Bachelor students retain largely also among Master students, which however during 2012-2013 in some fields slightly diminished. This holds true for humanities and arts, social sciences, business and law. On the contrary, in the same period the share of female students increased considerably in agriculture where they already exceeded male students for 20 percent points. The share of female Master students rises also in engineering, manufacturing and construction. Nonetheless, in this field of study there are still twice as many men than women.

Table 3: Master students by field of study and sex

	2010		2011		2012		2013	
	N							
	M	F	M	F	M	F	M	F
Education	358	1079	575	3646	560	2543	494	2033
Humanities and Arts	922	2339	662	2725	687	2063	586	1748
Social sciences. Business a nd Law	5019	9446	2883	6289	2855	6241	2900	6277
Science. Mathematics and Computing	1428	1407	684	902	739	546	921	771
Engineering. Manufacturing and Construction	2988	1526	1759	348	3008	1569	2548	1370
Agriculture	274	411	203	226	268	574	270	639
Health and Welfare	266	919	972	3160	1285	3692	1230	3330
Services	532	644	462	176	396	512	300	412
	%							
Education	24.6	75.4	14.3	85.7	18.05	81.95	19.55	80.45
Humanities and Arts	28.27	71.73	19.54	80.46	24.9	75.1	25.12	74.88
Social sciences. Business and Law	34.69	65.31	31.43	68.57	31.39	68.61	31.6	68.4
Science. Mathematics and Computing	50.37	49.63	43.12	56.88	57.5	42.5	54.43	45.57
Engineering. Manufacturing and Construction	66.19	33.81	62.88	37.11	65.72	34.28	65.03	34.97
Agriculture	40	60	47.31	52.69	31.83	68.17	29.7	70.3
Health and Welfare	22.44	77.56	23.57	76.43	25.82	74.18	26.97	73.03
Services	45.23	54.77	43.58	56.42	43.61	56.39	42.13	57.87

According to data in Table 4 and Graph 4 in Appendix, in the observed period, female PhD students also outnumbered men in all fields of study, except for science, mathematics and computing (44-49 percent). The same is applicable in engineering, manufacturing and construction (27-28 percent), the two fields, alongside with social sciences, humanities and arts, with the highest overall number of PhD students. In general, in the observed period the number of PhD students did not change significantly in any fields of study, except among female PhD students in agriculture where, in 2013 in comparison with 2010, their number increased by fivefold.

Table 4: PhD students by field of study and sex

	2010		2011		2012		2013	
	N							
	M	F	M	F	M	F	M	F
Education	62	122	44	185	51	202	39	169
Humanities and Arts	202	231	210	358	177	356	250	525
Social sciences. Business and Law	376	515	373	515	398	519	276	335
Science. Mathematics and Computing	351	269	456	358	497	484	408	326
Engineering. Manufacturing and Construction	423	156	540	214	539	195	474	178
Agriculture	43	57	51	66	27	42	151	286
Health and Welfare	131	288	117	332	128	317	27	41
Services	91	92	75	91	81	85	52	67
	%							
Education	41.89	58.11	19.21	80.79	20.16	79.84	18.75	81.25
Humanities and Arts	46.65	53.35	36.79	63.01	33.21	66.79	32.26	67.74
Social sciences. Business and Law	42.19	57.81	42	58	43.4	56.6	45.17	54.83
Science. Mathematics and Computing	56.61	43.39	56.02	43.98	50.66	49.34	55.56	44.41
Engineering. Manufacturing and Construction	73.05	26.95	71.62	28.38	73.43	26.57	72.7	27.3
Agriculture	43	57	43.59	56.41	39.13	60.87	34.55	65.45
Health and Welfare	31.26	68.74	26.06	73.94	28.76	71.24	39.71	60.29
Services	49.72	50.28	45.18	54.82	48.8	51.2	43.7	56.3

Contrary to aforementioned figures and numbers, the data on research staff reveals quite an opposite picture pertaining to gender balance in individual scientific disciplines. According to data in Table 5 and Graph 5 in Appendix, the highest share of researchers in Slovenia is significant for the field of engineering and technological sciences and natural sciences. In 2013, the shares of researchers in these two major fields were 37 and 22 percent, a slightly more than in 2010 (33 and 20 percent respectively). Male researchers mostly occupy these two fields. Throughout the observed period, the proportion of male researchers among engineers and

technologist at 80 percent and among natural scientist at 60 percent is more or less constant.

Table 5: Research staff by scientific field and sex

	2010		2011		2012		2013	
	M	F	M	F	M	F	M	F
	N							
Natural Sciences	1586	943	2007	1181	1915	1151	1898	1130
Engineering and Technological Sciences	3396	994	3799	1003	3918	951	3933	1074
Medical sciences	852	956	830	1006	783	927	805	976
Agricultural Sciences	159	156	284	317	338	380	195	219
Social Sciences	644	532	626	592	592	590	608	602
Humanities	401	437	418	450	386	426	311	359
	%							
Natural Sciences	60.3	39.7	63	37	62.5	37.5	62.7	37.3
Engineering and Technological Sciences	77.4	22.6	79.1	20.9	80.5	19.5	78.6	21.4
Medical sciences	47.1	52.9	45.2	54.8	45.8	54.2	45.2	54.8
Agricultural Sciences	66.5	33.5	47.3	52.7	47.1	52.9	47.1	52.9
Social Sciences	54.8	45.2	51.4	48.6	50.1	49.9	50.2	49.8
Humanities	47.8	52.2	48.2	51.8	47.5	52.5	46.4	53.6

As these data also shows in the period 2010-2013 remarkable change in direction to greater gender balance occurs only in the field of agriculture that employs three percent of all researchers. In this field, the proportion of women increased by almost 20 percentage points, which positioned them slightly above the proportion of their male colleagues. Additionally, a slight change (a few percentage points) in direction to greater gender balance among researchers took place also in the field of social sciences. Except in these two mentioned fields, relative gender balanced proportions among the researchers are found also in the field of humanities and medicine.

Therefore, taking into account the data presented in the last two paragraphs, it is evident that in Slovenia men considerably outnumber their female counterparts in research occupation.

3. NATIONAL/REGIONAL SURVEYS AND STUDIES ON PHD HOLDERS

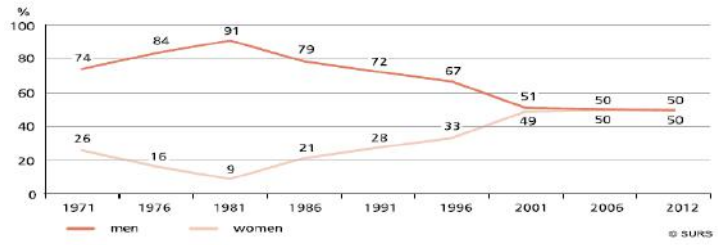
The issue of gender imbalance that still characterises a great majority of scientific fields and its persistence in spite of considerable proliferation of female students in all study levels in the last years has already attracted the interest of academics and other analysts in Slovenia. Recently the Statistical Office of the Republic of Slovenia (SORS), Commission for Women in Science at the Ministry for Education, Science and Sport (CWS) and researchers at the Institute Jožef Stefan conducted a collection of data on PhD holders and made their research results public. The key findings of these three surveys are outlined in the following paragraphs.

3.1. The SORS Survey on PhD holders

The first round of SORS statistical survey on PhD holders, which aimed to explore employment and career characteristics of male and female PhD holders and their international mobility, was conducted in 2010 in the frame of international project carried out in conjunction with OECD, UNESCO and Eurostat. In 2013, the second round followed.

In previous sections, it was demonstrated that in the recent years female students at all study levels outnumbered their male colleagues. The SORS survey on PhD holders (Arsenjuk and Vidmar, 2015) outlined the previous trends. According to Graph 1, a decade ago, male PhD graduates greatly outnumbered their female colleagues; in 1971 female PhD graduates represented 26 percent of PhD graduates, ten years later (in 1981) 9 percent, in 1991 28 percent. However, in 2001 they already represented 49 percent and in 2006 and 2012 50 percent.

Figure 1 – Gender structure of PhD graduates, Slovenia

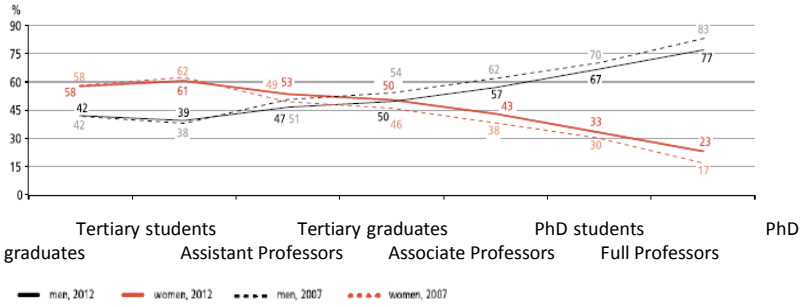


Source: Arsenjuk and Vidmar, 2015

Moreover, previous sections demonstrated unequal gender distribution in various fields of science both in respect to students and researchers. The data of SORS survey (Arsenjuk and Vidmar, 2015) considering a sample of all PhD holders also shows a slightly unequal distribution among different fields of science. This indicates the presence of anchored horizontal segregation that is mirrored in the higher shares of women in the so-called female sciences. At the same time, the lowest share of female PhD holders is found in engineering and technology, which are supposed to be 'male sciences'; women represented 17 percent of all PhD holders with degrees in these two fields. The same SORS data also shows that more women than men received their doctoral degrees in medical sciences and humanities.

The SORS survey 2013 (Arsenjuk and Vidmar, 2015) show that 88 percent of the PhD holders are professionals, among them 45 percent are educational professionals. Among them, women occupy lower positions. The data from this survey on faculty education (Graph 2) outlined as a scissor-shaped curve, shows that in typical academic careers the share of women is decreasing, with each higher step on the academic ladder. However, it seems that with time this vertical segregation might be slightly eroding.

Figure 2 – Women and men in typical academic careers. Slovenia



Source: Arsenjuk and Vidmar, 2015

The data set from the SORS surveys on employment characteristics of PhD holders disaggregated by gender seems particularly illustrative from the viewpoint of the leaky pipeline phenomenon. The data from the first round shows that 80 percent of employed male PhD holders and 74 percent of female PhD holders had a principal job with a permanent contract (SOSR 2011) (Table 6). However, among the PhD holders who graduated in the recent years, a higher share of those employed with temporary contract prevails: 64 percent of male PhD holders and 55 percent of female PhD holders.

The second round of SORS survey indicates that in the recent years these shares have been increasing. In 2012, the share of employed female PhD holders with a permanent contract counts for 71 percent. The corresponding share for male PhD holders was 79 percent.

Table 6: Number of employed doctorate holders and recent doctorate holders by type of employment and gender. Slovenia, 2009

Sex	Total number of employed doctorate holders			Number of employed recent doctoral recipients		
	Total	Type of employment		Total	Type of employment	
	Total	permanent	temporary	Total	permanent	temporary
Total	**5,985**	**4,659**	**1,327**	**812**	**493M**	**317M**
Men	3,731	2,996	735	496	319M	176M
Women	2,254	1,663	592	316	175M	141M

M estimate – use as information for guidance only

Source: SORS, 2011

Furthermore, the SORS survey data for 2009 shows that 79 percent of PhD holders dealt with research and/or experimental work at their principal position. Intersectoral comparison shows that among all PhD holders the highest share (59 percent) of researchers was in the higher education sector, of whom women made up to 36 percent of all researchers in the higher education sector. In the EU, the corresponding share was 40 percent (She Figures 2012).

3.2 The CEC-WYS Survey on PhD holders

The research group at Jožef Stefan Institute (Mladenić, 2006) carried out a survey[32] with the leading personnel at Slovenian universities and research institutes in 2005 in order to shed light on their views on gender imbalance in science and to discover possible ways to exceed this phenomenon. Because of the limited space, just the main findings based on answers of 15 female and 23 male[33] participants of this survey are presented here.

Weak respondents' sensitivity to gender unbalanced positions of PhD holders in their institutions is one of the key findings of this survey. The majority of the respondents (66 percent) believe that the status of women and men in science is equal. However, among the proponents of such a view, males predominate (74 percent), while the share of female respondents (50 percent) is also not negligible. Concurrently, a great majority of the respondents (93 percent) believe that in their academic institutions both genders have equal opportunities for promotion and that there is no tendency to feminise lower (university) positions (66 percent). Further analysis of these responses revealed that those who believe in gender equality in the academic promotion procedures belong to the respondents who at the same time agree with the statements: 'for a woman being employed means to be independent' and 'for a women being a housewife is equally fulfilling as being employed'.

[32] The survey was carried out in the framework of international research project Central European Centre for Women and Youth in Science (CEC-WYS), which the European Commission funded for the period 2004-2007 within Framework Programme 6.

[33] The questionnaire was sent to 168 academic institutions in the country.

This survey also revealed that according to the views of the majority of the respondents (78 percent), so far the academic institutions in Slovenia did not create any recruitment and promotional measures that would enable gender balanced academic trajectories of PhD holders. Moreover, only 26 of the respondents believe that changes are needed in relation to this issue; among them were 33 percent of women and 22 percent of men. Results of this survey also showed that scientists at leading positions are rarely encouraged (just in 13 percent) by the competent authorities to ensure equal opportunities for women and men in science and research. Moreover, none of the respondents confirmed that any such recommendation came from the media.

Majority of the respondents (84 percent) also stated that at their institutions girls (young women) were not specifically encouraged to pursue studies in programs where men are in the majority. In regards to the issue of ensured impartiality in the assessment of the quality of work of academic staff, 74 percent of the respondents believe that this was guaranteed equally for both genders.

3.3 The CWS Survey on PhD holders

The research findings of CEC-WYS survey alongside the analyses of statistical data on recent developments of women in higher education in Slovenia guided the research questions of the survey Gender Differences in Working Conditions and Career Paths in Science in Slovenia, conducted in 2011 in the framework of CWS (Ule 2012). The questions of the survey were the following: what are the main obstacles of women to win recognition in science in Slovenia, and what are the reasons for vertical gender segregation? The survey was carried out in 2011. The questionnaire was sent by post to 4551 PhD holders of both genders and 1100 respondents provided partial or complete feedback; among them 43 percent were men and 57 women.

The results of this survey showed that male and female PhD holders were encouraged by almost the same motives to enter into a scientific profession (personal aspirations, curiosity, freedom, creativity, to do something worthy, confidence in the possibility of changing the world, etc.). However, the survey also revealed that during their career trajectories both genders were facing unequal working conditions – opportunity structures and institutional arrangements. Above all stands the fact that 34 percent of men and 45 percent of women included in this survey had not yet received a self-guided national project. Another meaningful fact is that 34 percent of men and 48 percent of women received no assistance in arranging administrative matters. In both cases, the gender differences were statistically significant.

From the perspective of working conditions in science, another interesting survey result is the information on the characteristics of office: only 43 percent of men and only 35 percent of women have its own room for scientific work.

The survey results also demonstrated that the circle of those who were involved in decision making in science in Slovenia was rather narrow:

- 86 percent of women and 81 percent of men have never taken part in commissions or boards that make decisions about the distribution of financial resources,
- 81 percent of women and 77 percent of men have never occupied any significant functions in scientific hierarchy.

The reasons quoted by women were family, small children, no employment in the same research group after obtaining the PhD, looking for social security.

Why are women hindered in their scientific work by family obligations? This question was answered with the following results: 57 percent of male PhD holders and 44 percent of female PhD holders share their household chores with their partners; however, 43 female PhD holders (only 12 percent of male PhD holders) also carry out their household chores on their own.

Furthermore, the possibility of reconciliation of scientific work and family life is an important stimulus for scientific research mostly for women (in 32 percent. while only in 23 percent for men). In addition, the most stimulating factor of the work in science for both male and female PhD holders are good relations with their colleagues (44 and 49 percent) and well-arranged funding of scientific research (men 41 percent for men, 40 percent for women).

What are, according to male and female PhD holders included in this survey, the biggest obstacles to scientific work? The biggest obstacles in current research in Slovenia are poor remuneration of research work and financial problems (42 percent for both genders), absence of colleagues' loyalty and obstruction of promotion by superiors (men 17 percent, women 20 percent) and difficulties in reconciliation of scientific work and family life (men 23 percent, women 28 percent). The opinions especially outlined by women were also the following:

- women are not equally valued and encouraged by superiors;
- rating system of the national research agencies is discriminative against women because it gives extraordinary weight to quotes (whereas men are cited by the male lobbies);
- predominantly male superiors have a strong impact on all areas of science;
- motherhood is regarded as an indication of poorer interest of women for scientific work.

According to the author of this survey, the personal comments of PhD holders primarily give answers to the above-mentioned questions. The issue is discrimination based on gender, which is the result of an accumulation of disadvantages:

> *"For example: a woman does not pursue doctoral training abroad for family reasons, she does not come into personal contact with important foreign researchers, she has even fewer options to establish contacts with foreign editors of scientific journals, to get an invitation etc." (Ule, 2012: 640).*

4. MAPPING ORGANIZATIONAL INDICATORS

The data presented in Tables 6 and 7 and in Graphs 6-13 in Appendix, which refers to two testing departments of Slovenian partner: Fran Ramovš Institute of the Slovenian Language at Research Centre of the Slovenian Academy of Sciences and Arts (SSH Department) and Department of Agronomy at Biotechnical Faculty. University of Ljubljana (DABF) (STEM Department) shows a picture, which pretty much corroborates with the one described in the previous sections. That is to say, women strongly outnumber male researchers at all academic levels in the period 2010-2013 in SSH Department among permanent research staff including Research Advisers (equivalent to Full Professors) and Senior Research Fellows (equivalent to Associate

Professors). Strong prevalence of women in SSH Department also holds true for researchers with non-tenured positions whereas in the last period (in 2013) the difference between genders is decreasing.

In line with the already observed tendency described in the previous section, based on statistical data on research staff, in DABF, which is typified as STEM test department, gender unbalanced proportions among academic staff is diminishing or even turning in favour of women. This specifically holds true for research staff with permanent positions, where in 2010 and 2013 the share of women were 67 and 50 percent respectively. Similar tendencies are observed also in researchers with temporary positions. A slightly different situation is found among academic staff. Amid Full Professors and Associate Professors at DABF during the observed period, the number of men constantly exceeded the number of women. However, in this case the differences in gender proportions were much smaller (just a few percentages points) than in SSH Department.

Concerning the promotions and exits in both departments, the data shows a rather inconsistent picture. In the observed period there were altogether ten promotions in SSH and 14 in STEM Department. In SSH Department, they all took place in 2013, when two male researchers and eight female researchers were promoted and one male researcher left the department. In the STEM department, during the observed period, the promotions were more evenly distributed and gender balanced, while leavings were concentrated in 2010 when four men and one woman left the department. In successive years (2011-2012), the number of men and women who left the institution was equal.

Since SSH department as exclusively research institution does not provide a curriculum for programme of PhD studies, the data on this subject is presented only for STEM Department (Table 6). Although in this department during the observed period fewer PhD students enrolled each year, the share of women constantly increased. To some extent, the same tendency also holds true for PhD graduates: among 34 PhD titles awarded in 2010-2013, there were 52 percent of women; they particularly outnumbered their male colleagues in the middle of this period.

Table 7: Research and teaching staff (organisational level) by gender and STEM/SSH departments

		2010		2011		2012		2013	
		M	F	M	F	M	F	M	F
STEM	Research staff with permanent position N	1	2	1	2	2	2	2	2
	%	33.3	66.6	33.3	66.6	50.0	50.0	50.0	50.0
SSH	Research staff with permanent position N	4	15	7	19	3	15	4	14
	%	21	79	38.9	61.1	16.7	83.3	22.2	77.8
STEM	Full Professors (A) N	6	5	7	5	6	5	7	6
	%	54.5	45.5	58.3	41.7	54.5	45.5	53.8	46.2
SSH	Full Professors (A) N	1	4	1	4	1	2	1	3
	%	20	80	20	80	33.3	66.6	25	75
STEM	Associate Professors (B) N	6	5	5	5	5	4	5	3
	%	18.3	81.7	50	50	55.6	44.4	62.5	37.5
SSH	Associate Professors (B) N	2	2	2	2	1	2	2	3
	%	50	50	50	50	33.3	66.6	40	60
STEM	Research staff with a temporary position N	3	5	4	5	4	5	5	6
	%	37.5	62.5	44.4	55.6	44.4	55.6	45.5	54.5
SSH	Research staff with temporary position N	4	8	5	11	7	8	7	8
	%	33.3	66.6	31.3	68.7	46.7	53.3	46.7	53.3
STEM	Promotions N	1	4	3	1	0	0	3	2
	%	20	80	75	25	0	0	60	40
SSH	Promotions N							2	8
	%							20	80
STEM	Exits	3	1	1	1	2	2	0	0
	%	75	25	50	50	50	50	0	0
SSH	Exits N	0	0	0	0	0	0	1	0

Table 8: PhD students (organisational level) by sex and STEM/SSH departments

		2010		2011		2012		2013	
		M	F	M	F	M	F	M	F
STEM	PhD students N	9	14	9	15	8	14	5	13
	%	39.1	60.9	37.5	62.5	36.4	63.6	27.8	72.2
SSH	PhD students N								
	%								
STEM	PhD titles obtained N	6	3	2	7	2	4	6	4
	%	66.6	33.3	22.2	77.8	33.3	66.6	60	40
SSH	PhD titles obtained N								
	%								

5. INTERPRETATIVE ANALYSIS

An attempt to interpret the data presented in the previous sections relies on reflexions uncovered by some Slovenian scholars having the expertise in the issue of women in science and higher education. After their explanations of the leaky pipeline phenomenon through collected data, its diagnosis is outlined.

5.1 Outline of starting points

In his examination of the dynamics of higher education and its influences on the general structure of modern societies, Pavle Zgaga (2015) is addressing several questions relevant for the interpretation of the data mapped in this report. One of them is whether within the dynamics of modern higher education and research (already during the studies as well as after the graduation) are the mechanisms that contribute to unequal gender participation in important social positions, as well as in taking over important functions at universities, faculties and research teams. Concurrently Zgaga also raises the question whether an increase in the proportion of highly educated women may represent a lever for their greater involvement in the sharing of social and political power.

When trying to answer to these questions, Zgaga at first relies on Martin Throw's (1973) theory about the transition of the higher education from ‘elite’ to ‘mass’ and further to ‘universal’ stage, which however have the meaning of the ideal type-categories. The first stage of this theory denotes to the higher educational system that encompasses 0 to 15 percent of the cohort, in the second stage this share jump to 16 to 50 percent and at the universal stage, it represents over 50 percent. According to this theory, at the first stage, the university education is a privilege, at the second “mass” stage, it is a right and in the final “mass” stage, it is an obligation of particular class, ethnic group. However, as Zgaga explicates, these stages are just

manifestations perceived at the surface. Namely, these processes also include other more complex changes, such as changes in the curricula and forms of studies, changes in the understanding and implementation of academic standards and the shifts in holders of power and decision-making in these institutions. Explicitly, 'massivisation' of higher education has strong effect on (micro) academic culture, interinstitutional relations and behaviour that however does not lead to greater equality as it was originally expected. However, as well illustrated by Becher and Trowler (2001), to whom Zgaga in his deliberation refers, new forms of inequality in the frame of 'academic tribes and territories' are appearing, which does not function only according to the principle of meritocracy, but are tight to the waves of socio-economic factors, one of which is also gender.

When gender is in question it is, as Zgaga argues, even more accurate that 'elite forms survive' in a new practices. The possibilities for women to participate in tertiary education considerably increased, however.

> "*Discriminatory and segregation mechanisms in the process of massivisation moved to the deeper levels of the education system; educational 'experience' at one type of institution (or disciplines, levels of study, etc.) is incomparable with the 'experience' at the other one, which makes difference in careers, therefore in the opportunities an individual female or male has or not after their graduation. Therefore, here is situated one of the important levers that strengthen the 'male domination' in academic institutions*" (Zgaga 2015: 39-40).

The issue of insufficient inclusion of both genders in education and research that emerged during the transition from 'elite' to 'mass' stage is definitely not solved in its universal stage. On the contrary, as Zgaga argues, new dimensions of gender exclusion appeared which are alongside massivisation of teaching and research staff reproducing also in the academic sphere. When explaining the mechanisms that maintain gender inequality in academic world, Zgaga quote Jeff Hearn (2001). According to him, gender balance in academia is not just a matter of its structures and procedures, but also related to the content of academic teaching and research, as well as to deconstruction of prevailing habits (e.g. ignoring, not quoting the articles and books the female scientists wrote). Although today education is recognised as an important gateway to the academic world, this is not the single key factor that gives access to decision-making and promotion in this sphere. Because universities remain in 'male domination', Zgaga believes that far more from women than from men is expected when the value of academic merit is acknowledged.

Mirjana Ule, one of the authors of the CWS Survey on PhD holders explains this 'male domination' even more in a detail. She is convinced that "gender is still a key element of the institutional life in sciences; not in the lecture room, but where the power, influence, prestige, reputation, money is, there decisions are made" (Ule, 2012: 461). She believes that today academic institutions are—at least for the matter of power, influence, prestige, reputation and money—still social spaces strongly determined by specific masculine academic culture in which two types of characters prevail. One refers to a scientist fully engaged just in his professional work but anything else, and the other one to a scientist manager who in informal male networks negotiates the sharing of research money, positions and division of power and authority in science. In both these profiles, as Ule argues, female scientists hardly find themselves. They are not able to do that because of the nature, but because of the culture to which they belong. For them, the first option is not possible, since women scientist needs to be engaged in many things in their everyday life, while in the other case they are

excluded from a network of men's clubs, because of men-friendly norms that lead to gender biased key decisions. However, as Ule argues, because of greater attention to women position in science nowadays, this practice is losing its explicit character:

> "*Institutional domination has slipped into discreet aspects of power, which has the effects of naturalization of differentiations and justifies hierarchical positions in the common sense, rationality and the 'state of things' like sexual stigmatisation of certain positions*" (Ule, 2012: 461).

Furthermore, Ule argues that in a situation where men dominate, women frequently use the strategy of 'holding her head bowed' that means that they perceive their situation, the social order as 'inevitable and natural'. At the individual level, this is manifested in the withdrawal from engagement in wider organizational structure and concentration on the venues where individual control of the situation is possible: lectures, mentorships, consultations… However, today these academic activities bring lower reputation and possibilities for promotion.

5.2. Data interpretation

The data presented in the first section of this report clearly demonstrates that higher education in Slovenia has already entered into a phase of mass education and perhaps not yet in its universal stage. In the last sixty years, great move was made if only female students are taking into account: while in 1953/54 altogether 1763 (29 percent) (Gabrič, 2009) of female students were enrolled in university programme, the corresponding figure for 2013/2014 (Bachelor and Master Programme) is 48.495 (60 percent).

This massivisation of higher education is clearly mirrored in gender imbalanced distribution of students in specific SSH/STEM fields at all study levels. Female students greatly outnumber male students in SSH fields, particularly in education, health and humanities – a typical 'female sciences' whereas males strongly outnumber their female colleagues in engineering, manufacturing and construction – a typical 'male sciences'. Interestingly, the field of agriculture, which was 'traditionally' (particularly among the farming population) perceived as a typical male domain is gradually but for sure exposed to feminisation. According to beforehand explanations, this process could have meant that this field of science is losing its social and scientific reputation. For sure, further investigations should verify this assumption.

A comparison of statistical data on research and teaching staff with the data that pertains to PhD student clearly indicates gender segregation that is taking place in science in Slovenia. This data demonstrates that universities and research institutions in all scientific fields, except in humanities and medical sciences, and lately also in agriculture, employs more men than women. This is further corroborated with special statistical survey data on PhD holders career (SORS 2011 and 2013), which outlined as a scissor-shaped curve clearly demonstrates unequal professional trajectories of women and men in science. When alongside the survey data also gender unbalanced shares of those employed with temporary contract are taken into account, where women significantly prevail, the statement indicated at the beginning of this paragraph acquires additional weight. The information from WP4/WP6 template also indicates that this type of employment arrangement is the most common practice for researchers at the beginning of their career and just for the time of project duration.

On a general level, statistical indicators and statistical survey data unambiguously demonstrated the existence of leaky pipeline phenomenon in science in Slovenia. However, the mapping of organisational indicators at individual SSH/STEM departments presented in Section 3 gives an impression that in some individual scientific fields this phenomenon is less strongly expressed. Thus, based on situation revealed in the SSH department, it could be assumed that in general the SSH departments provide better career opportunities for female PhD holders. Moreover, the situation referring to the STEM department also seems rather atypical (but in line with the picture presented by statistical data) – more in favour of female PhD holders than it is supposed to be in other (similar) STEM departments. To verify this assumptions, it would be pertinent to get insight into career trajectories of women and men in different disciplines delineated in the same manner (e.g. as a scissor-shaped curve) if statistical data would permit such a data arrangement. However, as it was described in WP5.1. Report—in both these chosen departments, irrespective of their numerical representation—women still occupy to a much lesser extent the important decision making positions in their organisations than their male colleagues, which positioning them in a disadvantaged position. For that reason, the leaky pipeline phenomenon needs to be observed from various perspectives in the same organisational unites.

Previous observations, based on statistical data, that university and research departments are still strongly determined by specific masculine academic culture is corroborated with the findings of other surveys on PhD holders that enable insight into the attitudes and experience of PhD holders themselves. In this vain The CEC-WYS survey was revealed that those who are at the top of the academic management—the leading personnel of the Slovenian universities and research institutions—are rather gender blind when assessing the career trajectories and working conditions of their staff. So far, they did not see any need to create more gender friendly academic environment in their institutions. As a result, as the CWS survey showed, in their careers PhD holders—more frequently women than men—are faced with accumulation of disadvantages that arise from their working environment, as well as from family life and have implications for their less successful scientific career.

6. CONCLUSION

The interpretation of statistical and survey data on PhD holders presented in previous sections pinpointed by some theoretical thoughts indubitably corroborate the presence of leaky pipeline phenomenon in science at the national level; a clear picture of vertical gender segregation in academic career paths of the PhD holders. However, on the level of individual STEM/SSH departments, this picture is not so uniquely expressed—it shows that the reality is far more complex. However, accessible evidences enable a conclusion that a specific masculine academic culture, which is mirrored at different levels of scientific endeavours, is preventing more or less in every scientific discipline equal representation of women at more 'prestigious' stages and positions of scientific career. Moreover, what can be done to overpass the influence and agency of this particular culture?

In the world of politics, special female quotas have been introduced already some time ago to enforce greater participation, influence and interests of women in this domain. Perhaps the same kind of measure should be enforced and widely introduced in science as well. This idea is not as unusual as it seems at the first

glance, since in some way it is already materialising. For example, in the new financial perspective, the European Commission is already encouraging greater involvements of women in science within the Horizon 2014-2020. For this purpose, special evaluation criteria that require consideration of gender perspective in proposed project are set up (e.g. in terms of the content of the research, as well as in terms of the sample construction of observed populations and last but not least in scheduling the composition of research teams, such as involvement of 40 percent of women PhD students into ITN programmes). Similar logic should be applied also into the national calls for tenders, which will enable more gender-balanced composition of research teams. This will permit approaches that are more objective in scientific research through consideration of gender perspective as well. Additionally, the logic of quotas should be considered also in the management of scientific institutions; e.g. in membership of each scientific commissions and boards, where a certain share of women should be secured at the top positions (e.g. dean), and a gender rotation should be carried into effect. The criteria of scientific excellence (guaranteed quotations of females' scientific work) should be also restated and pertinent measures created to make women more visible in their scientific disciplines.

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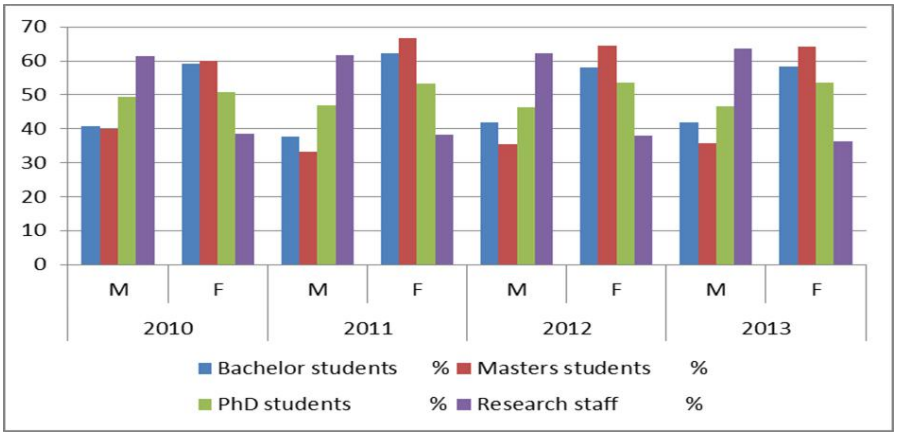
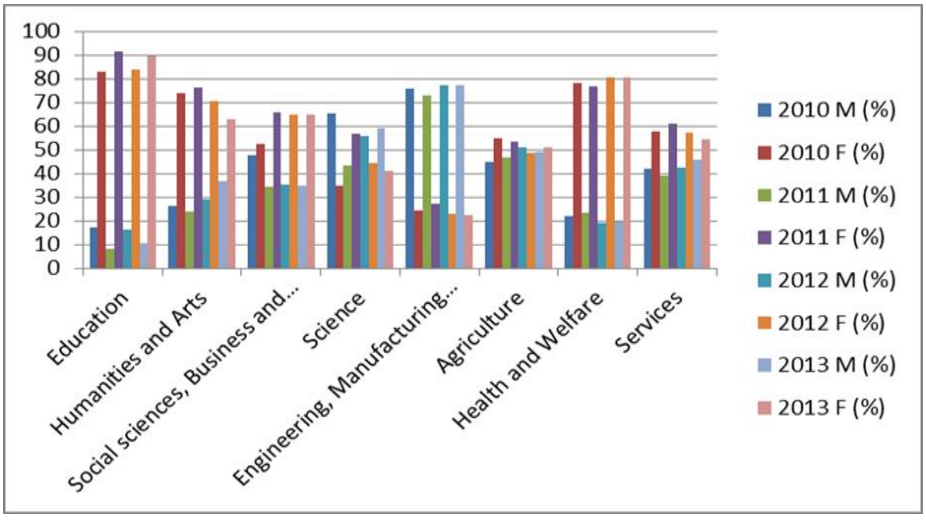
8. APPENDIX

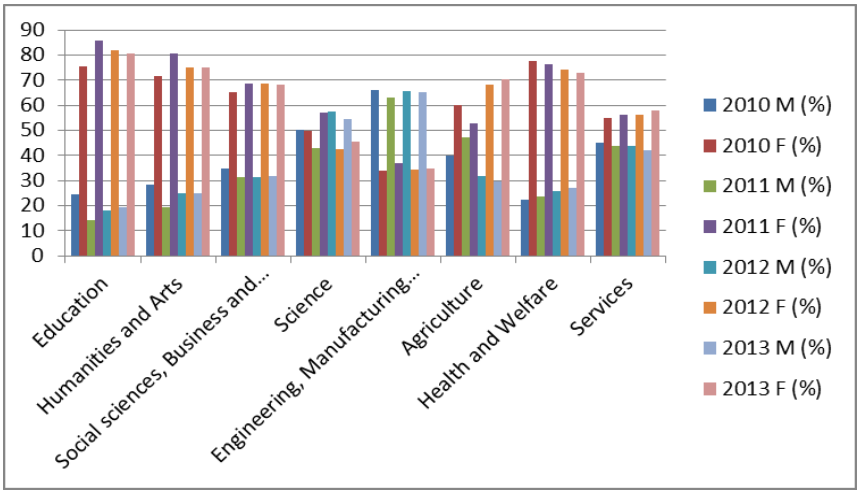
Graph 1 – Bachelor students, Master students. PhD students and research staff by gender (2010-2013)



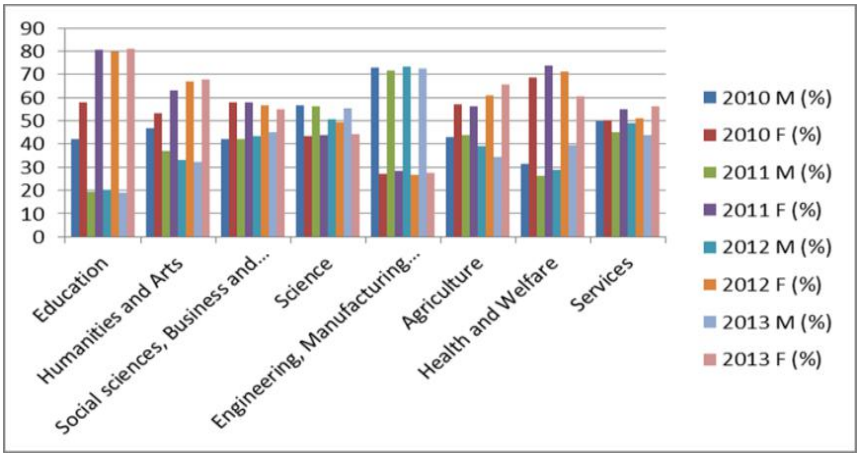
Graph 2 – Bachelor students by field of study and gender (2010-2013)



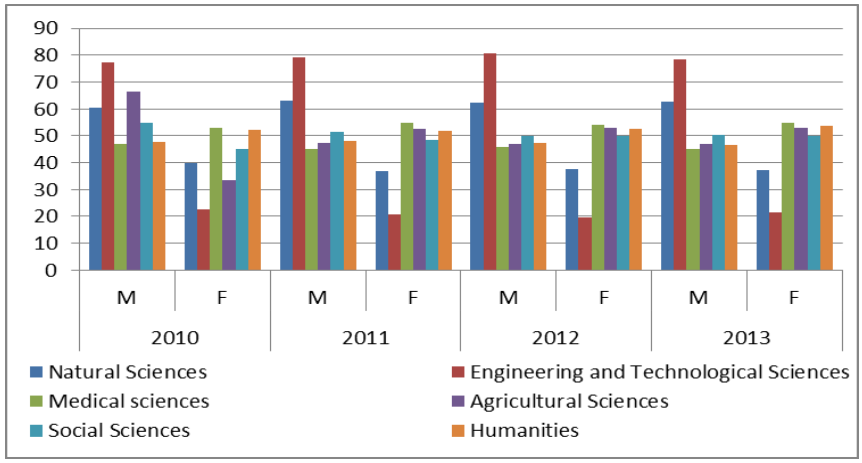
Graph 3 – Master students by field of study and gender



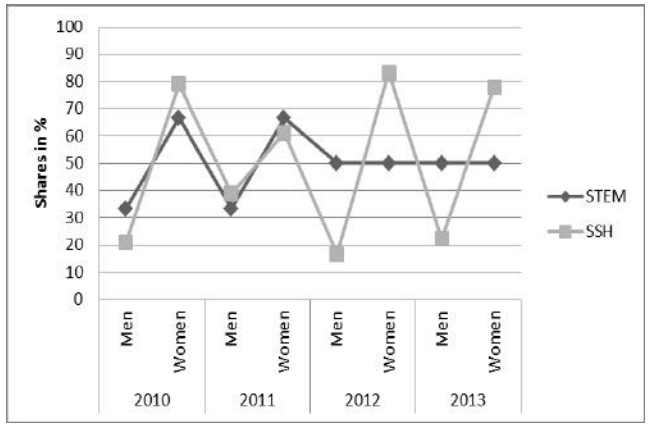
Graph 4 – PhD students by field of study and gender



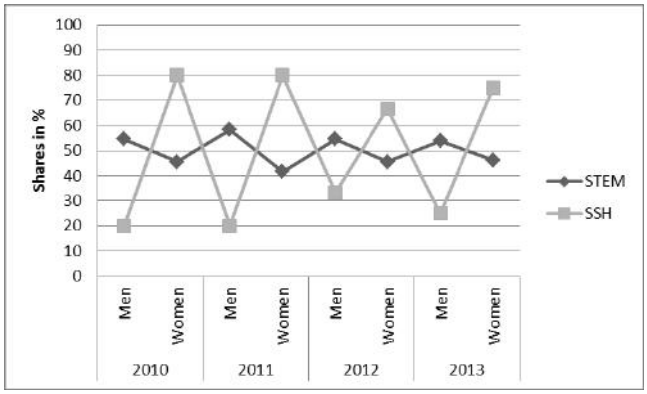
Graph 5 – Research staff by scientific fields and gender



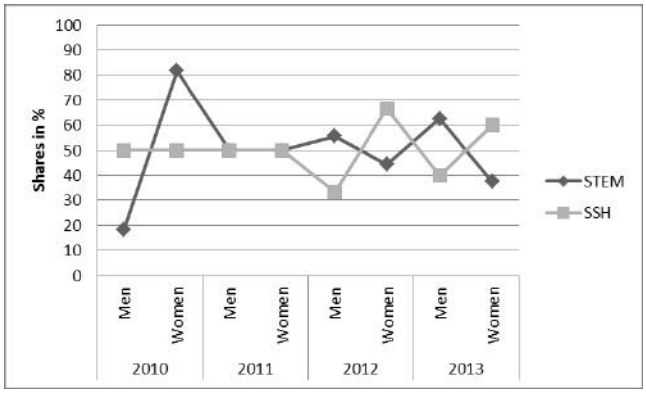
Graph 6 – Research staff with permanent position by SSH/STEM department



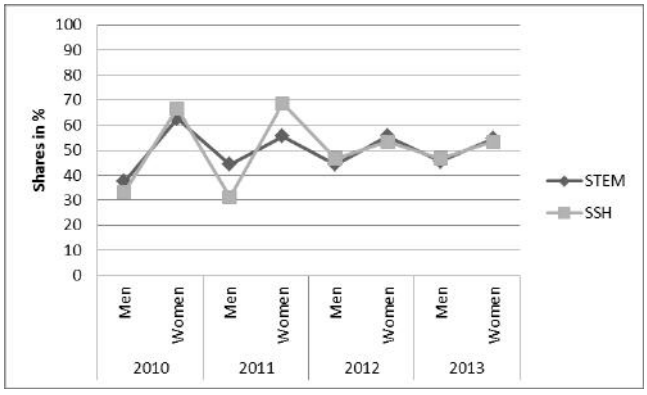
Graph 7 – Full Professors by SSH/STEM department



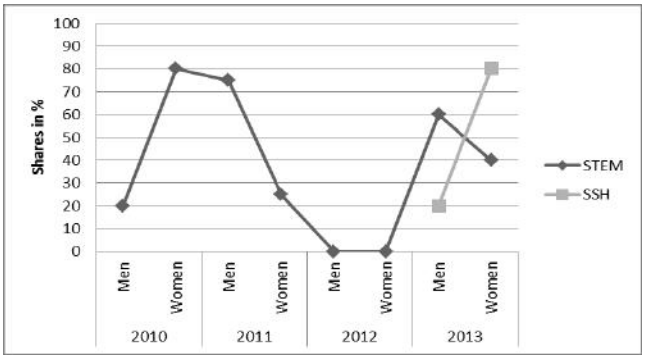
Graph 8 – Associate Professors by SSH/STEM department



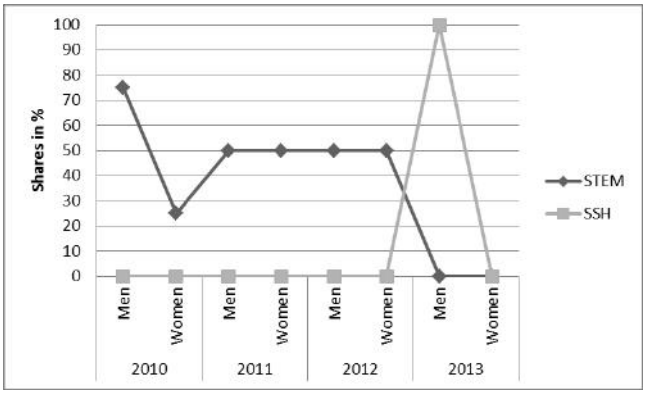
Graph 9 – Research staff with temporary position by SSH/STEM department



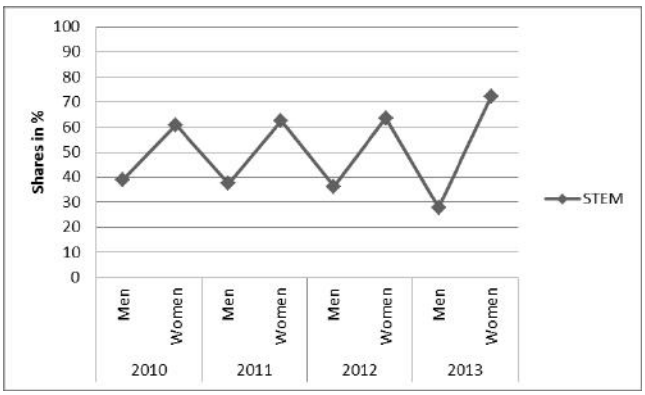
Graph 10 – Promotions Research staff with permanent position by SSH/STEM department



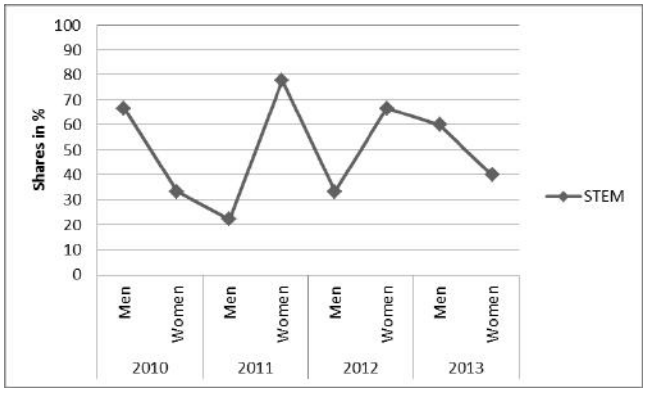
Graph 11 – Exits Research staff with permanent position by SSH/STEM department



Graph 12 – PhD students in STEM department



Graph 13 – PhD titles obtained in STEM department



7. Austria

By Florian Holzinger and Silvia Hafellner

1. INTRODUCTION

The Higher education system in Austria is differentiated in two main parts: the Universities and the Universities of Applied Sciences. The latter are not allowed to award PhD degrees. They offer quite different career paths and opportunities to their graduates as well as their employees. Therefore we have concentrated our analysis of gender inequalities on the Austrian universities.

We have made use the following data sources:

1) Datawarehouse Hochschulbereich (datawarehouse for the higher education sector) which provides statistical information on the higher education sector in Austria (https://oravm13.noc-science.at/apex/f?p=103:36:0::::). Although there is detailed information available in a sex disaggregated format there are some significant short comings: for instance data for scientific personell by field of education is not available. Also Postdocs are hard to identify in these datasets as this is no official staff category at Austrian universities (although open Postdoc positions are advertised by universities and their departments).

2) She Figures 2012: We have used the She Figures 2012 which provides data for academic staff by broad fields of science.

3) Furthermore we used data from the Career of Doctoral Holders survey (CDH). For Austria there are only CDH Indicators for 2006 available. Doctorate holders graduating between 1990 and 2006 under the age of 70 and living in Austria as of 1st December 2006 were included in the survey (not all doctorate holders living in Austria). As there is no register of doctorate holders living in Austria, the study population was reached through the universities' student registers and by contacting companies. Numbers were extrapolated to the statistical population based on an estimation model. As the calculations were done based on a sample and not a complete survey the values stated have a certain imprecision.

2. MAPPING AT THE NATIONAL LEVEL

At Austrian universities around 53% of all students are women - for Bachelor students 51% and for Master students 55% are women. But significant differences between enrollment rates in SSH and STEM fields can be observed. In 2014there were roughly 1/3 female and 2/3 male students in STEM. In SSH it is the other way round: around 59% of all SSH students were women. This distribution by sex has been almost

constant since 2005[34]. For the STEM fields the share of women students has increased slightly from 30% to 33% between 2005 and 2014.

For Master students the share of women in STEM fields is a bit higher (37%) then for Bachelor students (33%). This is also true for the SSH where 64% of Master students are women compared to 60% of Bachelor students.

In contrast to the distribution of students by sex in the bachelor and master degrees, men still account for the majority of PhD students (54% men and 46% women in 2014). Although the number of female PhD students has increased between 2005 and 2014 (with a peak in 2010) the share of women has not increased. Again differences concerning the participation of women between SSH and STEM fields are quite distinct: only 30% women are enrolled in STEM fields and 52% in SSH fields. In both fields a significant decrease in the share of women can be observed between bachelor/master students and PhD students.

Table 1: All Students at Austrian university by year, sex and broad scientific fields[35]

		SSH	STEM	All fields
Women	2014	103.325	30.900	181.255
	2010	114.666	27.273	182.683
	2005	91.673	19.537	149.328
Men	2014	71.203	61.369	160.537
	2010	78.265	56.032	157.699
	2005	65.321	45.820	132.252
Total	2014	174.528	92.269	341.792
	2010	192.931	83.305	340.382
	2005	156.994	65.357	281.580
% Women	2014	59%	33%	53%
	2010	59%	33%	54%
	2005	58%	30%	53%

Source: datawarehouse higher education sector

Table 2: Bachelor students at Austrian university by year, sex and broad scientific fields

		SSH	STEM	All fields
Women	2014	56.844	20.852	90.815
	2010	55.310	17.430	82.614
	2005	11.533	5.299	20.718
Men	2014	38.134	41.752	87.121
	2010	36.219	34.090	75.562
	2005	7.565	13.666	24.066
Total	2014	94.978	62.604	177.936
	2010	91.529	51.520	158.176
	2005	19.098	18.965	44.784
% Women	2014	60%	33%	51%
	2010	60%	34%	52%
	2005	60%	28%	46%

Source: datawarehouse higher education sector

[34] Bachelor and Master degrees at Austrian Universities were introduced since 2005.

[35] Including Bachelor, Master, Diploma and PhD Students.

Table 3: Master students at Austrian university by year, sex and broad scientific fields

		SSH	STEM	All fields
Women	2014	17.404	7.176	29.404
	2010	7.054	3.519	12.899
	2005	1.254	574	2.186
Men	2014	9.788	12.370	24.340
	2010	4.646	6.933	12.984
	2005	854	1.512	2.593
Total	2014	27.192	19.546	53.744
	2010	11.700	10.452	25.883
	2005	2.108	2.086	4.779
% Women	2014	64%	37%	55%
	2010	60%	34%	50%
	2005	59%	28%	46%

Source: datawarehouse higher education sector

Table 4: Diploma students at Austrian university by year, sex and broad scientific fields [36]

		SSH	STEM	All fields
Women	2014	21.715	449	48.475
	2010	43.319	3.922	73.123
	2005	73.781	12.131	118.533
Men	2014	16.590	1.472	34.523
	2010	29.263	9.155	53.303
	2005	52.048	27.061	96.224
Total	2014	38.305	1.921	82.998
	2010	72.582	13.077	126.426
	2005	125.829	39.192	214.757
% Women	2014	57%	23%	58%
	2010	60%	30%	58%
	2005	59%	31%	55%

Source: datawarehouse higher education sector

[36] Diplom studies usually last 8-12 semesters (one semester comprises 30 ECTS) consisting of two or three study periods, each ending with a Diplom examination. The graduates receive a degree as "Magister/Magistra" or "Diplomingenieur/Diplomingenieurin". In accordance with the Bologna declaration most of the programs have been converted to bachelor's and master's courses.

Table 5: PhD students at Austrian university by year, sex and broad scientific fields [37]

		SSH	STEM	All fields
Women	2014	7.362	2.423	12.561
	2010	8.983	2.402	14.047
	2005	5.105	1.533	7.891
Men	2014	6.691	5.775	14.553
	2010	8.137	5.854	15.850
	2005	4.854	3.581	9.369
Total	2014	14.053	8.198	27.114
	2010	17.120	8.256	29.897
	2005	9.959	5.114	17.260
% Women	2014	52%	30%	46%
	2010	52%	29%	47%
	2005	51%	30%	46%

Source: datawarehouse higher education sector

2.1 Postdocs and non-permanent researchers at Austrian universities

There is hardly any information on researchers with non-permanent contracts available. One major staff category where most researchers have short term contracts is staff financed by third-party-funds. There is hardly any data on postdocs available for Austria. In the Austrian university system the career position of assistant professors is dedicated for young researchers; these positions are non-permanent and their duration is limited for 6 years. The data for career positions in Austrian universities are not available differentiated by broad fields of science. Therefore a comparison between SSH and STEM is not possible.

Since 2005 the number of scientific staff financed by third-party funds has increased from 5.773 to 8.773. Absolute numbers increased for women as well as men. Regarding the distribution of third-party funded positions between men and women there was no big difference between the two sexes in 2005 (46% women and 54% men) whereas in 2014 almost two thirds of third-party funded positions were held by men (39% women and 62% men).

The share of men financed by third party funds among all male research staff at Austrian universities increased from 17% in 2005 to 24% in 2014. The share of women increased between 2005 and 2009 from 25% to 30% and dropped to 23% in 2010 and stabalized on this level until 2014.

[37] Diplom studies usually last 8-12 semesters (one semester comprises 30 ECTS) consisting of two or three study periods, each ending with a Diplom examination. The graduates receive a degree as “Magister/Magistra” or “Diplomingenieur/Diplomingenieurin”. In accordance with the Bologna declaration most of the programs have been converted to bachelor’s and master’s courses.

Table 6: Thrid party funded research staff at Austrian universities by year and sex

Year	Women	Men	Total	% Women	% Men
2014	3.379	5.394	8.773	39%	61%
2013	3.330	5.316	8.646	39%	61%
2012	3.205	5.170	8.375	38%	62%
2011	3.140	4.952	8.092	39%	61%
2010	3.079	4.869	7.947	39%	61%
2009	4.110	5.164	9.274	44%	56%
2008	3.944	4.902	8.846	45%	55%
2007	3.473	4.433	7.906	44%	56%
2006	3.147	3.757	6.904	46%	54%
2005	2.658	3.115	5.773	46%	54%

Source: datawarehouse higher education sector

In 2014 39% of all Assistant professors at Austrian universities are women. Between 2011 and 2014 the number of women assistant professors has increased by 40% whereas the number of men has grown only by 7%. Still between the level of PhD students and assistant professors the share of women drops significantly from 46% to 39%.

Table 7: Assistant professors at Austrian universities by year and sex

Year	Women	Men	Total	% Women	% Men
2014	219	343	562	39%	61%
2013	222	359	581	38%	62%
2012	205	320	525	39%	61%
2011	156	321	477	33%	67%

Source: datawarehouse higher education sector

2.2 Permanent research staff by grade and by sex

In 2010 almost 62% of academic staff were men and only one 38% were women. The share of women decreases with higher grades of academic staff. In grade D 42% of staff were women and 58% were men whereas in grade A the share of women was only 17% and the share of men was 83%.

Table 8: Academic staff by grade and sex, 2010

Grade A		Grade B		Grade C		Grade D		Total	
Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
381	1.814	884	3.098	3.115	3.962	5.426	7.418	9.806	16.288
17%	83%	22%	78%	44%	56%	42%	58%	38%	62%

Source: She Figures 2012

Most researchers in the Higher Education Sector (HES) work in the field of natural sciences followed by medical and health sciences and social sciences[38]. While men mainly work in natural sciences, medical & health sciences is the most popular field among female researchers. This has not changed between 2002 and 2009. However, the natural sciences gained importance among female researchers and were the third important field of research among women in 2009 after medical & health sciences and social sciences.

Table 9: Number of researchers in the Higher Education Sector (HES) by field of science, year and sex

	Women		Men		Total	
	2002	**2009**	**2002**	**2009**	**2002**	**2009**
Natural sciences	1.002	2.135	3.644	5.540	4646	7675
Engineering and technology	307	1.018	2.120	3.821	2427	4839
Medical and health sciences	1.646	2.825	2.952	3.563	4598	6388
Agricultural sciences	221	587	320	465	541	1052
Social sciences	1.028	2.438	1.807	2.704	2835	5142
Humanities	1.012	1.962	1.355	1.981	2367	3943

Source: She Figures 2012

Between 2002 and 2009 the share of female researchers increased across all fields of science in the HES. The proportion of female researchers was lowest in Engineering & Technology. However, in this field the share of women increased significantly between 2002 and 2009 (from 13% in 2002 to 21% in 2009). In natural sciences the proportion of women was with 28% still low in 2009. In social sciences and humanities the participation of men and women was almost equal. In Medical and health sciences women were slightly underrepresented (44% women in 2009). Agricultural sciences were the first and only field in 2009 where women held a majority.

Table 10: Share of researchers in the Higher Education Sector (HES) by field of science, year and sex

	Women		Men		Total	
	2002	**2009**	**2002**	**2009**	**2002**	**2009**
Natural sciences	1.002	2.135	3.644	5.540	4646	7675
Engineering and technology	307	1.018	2.120	3.821	2427	4839
Medical and health sciences	1.646	2.825	2.952	3.563	4598	6388
Agricultural sciences	221	587	320	465	541	1052
Social sciences	1.028	2.438	1.807	2.704	2835	5142
Humanities	1.012	1.962	1.355	1.981	2367	3943

bSource: She Figures 2012

Concerning the highest scientific position (professors) at Austrian Universities the share of women is considerably low: only 17% of professors are women. The differences between scientific fields are significant as in the Natural sciences and in

[38] We had to make use of the SHE Figures data as the national monitoring system for universities does not allow a differentiation of research staff by field of science.

engineering and technology the share of women is lowest with 8% and above average in the social sciences (21%) and humanities (28%).

Table 11: Number of staff in Grade A positions by field of science and sex

	Women	Men	Total	% Women
Natural sciences	38	460	498	8%
Engineering and technology	20	240	260	8%
Medical and health sciences	38	225	263	14%
Agricultural sciences	10	45	55	18%
Social sciences	116	438	554	21%
Humanities	159	406	565	28%
All fields of science	381	1814	2195	17%

Source: She Figures 2012

2.3 Doctoral holders in Austria

In December 2006 there were 25.801 people with a doctorate earned between October 1990 and September 2006 living in Austria. One third (8.835) of them were women. In younger age groups the share of women with a doctorate was considerably higher. In the group of under-35 olds the female share was 42% (Schwabe 2008).

Table 12: Number of Doctorate Holders by Sex and Age Class, 2006

	Men	Women	Total
Less than 35 years old	4.246	3.096	7.342
35-44 years old	10.065	4.468	14.533
45-54 years old	2.190	947	3.137
55-64 years old	398	225	623
65-69 years old	67	99	166
70 years old or more	0	0	0
TOTAL	16.966	8.835	25.801

Source: Statistics Austria, CDH survey 2006

More than 2/3 of doctorate holders living in Austria (9.411) hold a doctorate in social sciences. Second important are the natural sciences with 7.929 doctorate holders. Every seventh doctorate holder (3.497 out of 25.801) is foreign born (Schwabe 2008).

In December 2006 93% of doctorate holders (24.002 out of 25.801) were employed. Almost every seventh employed person (3.113 out of 24.002) was self-employed. The results also show that nearly 16% of doctorate holders (19.942 out of 25.801) had only a temporary employment. It is remarkable that 82% of men had a permanent employment whereas this was only the case for 68% of women. Also full-time and part-time employment was unequally spread among men and women. 17% of female doctorate holders were part-time employed in December 2006. This was only the case for 6% of male doctorate holders.

Nearly 5% of doctorate holders (1.205 out of 25.801) were inactive. The share of inactive doctorate holders was with 10% (919 out of 8.836) particularly high for women. The unemployment rate was 2,3% and thus very low for doctorate degree holders. However, the percentage of unemployed female doctorate holders was with 4,2% (375 out of 8.836) almost four times as high as for men with 1,3% (219 out of 16.965).

Table 13: Number of Doctorate Holders by Employment Status and Gender

	Employed							
Year of doctorate award	**Paid empl.**	**Self-empl.**	**Permanent empl.**	**Temporary empl.**	**Full-time empl**	**Part-time Empl.**	**Unempl.**	**Inactive**
Men (1990-2006)	84,3%	12,7%	81,9%	15,1%	91,1%	5,9%	1,3%	1,7%
Women (1990-2006)	74,5%	10,8%	68,4%	17,0%	68,0%	17,3%	4,2%	10,4%
Total (1990-2006)	81,0%	12,1%	77,3%	15,7%	83,2%	9,8%	2,3%	4,7%

Source: Statistics Austria, CDH survey 2006

The field of doctorate degree influences the employment status. While 15% of doctorate holders in the social sciences are self-employed (1.409 out of 9.411) this can be said only for 7% of doctorate holders in the natural sciences (538 out of 7.929). Furthermore, the unemployment and inactivity rates show differences across the various fields (Schwabe 2008).[39]

More than half of all employed doctorate holders (13.688 out of 24.002) carry out research activities according to the Frascati Manual of the OECD. 35% of them are employed in the business enterprise sector, 32% in the higher education sector, around 20% in the government sector and the rest in the private non-profit sector. Researchers with doctoral degrees in the natural sciences or in engineering and technology are mainly employed in the business enterprise sector whereas researchers with doctoral degrees in the social sciences and humanities are mainly employed in the higher education sector.

Most women employed as researchers are active in the higher education sector (37%) followed by the business enterprise sector (24%), government sector (21%) and the private non-profit sector (18%). Men mostly work in the business enterprise sector (39%). This distribution across sectors has an influence on earnings since median cross annual earnings are highest in the business enterprise sector (see below).

The majority of women employed as researchers holds a doctoral degree in SSH (50%). Women who hold a degree in SSH are mostly employed in the higher education sector followed by the government sector. This is the same for men. Women with a degree in STEM are also most frequently employed in the higher education sector followed by the business enterprise sector. For men this is different: those with a doctorate degree in STEM are most commonly employed in the business enterprise sector (30%) followed by the higher education sector (18%).

39 This data is not available in sex-disaggregated form.

Table 14: Number of Doctorate Holders Employed as Researchers by Field of Doctorate Degree

Field of doctorate degree	Total	Sector of employment			
		Business enterprise sector	Government sector	Higher education sector	Private non-profit sector
Total					
1 STEM	7.670	3.515	988	2.412	755
2 SSH	5.271	1.086	1.338	1.652	1.195
3 Medical sciences	257	81	31	111	34
4 Agricultural sciences	490	82	100	216	92
TOTAL	13.688	4.764	2.457	4.391	2.076
Men					
1 STEM	6.042	2.951	738	1.783	570
2 SSH	3.358	783	819	1.003	753
3 Medical sciences	130	49	23	50	8
4 Agricultural sciences	357	54	84	164	55
TOTAL	9.887	3.837	1.664	3.000	1.386
Women					
1 STEM	1.628	564	250	629	185
2 SSH	1.913	303	519	649	442
3 Medical sciences	127	32	8	61	26
4 Agricultural sciences	133	28	16	52	37
TOTAL	3.801	927	793	1.391	690

Source: Statistics Austria, CDH survey 2006

Table 15: Proportion of Doctorate Holders Employed as Researchers by Field of Doctorate Degree

Field of doctorate degree	Total	Sector of employment			
		Business enterprise sector	Government sector	Higher education sector	Private non-profit sector
Total					
1 STEM	56,0%	25,7%	7,2%	17,6%	5,5%
2 SSH	38,5%	7,9%	9,8%	12,1%	8,7%
3 Medical sciences	1,9%	0,6%	0,2%	0,8%	0,2%
4 Agricultural sciences	3,6%	0,6%	0,7%	1,6%	0,7%
TOTAL	100,0%	34,8%	18,0%	32,1%	15,2%
Men					
1 STEM	61,1%	29,8%	7,5%	18,0%	5,8%
2 SSH	34,0%	7,9%	8,3%	10,1%	7,6%
3 Medical sciences	1,3%	0,5%	0,2%	0,5%	0,1%
4 Agricultural sciences	3,6%	0,5%	0,8%	1,7%	0,6%
TOTAL	100,0%	38,8%	16,8%	30,3%	14,0%
Women					
1 STEM	42,8%	14,8%	6,6%	16,5%	4,9%
2 SSH	50,3%	8,0%	13,7%	17,1%	11,6%
Medical sciences	3,3%	0,8%	0,2%	1,6%	0,7%
Agricultural sciences	3,5%	0,7%	0,4%	1,4%	1,0%
TOTAL	100,0%	24,4%	20,9%	36,6%	18,2%

Source: Statistics Austria, CDH survey 2006

The median cross annual earnings of doctorate holders employed as researcher are 50.000 EUR. This is more than the median cross annual earnings of those not

employed as researcher who earn 46.500 EUR. For men there is no difference in earnings depending on their employment as researcher whereas for women a difference can be observed between employment as researcher (42.000 EUR median cross annual earnings) and employment not as researcher (38.500 EUR). Generally women earn less than men independent from their employment as researcher or not.

Generally speaking women earn considerably less than men. Female doctorate holders employed as researchers earn 21% less than their male colleagues and those not employed as researchers earn even 27% less than their male colleagues. For women employed as researcher differences are especially high in the business enterprise sector. For those not employed as researcher differences are highest in the private non-profit sector followed by the business enterprise sector.

Regarding to the field of doctorate degree the payment gap is largest in Engineering and technology, Medical sciences and Social sciences.

The table below shows that in certain cases women are even better paid than men. This is the case for women with a doctorate degree in medical sciences employed in the government sector or private non-profit sector as well as for women with a degree in engineering and technology employed as researchers in the government sector.

Table 16: Median Cross Annual Earnings of Employed Doctorate Holders[40]

Total	Employed as researcher					Not employed as researcher					
		Sector of employment					Sector of employment				
Field of doctorate degree	TOT	Business Enterprise sector	Government sector	Higher Education sector	Private non-profit sector	TOT	Business Enterprise sector	Government sector	Higher Education sector	Private non-profit sector	Business Enterprise sector
Natural sciences	48.000	55.000	42.000	45.000	43.000	49.000	56.000	45.000	38.000	42.000	45.500
Engineering and technology	58.000	64.000	47.000	49.500	65.000	56.500	65.000	50.500	42.000	55.000	60.000
Medical sciences	40.500	50.000	38.500	40.500	38.400	42.000	42.000	32.000	41.250	n	70.000
Agricultural sciences	45.000	47.500	45.000	45.000	48.000	42.500	42.000	45.000	56.000	44.000	42.500
Social sciences	50.000	65.000	50.000	48.000	50.000	49.500	53.000	45.000	37.000	42.000	50.000
Humanities	35.000	48.500	39.500	35.000	25.000	36.500	33.500	40.000	30.000	40.000	30.000
TOTAL	50.000	60.000	45.000	45.000	48.000	46.500	55.000	45.000	40.000	42.000	42.500
Men	Employed as researcher					Not employed as researcher					
	TOT	Sector of employment				TOT	Sector of employment				
Field of Doctorate degree		Business Enterprise sector	Government sector	Higher Education sector	Private non-profit sector		Business Enterprise sector	Government sector	Higher Education sector	Private non-profit sector	Business Enterprise sector
Natural s ciences	50.000	56.500	45.000	46.200	48.500	54.500	63.000	48.000	40.500	45.000	49.000
Engineering and technology	60.000	65.000	45.000	50.000	71.500	60.000	65.000	52.000	42.000	71.500	60.000
Medical sciences	45.000	50.000	38.000	45.000	38.400	56.000	56.000	23.200	71.500	n	70.000
Agricultural	46.034	52.110	45.000	45.000	48.000	44.000	56.000	45.000	n	44.000	42.500

40 Median. Part-time and full-time employment unweight.

sciences												
Social sciences	56.000	70.000	54.500	50.000	55.000		55.000	60.000	50.000	43.500	55.000	55.000
Humanities	36.500	58.500	45.000	36.000	28.000		40.000	33.500	48.500	35.000	42.500	30.000
TOTAL	53.000	62.000	50.000	47.500	50.000		53.000	60.000	50.000	42.000	46.500	50.000
Women	**Employed as researcher**						**Not employed as researcher**					
		Sector of employment						**Sector of employment**				
Field of doctorate degree	**TOT**	**Business Enterprise sector**	**Government sector**	**Higher Education sector**	**Private non-profit sector**		**TOT**	**Business Enterprise sector**	**Governent sector**	**Higher Education sector**	**Private non-profit sector**	**Business Enterprise sector**
Natural sciences	40.500	43.500	35.000	43.500	40.500		40.000	40.000	42.000	24.000	30.000	35.000
Engineering And technology	46.000	56.000	48.000	42.000	42.000		40.500	52.000	42.000	40.500	25.000	10.000
Medical sciences	38.000	38.000	38.500	29.000	68.000		35.000	35.000	32.000	20.000	n	n
Agricultural sciences	42.000	35.000	45.000	37.000	42.500		39.046	35.000	39.046	56.000	n	37.000
Social sciences	44.000	53.500	43.000	43.500	42.000		40.000	43.500	40.000	31.000	34.000	35.000
Humanities	35.000	48.500	37.000	35.000	24.000		31.000	32.000	36.000	30.000	32.500	24.000
TOTAL	42.000	46.000	40.500	42.000	40.000		38.500	40.600	40.000	30.000	32.000	32.500

Source: Statistics Austria, CDH survey 2006

Table 17: Differences in earnings between men and women doctoral holders

Women compared to men	Employed as researcher						Not employed as researcher					
		Sector of employment						Sector of employment				
Field of doctorate degree	TOT	Business enterprise sector	Government sector	Higher education sector	Private non-profit sector		TOT	Business enterprise sector	Government sector	Higher education sector	Other education	Private non-profit sector
Natural sciences	- 19%	- 23%	- 22%	- 6%	- 16%		- 27%	- 37%	- 13%	- 41%	- 33%	- 29%
Engineering and technology	- 23%	- 14%	**+ 7%**	- 16%	- 41%		- 33%	- 20%	- 19%	- 4%	- 65%	- 83%
Medical sciences	- 16%	- 24%	**+ 10%**	- 36%	**+ 77%**		- 38%	- 38%	**+ 38%**	- 72%	n	n
Agricultural sciences	- 9%	- 33%	- 0%	- 18%	- 11%		- 11%	- 38%	- 13%	n	n	- 13%
Social sciences	- 21%	- 24%	- 21%	- 13%	- 24%		- 27%	- 28%	- 20%	- 29%	- 38%	- 36%
Humanities	- 4%	- 17%	- 18%	- 3%	- 14%		- 23%	- 4%	- 26%	- 14%	- 24%	- 20%
TOTAL	- 21%	- 26%	- 19%	- 12%	- 20%		- 27%	- 32%	- 20%	- 29%	- 31%	- 35%

Source: Statistics Austria, CDH survey 2006

3. INTERPRETATIVE ANALYSIS

Although a process of feminization can be observed at Austrian universities since 2000 as more women then men are enrolled as students (Statistik Austria 2013) they are still characterized by a high degree of horizontal and vertical gender segregation. Women are underrepresented at the level of assistant professors (non-permanent, tenure track positions) and professors. Interestingly a the share of women in positions financed by third party funding has declined between 2005 and 2014. A hypothesis for explaining this reverse trend is that the lack of research positions and career opportunities at Austrian universities combined with the increasing number of students and graduateds leads to a higher competition for these non-permanent research positions.

In a horizontal perspective, women are concentrated in social sciences, humanities and underrepresented in natural sciences and engineering and technology. Although the number of women students enrolled in STEM fields has increased in the last years the share of women students in STEM has not in the same pace.

The leaky pipeline described in the well known scissors graph has a very different shape for SSH and STEM fields: whereas in the latter the curve between women students and professors is quite flat and drops from around 33% for women students to 8% for women professors. In the SSH fields the majority of students are women but at the professorial level there are only 21% to 28% women.

PhD graduates living in Austria are very well integrated in the labour market. They have good employment opportunities. Nevertheless the CDH survey shows that the share of inactive and unemployed women with a doctoral degree is significantly higher then for men. Furthermore women doctoral holders earn less then their male colleagues - around 21% if they work as researchers and 27% if they have other occupations.

4. CONCLUSION

Allthough there is a national monitoring of students and university personnell in Austria there is a lack of recent studies that try to explain the leaky pipeline beyond a mere description. There are only a few studies investigating causes of the leaky pipeline but these are limited to specific universities. A study for the Vienna University of Technology (VUT) shows that women have a significant higher drop out risk than male students - academic integration does not reduce this risk for women to the same extent as for men (Günther/Koeszegi 2012). Only those women who conform and adapt to the dominant culture and environment are able to succeed in their careers (Haas et al. 2011). Recruiting decisions are influenced by unconscious gender bias and women receive less support through informal mentoring and are offered less development perspectives than their male colleagues (Keinert-Kisin et al. 2012).

A successful policy to increase the number of women at professorial level was introduced in 2005 by the Austrian Ministry of Science and Research: the programme Excellentia provided bonuses for universities who appointed women professors. During the runtime of the programme € 4.706.520 were paid to Austrian universities for 121 promotion of women professors. Between 2003 and 2009 the share of women professors at Austrian universities has increased from 13% to 19%. Although

the objective to double the proportion of women professors was not reached the evaluation report concludes that in an international perspective this development is quite remarkable (Wroblewski/Leitner 2011).

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8. Comparative part at the national level

By Rossella Bozzon

This chapter briefly summarizes the main results emerged by each national chapters on the leaky pipeline and the (early stages) research/academic careers at national level.

1. LIMITS IN DATA AVAILABILITY

It is certainly difficult to produce systematic and rigorous comparative analyses on scientific careers and on the leaky pipeline process within and across countries. The main reason relies on the lack of systematic data on this target population. Most available data and indicators allow to describe changes in the composition of the academic staff by gender and fields of science. However, data gathered at the national (and at the organizational) level sometimes do not allow to monitor some of the emerging processes in academic and scientific careers because they are characterized by high mobility and instability.

There is a wide debate on how to classify and compare various academic positions because of substantial differences in institutional arrangements across countries and (sometimes) within the same country (Switzerland, Belgium). The classification used in the She Figures reports (2006 2009 2012) is often problematic. While it is quite easy to compare top positions, the varied positions available at the lower levels of the academic hierarchy and characterizing the early stages of the career are less harmonized and comparable across academic systems and institutional arrangements. The major problems arise in identifying the shares of non-permanent versus permanent positions. Postdocs are hard to identify because they often are not an official staff category even if universities and their departments advertise postdoc positions (see: Austria, Switzerland, Italy).

Although there are national monitoring of students and university personnel there is a lack of systematic studies that try to explain the leaky pipeline beyond a mere description. There are only a few studies investigating causes of the PhD holders' careers and they are often limited to specific national case studies or universities, or to research projects. In this context, the most relevant source is the "Careers of Doctorate Holders (CDH) project" produced by a consortium made up of the OECD, UNESCO Institute for Statistics and Eurostat. There are two data collections produced by this consortium, the first in 2006 and the second in 2009[41]. However, as stated in the Eurostat website, the comparability of CDH statistics between countries is limited because of the coverage/non-coverage of the particular sub-groups of the target population and other inconsistencies due to different data-gathering strategies and

[41] http://www.oecd.org/innovation/inno/oecdunescoinstituteforstatisticseurostatcareersofdoctorateholderscdh project.htm

to the grossing-up methods implemented in some countries involved in the project[42]. Among Garcia beneficiaries countries, Austria report include some results of the CDH 2006 survey, while Belgium the Netherlands, and Slovenia summarise some national results related to the CDH 2009.

Further relevant information on PhD holders labour market careers is gathered by some surveys produced by national statistical offices. It is the case of the surveys on "The Doctorate Holders' Vocational Integration" led in Italy in 2009 and 2014. The main shortcoming in this case is that peculiarities in the sample selection and the lack of a standard questionnaire limits and often nullifies the comparability with other international data.

2. PHD STUDENTS AND PHD GRADUATES

The number of doctoral students and PhD graduates are key indicators of a country's potential research capability. According to Eurostat data (2015), there were an estimated 717 thousand doctoral students in the EU-28 in 2012; women accounted for 46.3 % of doctoral students and 47.3% of PhD graduates (Tables 1 & 2). Generally, there is an increase of the total amount of PhD graduates in all the countries involved in the Garcia project, the only exception being Austria, where the number of PhD graduates in 2012 was almost stable when compared with the ones recorded in 2004 (Table1).

The gender split of doctoral students and doctoral graduates across the countries involved in the Garcia project was quite balanced in Italy, Slovenia and Iceland in 2012. On the contrary, women accounted for 44% of all the doctoral graduates in Belgium, the Netherlands and Switzerland, while in Austria the proportion of female PhD graduated is only 42%. Interestingly, the balance between men and women is slightly better among doctoral students (Table2). This would suggest that the process of feminization at this level of specialization should improve in the short run.

All national chapters highlight the persistence of a strong segregation of men and women across fields of study. In engineering, manufacturing and construction, the share of female PhDs is systematically below that of men but the opposite characterizes the field of health and welfare and the humanities (EU 2013).

Table 1: Doctor of Philosophy (Ph.D.), 2004 and 2012

	2004				2012				var% 2012-2004		
	Women	Men	Total	W/Tot%	Women	Men	Total	W/Tot%	Women	Men	Total
European Union	35,902	46,871	82,773	43.4%	56,652	63,061	119,713	47.3%	57.8	34.5	44.6
Belgium	501	978	1,479	33.9%	1,036	1,332	2,368	43.8%	106.8	36.2	60.1
Italy	4,364	4,102	8,466	51.5%	6,099	5,359	11,458	53.2%	39.8	30.6	35.3
Netherlands	1,056	1,623	2,679	39.4%	1,815	2,225	4,040	44.9%	71.9	37.1	50.8
Austria	989	1,454	2,443	40.5%	1,009	1,403	2,412	41.8%	2	-3.5	-1.3
Slovenia	144	211	355	40.6%	287	282	569	50.4%	99.3	33.6	60.3
Iceland	5	5	10	50.0%	21	19	40	52.5%	320	280	300
Switzerland	1,056	1,712	2,768	38.2%	1,571	2,067	3,638	43.2%	48.8	20.7	31.4

Source: Eurostat, 2015 (http://ec.europa.eu/eurostat/web/products-datasets/-/educ_grad5)

[42] http://ec.europa.eu/eurostat/cache/metadata/en/cdh_esms.htm

Table 2: PhD students (ISCED level 6), 2004 and 2012

	2004				2012			
	Total	Women	Men	W/Tot%	Total	Women	Men	W/Tot%
EU-28	*na*	*na*	*na*	*Na*	*717,320*	*384,944*	*332,376*	*46.3*
Belgium	7,014	4,283	2,731	38.9%	14,168	7,693	6,475	45.7
Italy	37,608	18,416	19,192	51.0%	34,629	16,648	17,981	51.9
Netherlands ([1])	7,054	4,155	2,899	41.1%	12,542	6,408	6,134	48.9
Austria	15,524	8,459	7,065	45.5%	26,052	13,800	12,252	47.0
Slovenia*(2005)	964	520	444	46.1%	4,098	1,898	2,200	53.7
Iceland	51	24	27	52.9%	452	170	282	62.4
Switzerland	15,850	9,703	6,147	38.8%	22,012	12,237	9,775	44.4

Source: Eurostat (online data code: educ_enrl5)

Table 3: PhD students by field of study (ISCED level 6), 2012

	Share (% of total PhD students)						
	Total PhD students	**Teacher training & education; humanities & arts**	**Social science, business & law**	**Science, maths & computing; engineering, manufacturing & construction**	**Agriculture & veterinary**	**Health & welfare; services**	**Others**
EU-28	*717,320*	*20.2*	*21.4*	*42.1*	*3.0*	*12.9*	*0.4*
Belgium	14,168	11.8	21.0	41.0	6.5	19.7	0.1
Italy	34,629	14.4	18.4	43.4	5.7	16.2	1.8
Netherlands ([1])	12,542	7.0	22.4	39.6	4.6	26.1	0.2
Austria	26,052	21.3	36.6	29.0	2.2	8.3	2.7
Slovenia	4,098	19.2	22.4	41.8	1.7	14.9	0.0
Iceland	452	30.3	19.9	32.3	0.4	17.0	0.0
Switzerland	22,012	15.7	24.2	39.7	2.0	18.1	0.4

([1]) Teacher training and services: not significant.
Source: Eurostat (online data code: educ_enrl5)

3. FEMINIZATION OF ACADEMIC POSITIONS

Academic career remains markedly characterized by strong vertical and horizontal segregation even if there are important differences across countries. Concerning the feminization of the various academic positions, the national chapters highlight that the situation has improved over the past ten years. This development is more evident for countries where the proportion of women along the career ladder was lower in 2004.

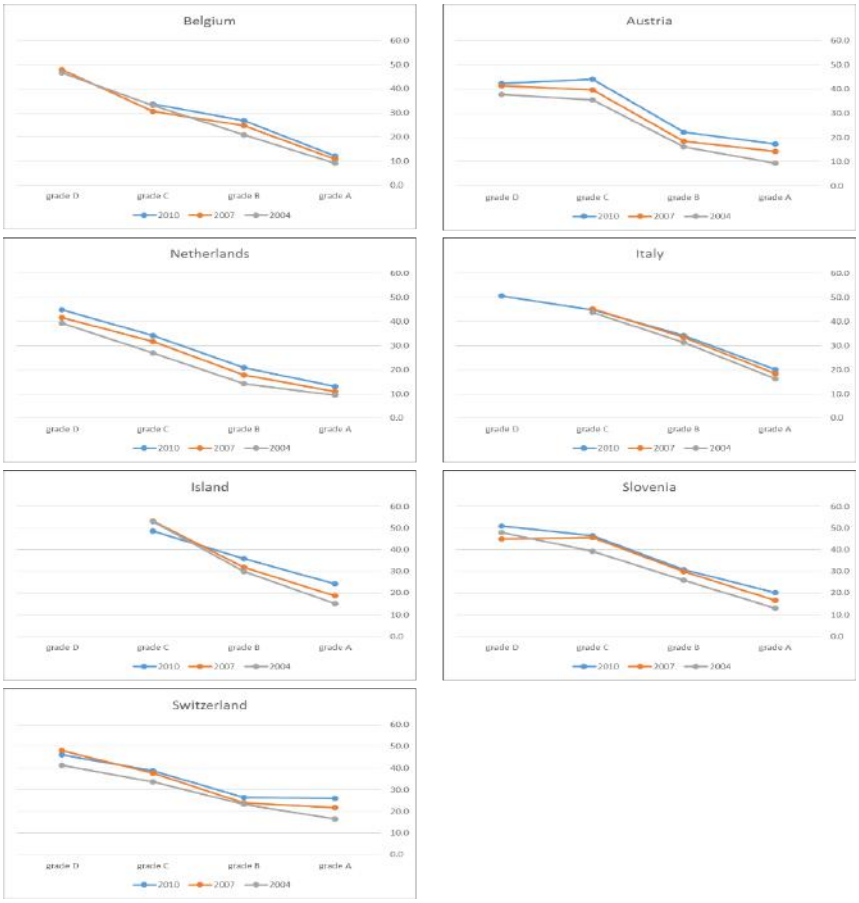
Table 4 and Figure 1 summarize some data from She Figures reports (Eu, 2013, 2010 and 2007) about men and women employed in different academic positions in the countries involved in the Garcia project.

Among grade A the presence of women has markedly increased in Switzerland, Iceland Slovenia and Austria. In these instances, the number of women among full professors has almost doubled between 2004 and 2010 (Figure 1 and Table 4).

According to the data shown in the She Figures 2012 (Eu, 2013), only Switzerland reached the target of 25% of women among full professors, while in Belgium and the Netherland this proportion is still below 15% (Table 4). However, the proportion of women in the top positions in Switzerland presented in the She figures research reports differs significantly by the ones reported in the Swiss chapter (included in this report) based on SEFR data (SEFR 2014). According to the Swiss chapter, women in top position were only 18% in 2012 (SEFR 2014: 88), a figure below the share (25%) shown in table 4. This difference is due to the type of institutions taken into consideration: the Hautes Écoles Spécialisées are not included in the figures reported by the SEFR. By the way, both data sources show a general growth in the presence of women in the top positions of the Swiss academia.

Less clear are the trends in the numbers in grade C and D of the She Figures classification because of the heterogeneity of the positions considered in each country. The general trend shows an increase of the incidence of researchers in the lower grades on the total distribution of academic positions (Table 4). However, it is quit hard to quantify trends in the She Figures classification because specific changes in national legislation on academic careers have occurred, and data availability is often limited.

Fig1 % of women by Grades, 2004, 2007 and 2010 (see table 4)



Source: WIS DATABASE, She Figures, 2012; 2009 and 2006

Grade explanations - Academic staff (or academia) can be broken down by grades in research activity. The grades presented in this publication are based upon national mappings according to the following definitions: A: The single highest grade/post at which research is normally conducted. B: Researchers working in positions not as senior as top position (A) but more senior than newly qualified PhD holders (ISCED 6). C: The first grade/post into which a newly qualified PhD graduate would normally be recruited. D: Either postgraduate students not yet holding a PhD degree who are engaged as researchers, or researchers working in posts that do not normally require a PhD.She figures, 2012 p:87

Table 4 - Women and men in academic positions by grade.

2010	GRADE A		GRADE B		GRADE C		GRADE D			%W/TOT			
	W	M	W	M	W	M	W	M		grade A	grade B	grade C	grade D
BE	272	1963	741	2030	1918	3785			**BE**	12.2	26.7	33.6	
IT	3182	12672	5814	11141	11786	14393	9087	8855	**IT**	**20.1**	**34.3**	**45.0**	**50.6**
NL	413	2745	512	1938	1821	3504	7622	9310	**NL**	13.1	20.9	34.2	45.0
AT	381	1814	884	3098	3115	3962	5426	7418	**AT**	17.4	22.2	44.0	42.2
IS	72	225	87	156	130	137			**IS**	24.2	35.8	48.7	
CH	1974	5633	814	2275	9914	15632	1585	1844	**CH**	25.9	26.4	38.8	46.2
SI	292	1161	353	794	1281	1480	309	298	**SI**	20.1	30.8	46.4	50.9
2007	**GRADE A**		**GRADE B**		**GRADE C**		**GRADE D**			**%W/TOT**			
	W	**M**	**W**	**M**	**W**	**M**	**W**	**M**		**grade A**	**grade B**	**grade C**	**grade D**
BE	246	2047	657	1997	1475	3341	4175	4548	**BE**	10.7	24.8	30.6	47.9
IT	3631	15994	6280	12453	10658	12913			**IT**	**18.5**	**33.5**	**45.2**	
NL	318	2552	422	1938	1586	3413	6453	9050	**NL**	11.1	17.9	31.7	41.6
AT	309	1847	615	2708	2579	3930	3972	5641	**AT**	14.3	18.5	39.6	41.3
IS	44	192	74	158	128	112			**IS**	18.6	31.9	53.3	
CH	1304	4708	626	2001	7837	12997	1294	1402	**CH**	21.7	23.8	37.6	48.0
SI	214	1073	307	718	994	1182	275	336	**SI**	16.6	30.0	45.7	45.0
2004	**GRADE A**		**GRADE B**		**GRADE C**		**GRADE D**			**%W/TOT**			
	W	**M**	**W**	**M**	**W**	**M**	**W**	**M**		**grade A**	**grade B**	**grade C**	**grade D**
BE	200	2016	544	2072	2031	4104	2712	3106	**BE**	9.0	20.8	33.1	46.6
IT	2960	15111	5682	12420	9296	11933			**IT**	**16.4**	**31.4**	**43.8**	
NL	219	2108	312	1884	1203	3261	5303	8153	**NL**	9.4	14.2	26.9	39.4
AT	188	1791	470	2427	2167	3917	2034	3339	**AT**	9.5	16.2	35.6	37.9
IS	30	169	55	129	122	108			**IS**	15.1	29.9	53.0	
CH	771	3894	485	1598	6554	12861	981	1392	**CH**	16.5	23.3	33.8	41.3
SI	130	876	203	583	642	993	299	325	**SI**	12.9	25.8	39.3	47.9

Source: WIS DATABASE, She Figures, 2012; 2009 and 2006

Grade explanations - *Academic staff (or academia) can be broken down by grades in research activity. The grades presented in this publication are based u pon national mappings according to the following definitions: A: The single highest grade/post at which research is normally conducted. B: Researchers working in positions not as senior as top position (A) but more senior than newly qualified PhD holders (ISCED 6). C: The first grade/post into which a newly qualified PhD graduate would normally be recruited. D: Either postgraduate students not yet holding a PhD degree who are engaged as researchers, or researchers working in posts that do not normally require a PhD.She figures, 2012 p:87*

4. THE PROFESSIONAL SITUATION OF DOCTORATE HOLDERS

The structure of labour markets and the organization of research systems have undergone significant changes, which contribute to traditional linear research career paths, paying the way to a more diverse range of career experiences (Auriol et al 2013).

Overall, PhD holders face lower risk of being unemployed or out of the labour market when compared with the other workers with lower levels of education.

Within the academic system, tenured positions have declined in importance in comparison to temporary ones (Auriol, 2010; Auriol et al, 2013). Generally speaking, in all countries investigated, the younger generation of PhD holders is more often employed in temporary research positions than the older generations.

The growth of the overall amount of PhD holders, rise the question on whether innovation systems are mature enough to create research positions that fully capitalize on the skills of the doctorate population (Auriol et. al, 2013). According to the CDH data available, in Belgium, the Netherlands and Slovenia almost 60% of doctorate holders worked as researchers in 2009. In Austria this share was 57% in 2006. Overall, natural scientists and engineers are those who are more likely to be engaged in research, while social scientists find more opportunities in non-research occupations (Auriol et al. 2013).

In most countries, The main sector of employment for doctorate holders working as researchers are the higher education and the business enterprise sector. Differently from other type of specialization, researchers with doctoral degrees in the natural sciences or in engineering and technology have more chances to work in the private sector. In Belgium, the Netherlands, the business enterprise sector employs a large share of doctorate holders especially from the natural science or engineering as researchers (Auriol, 2010; Auriol et al. 2013).

5. WOMEN DISADVANTAGES IN RESEARCH CAREERS

National chapters shows that female PhD holders are systematically disadvantaged when compared with male PhD graduates. These disadvantages can be summarized as follows:

- Higher risk of being unemployed or being employed in fixed term and part-time positions. On the one side, work instability is one of the main reasons motivating the decision to leave a scientific career (UPGEM, 2008). On the other side, part-time is often an obstacle for career advancement in highly competitive sectors such as the scientific research.
- Lower chances to perform research and development activities in their job or to be employed as researchers. This result is probably related to the field of specialization and to the higher presence of women among PhD graduates in the Humanities and the Social Sciences, who are more often engaged in non-research positions. An analysis of the composition of researchers by sex based on Eurostat data shows that women accounted only for 33% of the EU-28's workforce in 2012, three percentage points more than in 2003 (Eurostat, 2015). Countries involved in Garcia project show share of women researchers in line with the European average. The only exceptions are the Netherlands and Austria where women account only for respectively 24.1% and 29% of the overall amount of researchers. Differently from other European countries (Latvia,

Lithuania, Bulgaria, and Croatia), the current situation is still far to the parity between man and women[43].

- Lower average wages. All national chapters highlight the presence of a gender pay gap among PhD holders. Women earn considerably less than their male colleagues independently by the type of job (research/non-research job). In some countries, women disadvantages are partially explained by their higher presence in part-time positions (the Netherlands, Belgium Switzerland). In other cases (Italy) gender pay gap remains independently from the field of specialization and controlling for part-time job (Istat 2010; 2015). Among those who have a research position, the gender pay gap is wider in the private sector, and is significant especially in the business enterprise sector. With reference to the field of doctorate degree the payment gap is larger in Engineering and Technology, Medical Sciences and Social Sciences (Auriol et al, 2013).

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9. Researchers in early career stages: some learnings from/and on the web survey

By Rossella Bozzon and Nathan Gurnet

1. INTRODUCTION

This chapter summarizes some of the results that emerged from a web survey conducted with postdocs and researchers in early careers stages who worked or are working in Garcia's beneficiary departments. More precisely, the survey was addressed to a population composed by researchers who are currently working at or who worked between January 1st, 2010 and December 31st, 2014 in the selected departments of Garcia's beneficiary institutions with a post-doc or a fixed term research positon. The questionnaire covered several issues – such as their PhD experience; their job experience in the Garcia's departments; their current working conditions and work-life balance; their levels of job satisfaction, mobility and publications; their future perspectives; as well as health issues and socio-demographic information (see Appendix).

The main aim of the survey was to gain deeper insights on current employment conditions of those researchers who worked with a temporary position in a Garcia beneficiary department up to December 31st, 2014 and is currently employed elsewhere - a "target population" we labelled "Movers". With regard to this specific target population, we distinguished the researchers who are still carrying on their scientific career from those who started a new professional path**. As a side task**, we also explored some aspects (in particular, work-life balance, job satisfaction and future perspectives) in relation to those researchers that are currently working within Garcia beneficiary departments.

Implementing this research exercise provided an interesting challenge for all the organizations/institutions involved in the Garcia project. Several critical issues and organizational limits emerged along the way, in particular in relation to our capability to access crucial information to identify our target population of Movers as well as to contact them.

The very identification of the Movers revealed to be one of the most challenging aspects of this research exercise. In this regard, the main difficulties came from the overall lack of systematic information on both the numbers and the composition of some types of temporary research positions. In turn, such lack flows directly from the extreme fluidity/instability of some types of contracts as well as from the fact that most of them are not considered tantamount to university staff contracts because they are financed through external funds. Thus, the identification of Movers was particularly problematic in those case studies, such as the Swiss and the Belgian one, that are characterized by big research institutions, with a high number of research projects and high personnel turnover, such as those in the Swiss and the Belgian case studies. Conversely, for the Dutch and the Italian case studies, we were able to obtain a suitable level of information on the composition of the

target population. More in general, it is worth noticing that the problems we encountered in identifying Movers do mirror the broader difficulties to obtain suitable national-level statistics on the early stages of scientific careers that are highlighted also in other chapters in this volume.

However, even in those cases in which suitable information on the target population was available, **we experienced severe difficulties in contacting possible respondents.** In the first place, an institutional email address was rarely available to reach those researchers who left the Garcia's institutions. Secondly, because of privacy issues, contacts with members of the target population had to be often brokered by administrative offices. In general, these aspects have strongly influenced the data collection phase, thus reducing our possibility to freely conduct and monitor the data collection process as well as to manage possible resistances to fill out the questionnaire. In fact, we obtained better results in those institutions where some colleagues provided a formal or informal support to the collection of data, for example by sending out invitation email to possible respondents. In some cases, this was the only way to involve Movers in the data collection.

Further problems emerged in connection with the dimension of the departments involved in the survey. In the case of small departments, many of the researchers who received the email invitation to the survey had already been interviewed during other Garcia research activities carried out in the same period. For this reason, many of them perceived the survey as a repetition of the interview as was reluctant to fill it out. Conversely, in larger institutions, the survey provided a way to involve within the project a wider range of post-docs and temporary researchers and to find new volunteers for other Garcia's research activities.

We opened the data collection phase at the end of January 2015 and we closed it at the end of March 2015. We sent an invitation email and four official reminders.

Overall, we gathered 336 questionnaires. However, only the 90.8% (305) of these respondents have completed the whole questionnaire (Table 1).

The overall response rate (% of responses divided by the number of sent emails) is 27.5% but this proportion varies significantly across the institutions involved in the survey (see Table 2). In the case of the Dutch, Icelandic and Slovenian case studies, these variations in the response rate are mainly due to the small number of possible respondents.

In due consideration of the restricted number of observations as well as of some problems in the evaluation of the consistency of the sample, we are still in the process of assessing the quality of the data we collected. For this reason, this report presents only some descriptive results on the current job position of Movers and on the relation between work-life balance and parenthood of persons who are working in Garcia's beneficiary departments.

Table 1: Number of questionnaires by department and profile

	Working in Garcia Institutions			Movers			Total		
	SSH	STEM	Total	SSH	STEM	Total	SSH	STEM	Total
UNITN	18	27	45	9	14	23	27	41	68
UCL	23	32	55	5	7	12	28	39	67
Radboud University Nijmegen	9	6	15	5	3	8	14	9	23
UNIL	31	65	96	9	33	42	40	98	138
Fran Ramovš Institute of the Slovenian Language/ University Ljubljana	10	10	20	1	4	5	11	14	25
University of Iceland	4	10	14		1	1	4	11	15
Total	***95***	***150***	***245***	***29***	***62***	***91***	***124***	***212***	***336***
Completed Questionnaires			*224*			*81*			***305***
% of completed Questionnaires			91.4			89.0			90.8

Source: Garcia web-survey

Table 2: N. of sent email and response rate

	N. of email				Reponse rate		
	SSH	STEM	Total	Delivery Failed	SSH	STEM	Total
UNITN	37	102	139	9	78,4	41,2	48.9
UCL	174	285	459	64	16,1	13,7	14.6
Radboud University Nijmegen			84	2			27.4
UNIL			406	2			34.0
Fran Ramovš Institute of the Slovenian Language	21	38	59	1	52,4	36,8	42.4
University of Iceland	32	44	76	2	12,5	25,0	19.7
Total			**1223**				27.5

Source: Garcia web-survey

1. SOME DESCRIPTIVE STATISTICS ON MOVERS

Overall, 81 researchers who worked between January 1st, 2010 and December 31st, 2014 in the Departments involved in the Garcia project (i.e. "Movers") took part to the survey. Out of these, 60 currently have a research position in other institutions, 17 have left their research career (we label these individuals "Leavers"), and 9 are still looking for a job. Given these small numbers, we cannot pursue our original research tasks, i.e., to produce separate analyses on "Movers" for each Garcia's institution and to understand if and how some personal and career characteristics work differently for men and women. However, we can still present some descriptive results about possible similarities and differences between Movers who still hold a research position and "Leavers" (Table 3).

Table 3: Distribution of movers by type of Garcia department

	Garcia department		
	SSH	STEM	TOTAL
Still in research	19	39	58
Leavers	6	10	16
Unemployed	2	7	9
Total	27	56	83

Source: Garcia web-survey

Table 3 shows that, in relative terms, the proportion of Leavers seems to be higher among the respondents who worked in a SSH department in comparison to those who worked in a STEM one (Table 3). Also, there are not relevant differences between men and women in their propensity to leave their scientific career (Table 4). The mean age when they left their Garcia's department was 34.5 (Table 5).

Table 4: Distribution of movers by profile and sex

	Sex		
	Men	Women	TOTAL
Still in research	29	28	57
Leavers	8	7	15
Unemployed	2	7	9
Total	39	42	81

Source: Garcia web-survey

Table 5: Distribution of movers by age when they left their Garcia department

	Age		
	Mean	Median	TOTAL
Still in research	34.3	34	57
Leavers	34.3	33	16
Unemployed	35.0	35	9
Total	34.4	34	81

Source: Garcia web-survey

The majority of Movers who maintain a research position is working at university or in a higher education institution, 45 out of 59, while only 6 are working in the private sector. Interestingly, only those who worked in a STEM department are employed in a research centre in the public sector different from University or in the private sector (Table 6).

As far as the current positions hold by Leavers, a difference emerges between men and women in terms of work sector. While men are primarily employed in the business enterprise sector, women are still working at the University or in the higher education

sector, even if without a research positon (Table 7). In these cases, women are often employed as project manager or as teachers.

Finally, looking at the type of work contracts, the job positions occupied by Leavers are slightly more stable than those of other Movers: 1 out of 2 Leavers has a permanent position while this ratio is 2 out of every 5 for those who still hold a research position (Table 8).

Chances of becoming a Leaver seem to be related to some personal characteristics. More in particular, choosing a non-research position is more frequent among researches with weaker family constraints such as singles and childless people (Table 9). Indeed, among movers holding a work position, 3 out of 10 singles and 2.5 out of 10 childless researchers are Leavers; whereas it is the case respectively of only 2 out of 10 movers with a partner and 1.4 out of 10 movers with children (Figure 1).

Table 6: Movers by current job position and Garcia department

	Garcia department		
	SSH	**STEM**	**TOTAL**
Still in research			
- research or teaching position at University or in higher education	17	26	43
- research position in a research center or R&D office in the public (Government) sector (different from University)	1	7	8
- research position in a research center or R&D office in the private sector	0	6	6
Leavers (Non research position)			
business enterprise sector	2	3	5
private non-profit sector	1	1	2
government sector	1	2	3
higher education sector/University	2	4	6
Other	1	1	2

Source: Garcia web-survey

Table 7: Movers by current job position and sex

	Sex		
	Men	Women	TOTAL
Still in research			
- research or teaching position at University or in higher education	20	22	42
- research position in a research center or R&D office in the public (Government) sector (different from University)	5	3	8
- research position in a research center or R&D office in the private sector	3	3	6
Leavers (Non research position)			
business enterprise sector	4	1	5
private non-profit sector	1	1	2
government sector	2	1	3
higher education sector/University	1	5	6
Other	1	1	2

Source: Garcia web-survey

Table 8: Mover by current type of contract

	Still in research (N=56)	Leavers (N=17)
Permanent/tenure track	24	9
Temporary	32	5
Freelance/consultants		3
Full time	49	12
Part-time	6	4
Does not apply	2	1

Source: Garcia web-survey

Table 9: Distribution of movers by profile and the presence of a partner

	Having a partner		
	No	Yes	TOTAL
Still in research	12	45	57
Levers	5	10	15
Unemployed	4	5	9
Total	*21*	*60*	*81*

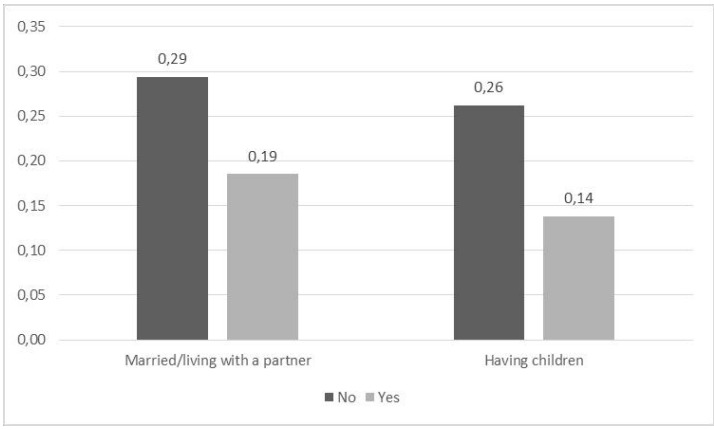
Source: Garcia web-survey

Table 10: Distribution of movers by profile and the presence of children

	Having children		
	Childless	With children	TOTAL
Still in research	31	26	57
Levers	11	4	15
Unemployed	7	2	9
Total	*49*	*32*	*81*

Source: Garcia web-survey

Figure 1 - Proportion of leavers for movers singles or married/living with a partner, and for movers with children or childless



Source: Garcia web-survey
Note: Unemployed not included.

If we take into account the levels of satisfaction for past job experiences within the Garcia's Departments, we notice another possible reason underpinning the decision to leave the research sector. Indeed, individuals who shows an overall low/medium level of satisfaction (0.28) are more often employed in a non-research position in comparison to those who declared a high level of satisfaction (0.18) for the research experience in the Garcia departments (Table 11).

Thus, if we further specify levels of satisfaction in relation to specific job features, we notice that the proportion of leavers is higher among those who declared to hold low/medium levels of satisfaction for their salary, job security, the opportunity of advancement, and their relationship with the post-doc supervisor during that period.

Table 11. Proportion of leavers among who has low/medium levels of satisfaction and high levels of satisfaction about their previous experiences in the Garcia institutions

	Proportions of "Leavers"						
	Salary*	Benefits	Job security*	Job location	Working conditions	Opportunities of advancement*	Intellectual challenge
Level of satisfaction:							
Low/medium	**0,31**	0,24	**0,24**	0,27	0,18	**0,24**	0,20
High	0,16	0,18	0,08	0,20	0,23	0,12	0,22
	Level of responsability*	Degree of indipendence	Contribution to society	Relationship with supervisor*	relationship with colleagues	nature of the supervision	overall level of satisfaction
Level of satisfaction:							
Low/medium	0,15	0,17	0,24	**0,28**	0,19	0,19	**0,28**
High	**0,24**	0,23	0,19	0,18	0,22	0,24	0,18

Source: Garcia web-survey

Note: the * means that the differences between low/medium level of satisfaction and High level of satisfaction are significant
On a range from 1= very dissatisfied and 5= very satisfied, "Low/medium level" of satisfaction is the sum of 1+2+3,
and High level of satisfaction is the sum of 4+5.

Turning to the exploration of motivations underpinning the decision to leave their scientific careers, the great majority of Leavers considers as very relevant the lack of unclear long term prospects (15 out of 17) as well as the lack of job opportunities in the research field (11 out of 17) (Table 12). In this sense, such results further strengthen the relevance of elements, such as job instability and the lack of long-term career perspectives, that have already been highlighted by previous researches on the leaky pipeline process in the academic careers (MORE2 2013, Toscano et al. 2014; Ajello et al. 2008).

Table 12: Why have they left their research career? (only Leavers, n=17)

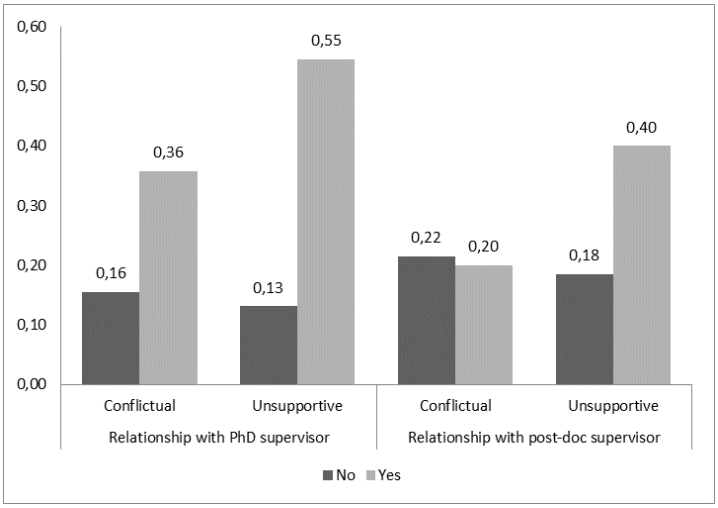
1= not relevant at all 5= very relevant	1	2	3	4	5		**Mean**
I was no longer interested in research	7	3	1	3	3		**2.5**
There were no job opportunities in research	2	0	4	3	8		**3.9**
Low remuneration	6	1	8	0	2		**2.5**
Poor working conditions	5	1	7	2	2		**2.7**
Unclear long term career prospect	1	0	1	5	10		**4.4**
Interpersonal conflict with colleagues/research team	12	1	2	1	1		**1.7**
Competitive environment	6	3	1	3	4		**2.8**
Personal issues	12	2	1	2	0		**1.6**
Health issues	15	1	1	0	0		**1.2**

Source: Garcia web-survey

Conversely, our results suggests that our respondents do not consider the difficulties connected to their personal life, health and dissatisfied job relationships as relevant reasons affecting their work-related choice (Table 12). However, a deeper exploration of data partially contradict the results about the relevance of job relations. More precisely, if we analyse the correlation between the quality of the relationship Movers had with the PhD and post-doc supervisors, having a non-research position seems to be connected with past experiences of unsupportive relationships with these reference persons. Indeed, among those who defined these relationships as “unsupportive” we can find a higher share of Leavers (Figure 2).

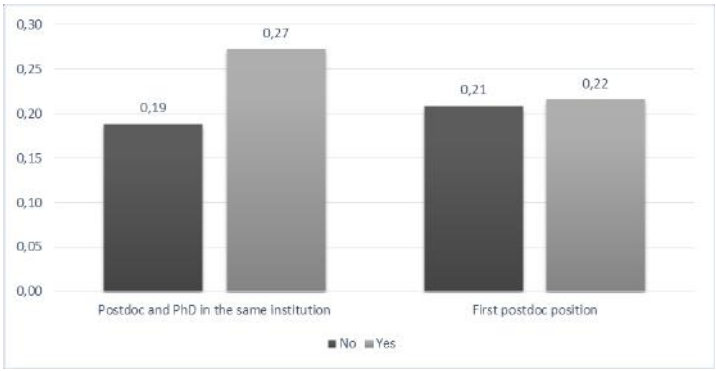
Finally, we have considered how two indicators on the quality of the research career are associated with a current non-research position. The first indicator considers having spent both doctoral and post-doctoral experiences in the same institution as a proxy of geographic mobility, which in turn is a crucial requirement for a successful scientific career. The second indicator considers if the period spent in the Garcia department was the first postdoc position as a proxy of the academic age. Figure 2 suggests that among those who did their PhD and postdoc in the same institution, and hence have low level of geographic mobility, there is a higher share of leavers. No differences seems to be connected to the number of postdoc positions occupied.

Figure 2 - Proportion of leavers by type of relationships with PhD and Postdoc supervisor



Source: Garcia web-survey

Figure 3 - Proportion of leavers by mobility and career indicators



Source: Garcia web-survey

2. WORK-LIFE BALANCE, GENDER AND PARENTHOOD

As displays in Table 13, the database is composed of 44% of men and 56% of women. Whatever the gender, nearly 50% of the individuals have at least one child at charge. Overall, leavers and movers have the same propensity of being parent.

Table 13: Gender and parenthood distribution of the sample

	Working in GARCIA institution	Movers/leavers	Total
Men with no children	50	21	71
Fathers	46	18	64
Women with no children	83	28	111
Mothers	43	14	57
	222	81	303

Source: Garcia web-survey

Concerning childbirth, as assessed by Table 14, most are made after the holding of the post-doctoral position or during the current position[44]. Less than one quarter of the births happened during or before the completion of the Ph.D.

Table 14: Percentage of childbirth following the following life periods:

Birth happened…	Before PhD	During PhD	After PhD	during Post-doc	after Post-Doc	during current position
Researchers in GARCIA (n=88)	0,13*	0,25	0,00*	0,00	0,73***	0,27***
Movers (n=32)	0,03*	0,22	0,19*	0,09	0,03***	0,94***

Source: Garcia web-survey. Legend : *sig<0.05 **sig<0.01 *** sig<0.001

Previous researches have shown that the combined factor of parenthood and gender could play a preeminent role on the interference between professional and personal lives and the benefit that the actor can possibly win. While women are playing a zero-sum-game on both (personal and professional) plans, men are playing a positive-sum-game mainly focusing on the professional sphere (Fusulier and Carral 2012). That study pointed out that we could not only study inequalities at work while letting private life apart.

In order to measure the connections between both spheres, we used a 17-items scale(Fisher et al. 2009) reduced into 10-items scales[45]. This scale is inititially composed by 4 sub-scales: Personal Life Interferes with Work, Work Interferes with Personal Life, Personal Life enhances Work, Work enhances Personal Life. We shortened those 4 subscales into two subscales:

- Personal life and work environment are negatively interfering each other
- Personal life and work environment are enhancing each other

For pragmatic reasons, only the researchers still working in the GARCIA departments answered to that set of questions. Initially, each scale ranged from 0(no interfering, no enhancing) to 5

[44] It then means after the referral period which is between 2010 and 2013.

[45] Dropped items are number 2, 3, 6, 8, 11, 13 & 16. See annexes for validation analysis.

(great interfering, enhancing). As we kept in the analysis, only a sum of the interfering subscales and the enhancing subscales, the range of those goes from 0 to 10. We can then notice in Table 15 that overall, researchers working in the GARCIA departments tend to have an higher score of personal life and work environment enhancing each other than an interference between both. However, if we cannot detect great differences on the interfering scores among gender, we can clearly identify differences among parenthood.

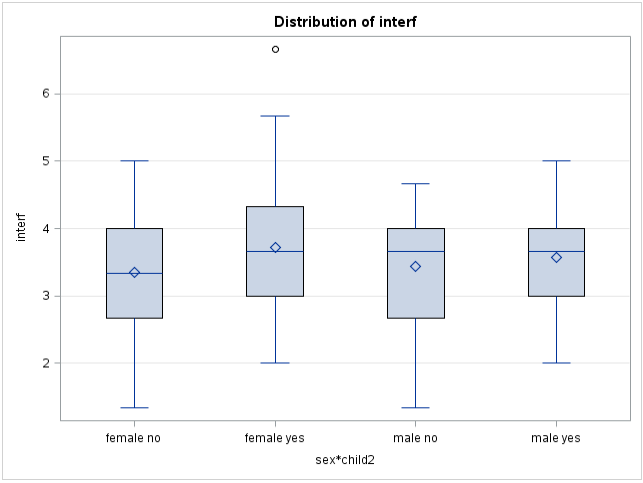
Table 15: Interfering and Enhancing scores by gender and parenthood.

	Gender		Parenthood	
	Male (n=136)	Female (n=169)	Yes (n=121)	No (n=182)
Interfering score	3,51	3,47	3,64	3,39
Enhancing score	5,35	5,9	5,61	5,69

Source: Garcia web-survey

In order to measure that phenomenon, we ran a covariance pattern model where we explained the interfering score with a crossed-term of gender and parenthood and taking into account the academic age of the respondents.

The result is lackluster. The p-value of the overall model is at 0.097 which means that we are slightly above the common admitted threshold (which is 0.05). Concerning the contribution to the model, only the parenthood variable have a significant p-value which means that, if we can identify differences among gender, those differences are not strong enough to be generalized to the whole population.



It seems then that a hierarchy point out, concerning the work-life balance and more precisely the negative interfering between both. Mothers are the most affected by the interference, followed by the fathers, women without children and the least affected are the men without children. Inferentially, only the distinction between parents and non-parents is valid.

3. CONCLUSION

In this chapter, we described the Garcia web-survey, a research exercise that we implemented in order to explore and measure the current job position of individuals who worked with unstable research positions in the departments involved in the Garcia project.

Quite interestingly, the main result of this research exercise is our increased and critical knowledge about the difficulties and the challenges connected to the actual implementation of the data collection phase. During this research activity, we learned a lot about how the organizations involved manage their relation with postdocs and temporary researchers. Overall, it was very difficult, and sometimes almost impossible, to get a reliable estimate of the number as well as of the sociodemographic composition of the group of researchers employed with fixed-term contracts between 2010 and 2014, let alone to contact them directly. These lacks constrained our possibilities to manage directly and monitor the data collection process and, ultimately, affected our possibility to map high-quality data.

Despite these limitations, the descriptive results on Movers we illustrated in this chapter support evidences highlighted by other researches on how uncertainties connected to these job positions, the lack of long-term perspectives and unsupportive relations with PhD and postdoc supervisors seem foster the decision to leave research.

On the other hand, when the persons are still in the process of research inside the departments from the GARCIA project, men and women do not hold the pressure put by the greedy institution between personal and working lives the same way. From this sight, parenthood seems to hold a major role. While there is no significant difference among gender concerning the interference between personal life and work, it becomes significant when researchers becomes also parent. Each time, women feel a higher sentiment of interference between personal life and work than men. If the result from the web-survey is quite feeble, we can guess it might be one of the components of the leaky pipeline phenomenon.

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5. APPENDIX – WEB SURVEY QUESTIONNAIRE

MODULE 1 - PhD

M1_1 Do you hold a PhD degree?
1. Yes
2. I am currently a PhD student
3. No

M1_2A When did you start your PhD? year_____

M1_2B When did you finish your PhD? year_____

M1_3 In which country did you get/are you doing your PhD?

M1_4 In which field of science have you led your PhD research?

M1_5 Were/are you financially supported during your Ph.D.? If yes, please mention your main financial support.
1. Fellowship, scholarship or salary from an institution from the country of your Ph.D. certification
2. Fellowship, scholarship from abroad
3. Teaching and/or assistantship
4. Income from employment other than teaching or research
5. Private/Employer reimbursement or assistance
6. Loan, personal savings, support from spouse, partner or family
7. Unemployment benefits
8. Other
9. No financial support

M1_6 Deciding to do a Ph.D. research was:
a. At the suggestion of your Ph.D. supervisor **Yes/No**
b. Developed during a contractual research project **Yes/No**
c. At the suggestion of a company **Yes/No**
d. Other. Please specify **Yes/No**

M1_7 Did/does your PhD research involve:

		Never	Rarely	Somewhat	Often	Mostly
a.	Theoretical work	1	2	3	4	5
b.	Courses attendance	1	2	3	4	5
c.	Teaching	1	2	3	4	5
d.	Field work	1	2	3	4	5
e.	Laboratory work	1	2	3	4	5
f.	Working with a company	1	2	3	4	5

M1_8 Your main PhD thesis supervisor/promotor is/was:
1. Male
2. Female

M1_9 Overall, how would you describe your relationship with your Ph.D. supervisor?
1. Friendly & supportive
2. Friendly & unsupportive
3. Conflictual & supportive
4. Conflictual & unsupportive
5. No relationship (very few contacts) & supportive
6. No relationship (very few contacts) & unsupportive

M1_10 Overall, how would you describe your relationship with your colleagues at the Phd institution?
1. Friendly & supportive
2. Friendly & unsupportive
3. Conflictual & supportive
4. Conflictual & unsupportive
5. No relationship (very few contacts) & supportive
6. No relationship (very few contacts) & unsupportive

M1_11 At the end of that period, were you considering a scientific career? Please rate your consideration on a scale on a 5-point scale:

1 Not at all considering
2
3
4
5 Fully considering

M1_12 How much has your relationship with your PhD supervisor influenced your scientific prospects?

1. Not at all
2. Slightly
3. Somewhat
4. Moderately
5. Extremely

CROSSROAD 1 – Select who is currently working in Garcia Institutions

C1_1 Are you **currently** working with a research position in one of the following institutions?

1	University of Trento
2	Université catholique de Louvain
3	Radboud University Nijmegen
4	Université de Lausanne
5	Fran Ramovš Institute of the Slovenian Language
6	University Ljubljana
7	University of Iceland
8	No, I am not currently working in those institutions -> **Go to Crossroad 2**

C1_2 - In which department/faculty are you currently working at #Institution#

C1_3 Your current position is? (List of the possible positions) **Go to PROFILE 1**

CROSSROAD 2 – Movers

C2_1 -Between 01/01/2010 and 31/12/2014, did you hold: - a post-doc or an equivalent temporary research position or- a tenure track position or- the first permanent academic position in one of the following institutions?

1	University of Trento
2	Université catholique de Louvain
3	Radboud University Nijmegen
4	Université de Lausanne
5	Fran Ramovš Institute of the Slovenian Language
6	University Ljubljana
7	University of Iceland
8	No, I am not currently working in those institutions -> exit: thank you for your time!

C2_2 In which department/faculty did you work at #Institutio#

C2_3 Your position was? (List of the possible positions)

MODULE 2 - Only movers - Research position between 1/1/2010-31/12/2013 in Garcia institution

M2 When did you START and END that research position?
Start: year_____
End: year_____

M2_1 Your position/contract was….

1. Permanent
2. Temporary
3. Does not apply

M2_2 Your position/contract was….
1. Full-Time
2. Part-Time → **M2_3** how many hours a week according to the contract? _____
3. Does not apply

M2_4 Did your contract include teaching duties? **Yes/No**

M2_5 Was it a tenure track position? **Yes/No**

M2_6 Did you get your PhD in the same institution? **Yes/No**

M2_7 Was it your first post-doc position? **Yes/No**

M2_8 How many postdoc research positions did you have before?

M2_9 How did you hear of that research position?

a.	Public advertising	**Yes/No**
b.	Previous colleagues	**Yes/No**
c.	Professional network	**Yes/No**
d.	Ph.D. supervisor	**Yes/No**
e.	Relatives/acquaintances	**Yes/No**
f.	Other *[Please specify : 40 characters]*	**Yes/No**

M2_10 In which scientific field did you do most of that research?

M2_11 What were the reasons you took that research position? Please rate the following items on a scale from 1 (not relevant at all) to 5 (very relevant)?

		Not relevant at all				**Very relevant**
a.	Additional specialization in your research field	1	2	3	4	5
b.	International experience	1	2	3	4	5
c.	Opportunity to carry out research independently	1	2	3	4	5
d.	Work with a specific person or research team	1	2	3	4	5
e.	Opportunity to undertake teaching activities	1	2	3	4	5
f.	Other employment opportunities not available	1	2	3	4	5
g.	This position is generally expected for a career in this field	1	2	3	4	5
h.	Flexibility of the position/autonomy	1	2	3	4	5
i.	Work in a specific institution					5
j.	Wok on a specific topic					5
k.	A specialization in a new research field					5
l.	Other (please specify)	1	2	3	4	5

M2_12 Was your research supervisor a…
1. male
2. female
3. I do not have a supervisor *[Skip next question]*

M2_13 Overall, how would you describe your relationship with your research supervisor?
a. Friendly & supportive
b. Friendly & unsupportive
c. Conflictual & supportive
d. Conflictual & unsupportive
e. No relationship (very few contacts) & supportive
f. No relationship (very few contacts) & unsupportive

M2_14 Overall, how would you describe your relationship with your colleagues/research team in this institution?
a. Friendly & supportive
b. Friendly & unsupportive
c. Conflictual & supportive
d. Conflictual & unsupportive
e. No relationship (very few contacts) & supportive
f. No relationship (very few contacts) & unsupportive

M2_15 Did that research activity involve on a 5-points scale:

		Never	Rarely	Somewhat	Often	Mostly
a.	Theoretical work	1	2	3	4	5
b.	Field work	1	2	3	4	5
c.	Laboratory work	1	2	3	4	5
d.	Working with companies	1	2	3	4	5
e.	Project management	1	2	3	4	5
f.	Administrative duties	1	2	3	4	5
g.	Teaching activities	1	2	3	4	5
h.	Other. Please specify:	1	2	3	4	5

M2_16 Please rate your satisfaction with that job:

		Very dissatisfied				Very s atisfied
a.	Salary	1	2	3	4	5
b.	Benefits	1	2	3	4	5
c.	Job security	1	2	3	4	5
d.	Job location	1	2	3	4	5
e.	Working conditions	1	2	3	4	5
f.	Opportunity of advancement	1	2	3	4	5
g.	Intellectual challenge	1	2	3	4	5
h.	Level of responsibility	1	2	3	4	5
i.	Degree of independence	1	2	3	4	5
j.	Contribution to society	1	2	3	4	5
k.	Relationship with superior/supervisor	1	2	3	4	5
l.	Relationship with colleagues	1	2	3	4	5
m.	Nature of the supervision/help from your senior					
n.	Overall level of satisfaction with that job	1	2	3	4	5

M2_17 How satisfied were you with the balance between the time you spend on your paid work and the time you spend on other aspects of your life in that period?
1=very satisfied
2
3
4
5=very dissatisfied

M2_18 Did you have other **paid jobs** during that period? **Yes/No**

M2_19 If Yes, how many other paid jobs?_____

M2_20 Please estimate the average number of hours you usually worked during a typical week in that period. ___ **[hours]**

M2_21 At the end of that period, were you considering a scientific career? Please rate your consideration on a 5-points scale:
1 Not at all considering
2
3
4
5 Fully considering

CROSSROAD 3: MOVERS -> Current position

C3_1 What is your current employment status?
□ Employed -> Go on to next question
□ Unemploye or Inactive -> Go to **Profile 3**

C3_2 What is your main job?
You hold a :
1. **Research or teaching position** at a University or in higher education **[Go to Profile 1]**
2. **Research position** in a Research center or R&D office in the public (Government) sector (different from University) **[Go to Profile 1]**

3. **Research position** in a Research center or R&D office in the private sector **[Go to profile 1]**

Or you hold a non-research position in:

4. □ Business enterprise sector **[Go to Profile 2]**
5. □ Private non-profit sector **[Go to Profile 2]**
6. □ Government sector **[Go to Profile 2]**
7. □ Higher education sector/University **[Go to Profile 2]**
8. □ Other education sector **[Go to Profile 2]**
9. □ Other **[Please specify: (open field w/ 40 characters?)]** **[Go to Profile 2]**

C3_3

For C3_2==1 or 2(research position at university or public research center)

Are you:

1. Full professor
2. Associate professor
3. Assistant professor
4. Post-doc
5. Other positions_ please specify_____-

For C3_2==3

Are you:

1 Self-employed with employees
2 Self-employed without employees
3 Freelance/consultant
4 Employee
6 Other. Please specified

C3_4 Can you please enter the exact title of your position?

C3_5 When did you start this position?

C3_6 In which country are you currently working?

MODULE 3 – Current position

PROFILE 1 - People who are currently working as researcher at University or in a research center

P1_1 Your current position/contract is:

1. Permanent
2. Temporary
3. Does not apply

P1_2 Your current position/contract is:

1. Full time (skip next question)
2. Part time
3. Does not apply

P1_3 How many hours a week according to the contract?

P1_4 Does your contract include teaching duties?

1. Yes
2. No
3. Does not apply

P1_5 Is it a tenure track position?

1. Yes
2. No
3. Does not apply

P1_6 Did you get your Ph.D. in the same institution where you are currently working?

1. Yes
2. No
3. Does not apply

P1_7 Is it your first post-doc position?

1. Yes (skip next question)
2. No
3. Does not apply

P1_8 How many post-doc research positions did you have before?

P1_9 How did you hear of this position?

a.	Public advertising	**Yes/No**
b.	Previous colleagues	**Yes/No**
c.	Professional network	**Yes/No**
d.	PhD supervisor	**Yes/No**
e.	Relatives/ acquaintances	**Yes/No**
f.	Other **[Please specify : 40 characters]**	**Yes/No**

P1_10 In which scientific field do you conduct your research?

P1_11 What are the reasons why you took this position? Please rate the following items on a scale from 1 (not relevant at all) to 5 (very relevant)?

		Not relevant at all				**Very relevant**
a.	Additional specialization in your research field	1	2	3	4	5
b.	International experience	1	2	3	4	5
c.	Opportunity to carry out research independently	1	2	3	4	5
d.	Work with a specific person or research team	1	2	3	4	5
e.	Opportunity to undertake teaching activities	1	2	3	4	5
f.	Other employment opportunities not available	1	2	3	4	5
g.	This position is generally expected for a career in this field	1	2	3	4	5
h.	Flexibility of the position/autonomy	1	2	3	4	5
i.	Work in a specific institution					5
j.	Wok on a specific topic					5
k.	A specialization in a new research field					5
l.	Other. Please specify:	1	2	3	4	5

P1_12 Did that research activity involve on a 5-points scale:

		Never	**Rarely**	**Somewhat**	**Often**	**Mostly**
a.	Theoretical work	1	2	3	4	5
b.	Field work	1	2	3	4	5
c.	Laboratory work	1	2	3	4	5
d.	Working with companies	1	2	3	4	5
e.	Project management	1	2	3	4	5
f.	Administrative duties	1	2	3	4	5
g.	Teaching activities	1	2	3	4	5
h.	Other. Please specify:	1	2	3	4	5

M2_13 Your research supervisor is a…

1. male
2. female
3. I do not have a supervisor [*Skip next question*]

M2_14 Overall, how would you describe your relationship with your research supervisor?

a. Friendly & supportive
b. Friendly & unsupportive
c. Conflictual & supportive
d. Conflictual & unsupportive
e. No relationship (very few contacts) & supportive
f. No relationship (very few contacts) & unsupportive

M2_14 Overall, how would you describe your relationship with your colleagues/research team in this institution?

a. Friendly & supportive
b. Friendly & unsupportive
c. Conflictual & supportive
d. Conflictual & unsupportive
e. No relationship (very few contacts) & supportive
f. No relationship (very few contacts) & unsupportive

PROFILE 2 - Leavers -> employed in a NON-RESEARCH POSITION

P2_1 Are you:

1. self-employed with employees
2. self-employed without employees
3. freelance/consultant
4. employee with a work contract of unlimited duration (permanent contract)
5. other_____

P2_2 Can you please enter the exact title of your position?

P2_3 When did you start this position?

P2_4 In which country are you currently working?

P2_5 Your current position/contract is:

1. Permanent
2. Temporary
3. Does not apply

P2_6 Your current position/contract is:

1. Full time *(Skip next question)*
2. Part time
3. Does not apply

P2_7 How many hours a week according to the contract?

P2_8a To what extent do you use the skills acquired during your PhD in your current job?

1. Not at all
2. Rarely
3. Sometimes
4. Often
5. Almost all the time

P2_8b How relevant were the following issues in your choice to leave your research career?

		Not relevant at all				Very Relevant
a.	I was no longer interested in research	1	2	3	4	5
b.	There were no job opportunities in research	1	2	3	4	5
c.	Low remuneration	1	2	3	4	5
d.	Poor working conditions	1	2	3	4	5
e.	Unclear long term career prospects	1	2	3	4	5
f.	Interpersonal conflict with colleagues/research team	1	2	3	4	5
g.	Competitive environment	1	2	3	4	5
h.	Personal issue	1	2	3	4	5
i.	Health issue	1	2	3	4	5
j.	Other. Please specify:					

P2_9 How much has your relationship with your supervisor/superior influenced your decision to leave your scientific career?

1. Not at all
2. Slightly
3. Somewhat
4. Moderately
5. Extremely

P2_5 Are you considering changing your current job for a research career in the next three years?

1 Fully not considering
2
3
4
5 Fully considering

PROFILE 1 & PROFILE 2 - Job satisfaction

P12_1 Please rate your satisfaction with that job:

		Very dissatisfied				Very satisfied
a.	Salary	1	2	3	4	5
b.	Benefits	1	2	3	4	5
c.	Job security	1	2	3	4	5
d.	Job location	1	2	3	4	5
e.	Working conditions	1	2	3	4	5
f.	Opportunity of advancement	1	2	3	4	5
g.	Intellectual challenge	1	2	3	4	5
h.	Level of responsibility	1	2	3	4	5
i.	Degree of independence	1	2	3	4	5
j.	Contribution to society	1	2	3	4	5
k.	Relationship with superior/supervisor	1	2	3	4	5
l.	Relationship with colleagues	1	2	3	4	5
m.	Nature of the supervision/help from your senior					
n.	Overall level of satisfaction with that job	1	2	3	4	5

P12_ST_2 How satisfied are you with the balance between the time you spend on your paid work and the time you spend on other aspects of your life?

1=very satisfied
2
3
4
5=very dissatisfied

P12_2 Do you have other **paid jobs** during that period? **Yes/No**

P12_3 If Yes, how many other paid jobs?

P12_4 Please estimate the average number of hours you usually work in a typical week.

WORK-LIFE BALANCE - ONLY FOR WHO IS CURRENTLY WORKING IN GARCIA'S BENEFICIARY DEPARTMENTS

WLB_1 How do you feel with the following items:

		Not at all	Rarely	Sometimes	Often	Almost all of the time
a.	I come home from work too tired to do things I would like to do.	1	2	3	4	5
b.	My personal life suffers because of my work.	1	2	3	4	5
c.	I have to miss out on important personal activities due to the amount of time I spend doing work.	1	2	3	4	5
d.	My job gives me energy to pursue activities outside of work that are important to me.	1	2	3	4	5
e.	The things I do at work help me deal with personal and practical issues at home.	1	2	3	4	5

WLB_2 How do you feel with the following items:

	Not at all	Rarely	Sometimes	Often	Almost all of the time
a. My work suffers because of things that is going on in my personal life	1	2	3	4	5
b. I am too tired to be effective at work because of things I have going on in my personal life.	1	2	3	4	5
c. When I am at work, I worry about things I need to do outside work.	1	2	3	4	5
d. I am in a better mood at work because of everything I have going for me in my personal life	1	2	3	4	5
e. My personal life helps me relax and feel ready for the next day's work.	1	2	3	4	5

ST_2 Thinking about your current job, how often you feel that…

	Never	Rarely	Sometimes	Often	Very often
a. conditions at work are unpleasant or sometimes even unsafe.	1	2	3	4	5
b. your job is negatively affecting my physical or emotional wellbeing.	1	2	3	4	5
c. you have too much work to do and/or too many unreasonable deadlines.	1	2	3	4	5
d. you find it difficult to express your opinions or feelings about my job conditions to my superiors.	1	2	3	4	5
e. you feel that job pressures interfere with your family or personal life.	1	2	3	4	5
f. you have adequate control or input over your work duties.	1	2	3	4	5
g. you receive appropriate recognition or rewards for good performance.	1	2	3	4	5
h. you are able to use your skills and talents to the fullest extent at work.	1	2	3	4	5

PROFILE 1 & 2 - Futures expectations

F_1 Are you considering going on with a scientific career? Please rate your consideration on a 5-points scale:
1 Not at all considering
2
3
4
5 Fully considering

F_2 In which job are you considering to going on with your career?

a.	With my current job	Yes	No
b.	research or teaching position at University or in higher education	Yes	No
c.	research position in a research center or R&D office in the public (Government) sector (different from University)	Yes	No
d.	research position in a Research center or R&D office in the private sector	Yes	No
e.	Non-research position in the business enterprise sector	Yes	No
f.	Non-research position in the private non-profit sector	Yes	No
g.	Non research position in the Government sector	Yes	No
h.	Non research position in other education sector	Yes	No
i.	Other. Please specify:	Yes	No

PROFILE 3 –Unemployed (Only Mover)

P3_1 Have you ever worked between the end of the last research position at the <garcia insitution> and now? **Yes/No**

P3_2 How many months did you work from the end of the last research position at the <garcia insitution> and now? _ _ _ [months]

P3_3 What was your main job during these months? You held a…

1. Research or teaching position at a University or in higher education
2. Research position in a Research center or R&D office in the public (Government) sector (different from University)
3. Research position in a Research center or R&D office in the private sector

Or you held a **non-research position** in:

4. Business enterprise sector
5. Private non-profit sector
6. Government sector
7. Higher education sector/University
8. Other education sector
9. Other. Please specify:

P3_4 How long have you been unemployed? Months: _____-

P3_5 Have you received any unemployment benefits, social insurance contributions during this period? **Yes/No**

P3_6 Are you currently looking for a job? **Yes/No**

P3_7 What job are you considering? Find a

a.	**research or teaching position** at University or in higher educationr	Yes	No
b.	**research position** in a research center or R&D office in the public (Government) sector (different from University)	Yes	No
c.	**research position** in a Research center or R&D office in the private sector	Yes	No
d.	Non-research position in the business enterprise sector	Yes	No
e.	Non-research position in the private non-profit sector	Yes	No
f.	Non-research position in the Government sector	Yes	No
g.	Non-research position in other education sector/University	Yes	No
h.	Non-research position n other education sector	Yes	No
i.	Other. **Please specify:**	Yes	No
j.	Do not know	Yes	No

P3_8 Are you considering going on with a scientific career?:

1 Not at all considering
2
3
4
5 Fully considering

P3_9 In this period, do you submit projects for financial support? **Yes/No**

P3_10 How much do you agree with the following statements:

		Totally disagree				Totally agree
a.	My PhD prepared me well for jobs in the academic sector	1	2	3	4	5
b.	My PhD prepared me well for jobs in the private sector	1	2	3	4	5
c.	A PhD is an added value to the actual labour market	1	2	3	4	5
d.	My experience is too specialized for the actual labour market	1	2	3	4	5

FOR ALL: Health issues & Life satisfaction

H_1 All in all, how would you describe your state of health these days? Would you say it is

1 Very bed
2 Poor
3 Fair
4 Good
5 Very good

H_2 All things considered, how satisfied are you with your life as a whole these days?

1 Completely dissatisfied
2

3
4
5 Completely satisfied

Mobility & publications

How many times did you spend **abroad** in another university for research and/or teaching activities?

MP_1 Short stays (<1 month): _ _
MP_2 Medium stays (between 1 and 4 months): _ _
MP_3 Long stays (between 4 and 12 months): _ _
MP_4 Stays longer than 1 year:__

MP_5 Concerning those stays, did you received/use:

a. Marie-Curie fellowship **Yes/No**
b. Other International fellowship **Yes/No**
c. Other National fellowships **Yes/No**
d. Funding from research groups **Yes/No**
e. Personal resources **Yes/No**
f. Other. Please specify: **Yes/No**

MP_6 Have you ever been:

a. Member of the board of a national scientific association/research network **Yes/No**
b. Coordinator or responsible of a national scientific association/research network **Yes/No**
c. Member of the board of an international scientific association/research network **Yes/No**
d. Coordinator or responsible of a international scientific association/research network **Yes/No**
e. Featured speaker for national conference **Yes/No**
f. Featured speaker for International conference **Yes/No**

MP_4 How many publications do you have in

a. International peer-review journal articles : _ _
b. National peer-review journal articles : _ _
c. Scientific journal articles (without peer-review): _ _
d. Books _ _
e. Book-chapters:_ _

Socio-demographic information

D_1 Are you:
1. Female
2. Male

D_2 What is your year of birth?

D_3 Country of birth:

D_4 Are you currently….
1. Single -> *skip the part on partner*
2. In a relationship but not married
3. Married
4. A civil partner in a legally-recognized Civil Partnership

PARTNER:

D_5 What is the highest level of education your partner successfully completed?
1. Primary education of below
2. General secondary education
3. Vocational education and training
4. Higher education ->
5. No studies

D_6 Does s/he have a PhD?
1. Yes
2. She/He is a PhD student
3. No

D_7 What is her/his main job?
1. Research or teaching position at a University or in higher education
2. Research position in a Research center or R&D office in the public (Government) sector (different from University)
3. Research position in a Research center or R&D office in the private sector

With a **non-research position** in:
4. Business enterprise sector
5. Private non-profit sector
6. Government sector
7. Higher education sector/University
8. Other education sector
9. Other. Please specify:
10. S/He in unemployed/inactive

FOR ALL

D_8 How many persons usually live in your household?

Do you live…
D_9 With your parents? **Yes/No**
D_10 With your partner? **Yes/No**
D_11 With your children? **Yes/No**

D_12 Regarding your accommodation…
1 you own it
2 you are buying it with the help of a mortgage or loan
3 you are paying part rent and part mortgage (shared ownership)
4 you are renting it
5 you are living here rent-free (including rent-free in relative's/friend's property; excluding squatting)
6 you are squatting

D_13 Do you have children?
1. Yes
2. No *[Skip the part of children]*

CHILDREN

D_14 How many children do you have?

	Year of birth	Maternity leave	Paternity leave	Parental leave
Child 1		**Yes/No**	**Yes/No**	**Yes/No**
Child 2		**Yes/No**	**Yes/No**	**Yes/No**
Child 3		**Yes/No**	**Yes/No**	**Yes/No**
(…)		**Yes/No**	**Yes/No**	**Yes/No**
Child N…		**Yes/No**	**Yes/No**	**Yes/No**

ECONOMIC SITUATION

D_15 Which of the following descriptions comes closest to how you feel about your household's income nowadays?
1 Living comfortably on present income
2 Coping on present income
3 Finding it difficult on present income
4 Finding it very difficult on present income
5 (Don't know)

D_16 How satisfied are you with the financial situation of your household?
1 Completely dissatisfied
2
3
4
5 Completely satisfied

SOCIAL ORIGINS

D_17 What is the highest level of education your father successfully completed?

1. Primary education of below
2. General secondary education
3. Vocational education and training
4. Higher education
5. No studies

D_18 What is the highest level of education your mother successfully completed?

1. Primary education of below
2. General secondary education
3. Vocational education and training
4. Higher education
5. No studies

D_19 People sometimes describe themselves as belonging to the working class, the middle class, or the upper or lower class. Would you describe yourself as belonging to the:

1. Upper class
2. Upper middle class
3. Lower middle class
4. Working class
5. Lower class

D_20 Did/do any of your parents OR relatives (father, mother, aunt, uncle, etc.) lead a scientific career?

1. Yes
2. No

LAST PART

TEXT1 In another step of our project, we mean to lead in-depth interviews about the early stages of academic and scientific careers. Would you eventually be available for an interview in a futher time? If yes, please indicate how we can contact you. _____---

TEXT2 The questionnaire is now over. If you have any comments, please write them down here:

Thank you for your time!
GARCIA research team

Details on CROSSROAD 1 and CROSSROAD 2

Gracia institutions	**In which department/faculty did/do you work?** ***(Questions C1_2 & C2_2)***	**Your position was/is:** ***(Questions C1_3 & C2_3)***
University of Trento (Italy)	1. Department of Sociology and Social Research (DSRS) *2.* Department of Information Engineering and Computer Science (DISI)	1. Post-doc research fellow 2. Fixed term researcher (type A, type B or "Moratti") 3. Permanent assistant professor 4. Associate professor 5. Full professor 6. Research collaborator 7. Research assistant 8. Other. Please specify:
Université catholique de Louvain (Belgium)	*1. Institute for the Analysis of Change in Contemporary and Historical Societies (IACCHOS)* *2. The Earth and Life Institute (ELI)*	1. Research Associate FNRS 2. Senior research Associate 3. Director of research 4. Adjoint researcher 5. Assistant researcher 6. Engineer 7. Temporary researchers (non-PhD, ongoing PhD, postdocs) 8. Associate professor 9. Full professor *10.* Other. Please specify:
Radboud University Nijmegen (The Netherlands)	1. Institute for Management Research (IMR) 2. Institute for Mathematics, Astrophysics and Particle Physics (IMAPP)	1. Researcher (with a permanent position) 2. Lecturer (with a permanent position) 3. Researchers (with a temporary position) 4. Lecturer (with a temporary position) 5. Assistant professor (UD) (with a permanent position) 6. Assistant professor (UD) (with a temporary position) 7. Associate professor (UHD) (with a permanent position) 8. Associate professor (UHD) (with a temporary position) 9. Full professor *10.* Other. Please specify:
Université de Lausanne (Switzerland)	1. Faculty of Social and Political Sciences 2. Faculty of Biology and Medicine	1. Full professor 2. Associate professor 3. Assistant professor with tenure track 4. Assistant professor without tenure track

		5. Professeur-e-s boursiers/sières SNSF 6. Maître-sse d'enseignement et de rechercher (MER) 7. Maître-sse assistant-e 8. SNFS Ambizione grant holder 9. Permanent responsable/chargé-e de recherche (with PhD) 10. Non-permanent responsable/chargé-e de recherche (with PhD) 11. SNFS Senior researcher 12. Assistant with PhD (Premier/mière assistant-e) 13. Assistant without PhD 14. Non-permanent responsable/chargé-e de recherche (without PhD) *15.* Other. Please specify:
Fran Ramovš Institute of the Slovenian Language (Slovenia)		1. Assistant professor 2. Senior lecturer 3. Assistant researcher 4. Assistant researcher (with PhD) 5. Young researcher (without PhD) 6. Assistant (pedagogue) 7. Research fellow 8. Research advisor 9. Associate professor 10. Full professor 11. Other. Please specify:
University Ljubljana (Slovenia)	Department of Agronomy/Biotechnical Faculty	
University of Iceland (Iceland)	1. Faculty of Political Science 2. Faculty of Physical Sciences 3. Faculty of Civil and Environmental Engineering 4. Faculty of Earth Sciences 5. Faculty of Electrical and Computer Engineering 6. Faculty of Industrial Eng., Mechanical Eng. and Computer Science 7. Faculty of Life And Environmental Sciences 8. Faculty of Business Administration 9. Faculty of Economics 10. Faculty of Law 11. Faculty of Social and Human Sciences 12. Faculty of Social Work 13. Other. Please specify:	1. Research specialist 2. Assistant professor 3. Adjunct (I, II and III) 4. Seasonal teacher 5. Research scientist 6. Research specialist 7. Research scholar 8. Associate professor *9.* Full professor *10.* Other. Please specify:

10 Interpretative comparative analysis - Leaky Pipeline and interrelated phenomena

By Farah Dubois-Shaik and Bernard Fusulier

1. INTRODUCTION

Based on the different country reports, compiling a large panoply of secondary data reviews and contextual organizational analyses, and also the comparative national analysis in the previous chapter, the picture emerging for the phenomenons of "leaky pipeline" (Berryman, 1983; Alper, 1993) and the related "glass ceiling" (Hymowitz, Schellhardt, 1986) effect, can be largely confirmed in all the Garcia case study countries for women in scientific or academic careers in a classic sense. Of course, this is nothing new in terms of findings from previously conducted studies both on an international level, such as SHE figures or OECD studies, or the various national and local studies upon which a major part of all country reports are based. However, a multi-level and interpretative analysis of conditions, modalities, gender regimes, policies and configurations of scientific/academic careers in the seven different Garcia contexts has enabled us to underpin some significant tendencies in the way scientific/academic careers are organized, embedded and conceived, which may be *jointly and interrelatedly* contributing to the kind of gendered configurations that are visible in all country and institutional cases, despite the various differences across national and organizational contexts. These interrelated results have certainly underpinned the importance of changing the analytical perspective upon the leaky pipeline by looking at the Garcia institutions as gendered organizations (Acker, 1990), rather than merely tracing and locating the "leaks". The various reports enable us to identify the *nature of the pipeline(s)* on the one hand. On the other they evoke how much the *social division of work* between the sexes is indeed translated in distinctive ways in its structured institutions; in the gender and welfare regimes within which the institution is embedded and by which its work ethos is unvariably shaped; in the principle of its organisation, influenced by external and internal pressures and discourses; the kind of policy responses it draws forth to tackle these phenomena; and not least, in the habits of research/academic work and modalities of careers at the heart of the institution.

At a glance, there is therefore nothing shockingly new in terms of figures that we can record (see chapter 8); a massive feminization in the majority of fields of study in all Garcia countries, over the past 10 years, with, however, despite this initial feminization at the level of Bachelors and Masters (still less so in STEM fields!), the phenomenons of leaky pipeline and glass ceiling that can be recorded for all participating countries, whereby fewer women are recorded the higher we climb the scientific/academic ladder. An important fact still remains is that in most countries the *bottle neck is located at either the doctoral or postdoctoral level*, with the difficult jump to obtaining permanent positions. Again, this may seem as nothing new in terms of the famous scissor shaped curves that are largely confirmed

in most Garcia countries, with some exceptions in certain Garcia institutes or departments where women outnumber men, in both SSH and STEM. In STEM, the leaky pipeline tends to start already at bachelor and masters levels, with some exceptions, such as in Austria. However, this confirmation of the location of the bottleneck or what we would point out as a *precarious stage of doctorate and postdoctorate* remains largely unexplored so far in terms of actual numbers of researchers/contracts, or even the in-and outflow of persons, and mostly in terms of types of profiles and personal experiences of persons in this stage. One part of the reports is dedicated to a mapping of this crowd in the different case studies, which has been achieved in some measure with some important limitations and obstacles in terms of lack of data and access. The attempt at constructing a web survey to trace people of this stage of the career having moved through the Garcia case study institutions has achieved also some limited descriptive results, which nonetheless allow a certain cross-institutional mapping (Chapter 9). Moreover, we hope that through the qualitative, narrative part of the Garcia project we will be able to shed some light on this yet "invisible" crowd of researchers within research institutions.

This comparative interpretative analysis focuses upon three different aspects that are aimed at underpinning what we have outlined as *addressing and tackling the precarious stage of the early career (doctorate, postdoctorate, first years of tenureship)*, the effects of which, we would argue, go beyond the particular stage itself as being precarious to the danger of creating a kind of bottleneck in research institutions, ultimately limiting the form science is taking, as much as society and work/life balance:

- interelated phenomena at national and organizational levels;

- the type of policy responses currently deployed and their limitations and strengths;

- some recommendations based on the Garcia case studies.

2. INTERRELATED PHENOMENA AT NATIONAL AND ORGANIZATIONAL LEVELS

When we look at the the massive entry of female students into the majority of fields in all Garcia countries, equalling that of their male counterparts and often surpassing them in recent years on Bachelor and Masters levels, and in some cases in doctoral levels, with however the doctorate and postdoctorate certainly representing a point of inversion or "attrition" of this trend, we are faced with multiple questions as to why and how. Moroever, in terms of sectors of study/science we continue to record a structural effect of the distribution of students amongst fields of science. The horizontal segregation is still very high. The percentage of students in SSH is ofen much higher and the figures for STEM are lower, sometimes for both male and female students, which points to a significant limitation in terms of analysis only based on choice or preference. The metaphors of leaky pipeline and glass ceiling apply insofar that there are fewer women in higher permanent posts and even less so in full professorship levels in most countries and also in most Garcia institutional cases. Moreover, this "attrition" is happening the higher we rise. The Garcia reports point to multiple interrelated phenomena acting jointly, which may give part of the reasons for these trends, which have continued to develop during the last ten years. We believe that certain interrelated phenomena may be contributing to an *increase in the trends by their very nature*.

2.1 Student attraction, budgeting, massification and bottleneck

Without doubt, attracting students has become a significant aim of most of the research insititutions and universities that we have examined in this project. *Having an important study body* is often the prerequisite for the distributon of governmental subsidies and budget allocations for universities in many countries (see also Garcia WP5 5.1 report on gender budgeting). It remains therefore an important facet of *competition between research institutions*. Moreover, the "Bologna system" in European Union has also allowed a transferability and mobility of students from different sectors and higher education colleges, also with an evergrowing international student body. At the same time, the access to PhD has risen – here too research institutions try to obtain a maximum number of doctorates - with growing numbers of ongoing PhDs, however with lesser women (and men) actually obtaining PhD, which points to some particular yet under-explored difficulties to be located during this period.

An important result obtained is that *postdocs and assistant researchers with non-permanent contracts are significantly rising in numbers,* and insitutions are hosting a growing number of temporary researchers. These, we would argue, are a "floating and invisible" research body, contributing to an important production of knowledge and of teaching, but remaining instiutitonally largely invisible, unstable and unaccounted for. Some Garcia institutions, such as University of Trento (Italy), or UNIL (Switzerland) have introduced permanent research assistant posts, but with the phenomena of *pushing women into these lower research posts* rather than academic posts (see below). Other Garcia institutions and countries have permanent research posts, which are tied however to a *self-enterprising condition of being able to obtain your own funding i*n order to legitimize and sustain the permanent contract at the given institution (Slovenia, Belgium).

One key problem with this kind of massificaton at these levels of study and posts is that the number of permanent academic posts and higher education positions are not equivalent or rising in proportion to rising number of PhDs and postdocs, especially in SSH, where the mobility to other sectors is less possible and higher education remains a major job sector. In STEM, the mobility to other sectors, such as industry, remains still an attractive and real feature for many students and PhDs, although the value of the doctorate is not always equivalent in terms of recognized skills, status and pay, as can be observed in the different national case studies. A response by research institutions and mainly of national governments to this rise in massificaton is a means of introducing some filters as well as selective opportunities, such as an introduction of research fundings, or prizes attributed to excellent research or grants (Switzerland, Slovenia, Iceland, Belgium, Netherlands, Austria). However, tying in with the difficulties that are addressed in the Garcia WP7.1 report, on the types of excellence standards and the criteria for selection for gaining access to research projects as well as permanent posts (CV body building, production, competition, merit on numbers of publications and so on), these are found not to be very conducive or less realistic for women to realize in the periods of doctorates and postdocs, an age group normally dedicated to family building or potential motherhood. So although gender equality is sometimes featured in the types of research fundings, the nature of selection criteria remain largely the same, more male orientated. Achieving these kind of research fundings and prizes are therefore still conceived in a particular type of profile, which require a high level of engagement, CV building and dense work practice, often not inclusive of other aspects of life, such as family, care and social life.

An other aspect impacting upon gendered pipelines is that *funding allocations are not always equivalent in different sectors of science.* For instance, the per student rate allocation is triple the amount for STEM students than for SSH students and sometimes for ongoing doctorates in several Garcia national contexts and case study institutions (Iceland, Belgium, Austria). Given that men outnumber women in STEM (mostly) fields, there is a tendency that *per student rate for men is higher than for women generally*. Moroever, higher research funding for ongoing docs in STEM impact upon ressources and length of the project; STEM docs can complete their PhDs in 3-5 years majorly, whereas this is true to be to a lesser percent in SSH, where we can observe more women to be represented. This could be also part of the reason for the dropping numbers of actual PhD obtainees in women (and men). These kind *of funding conditions could certainly impact upon the further career advancement in a gendered way*, as higher per student fundings for Bachelors and Masters can mean a higher teacher-student ratio, more individual supervision and advancement in STEM, where men are overrepresented, and a higher support in terms of money for research purposes (travelling to conferences or project meetings, money for publications and joining research networks, undertaking empirical studies etc.), which has impact upon the further career path and hence existing criteria for permanent recruitments. In SSH, where women are more represented, there are a less favorable teacher/student ratio, fewer career openings and ressources are harder to get by.

Therefore, it could be argued that the number of students and the financial allocation create in part the framework and the prerequisites for the working conditions of women and men as well as respectively female and male dominated disciplines and fields. Whereas women are more numerous in SSH, career options and conditions in these fields are fewer, less supportive and more restrained. In this respect, the number of students and the allocation of public funding are connected to the leaky pipeline. Also *the possibilities for research funding* differs extensively in some Garcia contexts; a vast majority of the large externally funded research projects at the University of Iceland for example are STEM related. This facilitates the funding of PhD studies, which explains the higher number of PhD students in STEM, of which the majority are men. Furthermore, the STEM fields are more respected. Hence the leaky pipelines are strongly related to the issue of gender budgeting that is the focus in WP5 of this Garcia project. In Austria, for example, since 2005 the number of scientific staff financed by third-party funds has increased from 5.773 to 8.773 and absolute numbers increased for women as well as men. However, in recent years, almost two thirds of third-party funded positions were held by men (39% women and 62% men); we can observe therefore the significant increase in third-party or external funding to research, in which men have the advantage.

2.2 Tensions in the value, purpose and status of the doc/postdoc and leaky pipeline

From the different country reports, it also becomes visible that the *value, purpose and status of doctorate and postdoctorate* is fraught with some important tensions, which we would argue would contribute to the precariousness of this stage. For example in Switzerland, until recently there was a necessity of doing a “Habiliation” (obligatory postdoctoral experience and thesis) for gaining a professorial position, although this no longer a formal requirement this still continues in practice. In most country and institutional cases the scientific value or purpose of the doctorate and postdoc therefore continues to constitute part of the real practical requirements of the research and academic career. It can be argued that this has its

rightful continuity, as the actual purpose of a doctorate is to develop, deepen and widen your research content and field and to undertake a profound examination of a given topic, which would enable you to "become" an able researcher and expert. The postdoctoral purpose would originally perhaps consolidate the doctoral period, both in terms of your field, specialization and gaining a certain independence in conducting research. However, the reality shows *an increasing and significant tension between the scientific and formative value of the Phd and postdoc as opposed to the job market value on two levels*: firstly, increasingly docs and postdocs are taking on the place of temporary job opportunities and employees within the research institutions. They provide research institutions with funding contracts, projects and also increasingly a cheap source of teaching staff. There is also a *feminization in the teaching corps*, *which concerns mainly the lowest levels of the academic ladder*: the assistants and other non-defined or permanent status of the scientific corps (notably postdocs, or PhD holders without permanent posts). However, this evergrowing crowd of PhDs and postdocs are not given any institutional permanence or affiliation, sometimes even classified as administrative and technical staff (UNIL, Switzerland).

Research institutions (as well as government orientations and fundings) are increasingly operating as tenders for temporary positions without any obligations as employers: we could be speaking about a loss of employership of research institutions, while increasingly subscribing to entrepreneurship. The contradicton arises in that in institutional practices for career advancement, doctorate and postdoctorate, even in funding practices (Belgium, Switzerland, Netherlands) are seen as a scientific "rite of passage", a neccessary formation or limited period of passage before moving on: however, as jobs are slim and not available, postdoctoral periods have become longer and become job contracts, with no status within the institution. Hence once again the idea of "invisible" labour force that constitutes no insitutional obligations, simply contributions that go largely unaccounted for. This has gendered configurations, as women are increasing in these temporary contracts. Also in certain countries they are increasingly getting pushed into permanent assistant research positions that are "low" in terms of status, pay and tasks. The Dutch report speaks interestingly about "postdoc-stacking" (i.e. doing multiple subsequent postdoc projects) within the same department and the same institute, which has a negative effect on the career perspective of researchers. After a few postdoc projects, these people are not only "too old" but also too specialized to transfer to another organization, whether inside or outside of academia. The exit flow is higher than upward flow, which means they have little chance of climbing up the current institute.

There is therefore some confirmation of the phenomenon of "sticky floor" (Booth et al., 2003), because literally more women are indeed "getting stuck" in early stages of the career without advancement opportunties and "cornered" into lower ranks, without institutional employership obligations. Of course, this type of research posts and positions are often paired with lower involvement in decision-making and power within instiutional politics and organziations. Although during these stages the research value is quite high: project work, publications etc: but paired with other effects, such as Mathilda (Rossiter, 1995) and St. Matthew (Merton, 1968) and also the pivotal relationship with supervisors and colleagues, creating networks and CV 'body-building' pressures (Fusulier and Del Rio Carral, 2002), women are at a definite disadvantage.

Another tension is that often institutional embeddedness and integration is difficult for doctoral and postdoctoral researchers that are hired on temporary contracts or on personal grants, and work on research projects that are not necessarily at the core of the

departments, or are thought to be "passing through". In some Garcia contexts, such as in University of Radboud (Netherlands), most of the postdocs are hired from outside, and often they do not get the possibility to get teaching experience; a criterion that becomes important as an assistant professor. They are not embedded in the department, although one of the criteria for selection into permanent posts is the "local" aspect; the neccessity to be a colleague, to be integrated in the centre or department, to know the rules of the game and to have an internal network. Therefore, arguably postdoctoral positions are focused on a research project and not on a career path.

In terms of the models of scientific/academic career and the pathways of progression or climbing the ladder, the nature of how recruitment works (see WP7 D 7.1) and the organizational culture in most Garcia contexts point to *an importance of the informal nature of dealings, interactions and local ways of integration into the system (*see also WP5 D 5.1). Firstly, as discussed, doctoral and postdoctoral positions in many Garcia instiutions are based on external or third-party funding. Some limited funding is supported by industrial sectors for STEM. There is also some PhD research funded by governmental foundations. However, all these funding paths are subject to a very harsh, very political selection and a massive increase in candidates (especially international or external candidates to the given university, which is hardly surprising if we consider the "international mobility and attractiveness" discourse running in university policy lately). The recruitment process is therefore often split into multiple complex segments: first there is a selection of "ideal-type" candidates (of which there are still many for very few openings per year or two/three year) based on competitve criteria (see WP7 7.1 report) such as publications, types of projects obtained, CV, place of education and PhD, mobility and son on. Then upon closer selection, recruitment committees (with very different dynamics) negotiate the "ideal –to-embed candidate" for what is often a very local nomination, defending the interests of being able to integrate/fit and collaborate with existing teams, and being able to ensure the handling of and carrying out what are deemed all three (or four) pillars of academic work (research production, teaching, institutional engagement and perhaps also contribution to society). Qualitative and policy findings point to a recruitment and scientific/academic career model which favours general or competitive criteria and focus upon high production of research and research-orientated skills in the early stages of the career ladder (Masters, doctorate, postdoc), and *a sudden expected leap into local integration and juggling multiple academic sphere*s, of which the institutional and self-administering engagement levels are high. It can be therefore argued that the joint phenomena that we discussed could introduce obstacles at multiple levels of doctoral and postdoctoral purposes in a gendered way.

Looking at the numbers of men and women staff in the scientific career ladders in the different Garcia contexts, the number of *tenured assistant professors has decreased over the years*, whereas the *number of non-tenured assistant professors has increased*. The numbers of tenured associate professors and full professors has remained quite constant, so there is a relative stability of few and select professorships. In some Garcia contexts, some policies that have been introduced, such academic staff who hold a PhD, who cannot get more than three consecutive temporary contracts (Netherlands). Moroever, certain types of fundings for obtaining permanent research positions are tied to these type of *numeric restrictions* (Belgium). The total period of temporary employment cannot exceed six years in some cases (Dutch Universities, Belgian universities). In the Dutch case, a new law will be limiting this to four years. This has serious consequences for academics. The intention of the policy change was to reduce precarity, however within the current financial structure of universities, the measure will most likely increase precarity (an adverse effect). One result of the change is

that academics, also academics who attract external funding, might not be able to renew their contract in their current university when they reach the four years of employment. In the Swiss case of UNIL, they consider as "permanent positions" those of full professor, associate professor and senior lecturer (Maître/maîtresse d'enseignement et de recherché, MER) but in fact they are renewable every 6 years, after an internal evaluation procedure. In UCL, Belgium, there is also a three year probation period after nomination of a tenured candidate, during and after which the appointee has to "prove worthy" of the selection before getting definite tenureship. Although it is formally possible for the University not to renew these contracts, such cases are extremely rare; but nonetheless there still is a continuity of precarity beyond the nomination level and in the early years of tenureship with multiple pressures, which could have important gendered implications for both women and men.

2.3 Gender regimes, work life balance and work ethic in greedy institution(s)

The previous chapters examine different and particular gender regimes in the various national contexts, which also have a significant impact upon the way the scientific/academic work is modelled and organized. According to the findings in WP3 D 3.1 and also WP5 5.1, *the problem of articulating work and family within a gender regime maintaining a sexual division of productive work and reproductive work is one of the apparent causes* of the downfall in terms of leaky pipeline. For example the Swiss example speaks of a "modified male breadwinner" model, with extremely high childcare costs, high levels of horizontal and vertical segregation, a relatively large gender pay gap, particularly at the upper reaches of the occupational hierarchy. Similarly, the Dutch example speaks about a oneandahalfearner model: the most dominant working arrangement of (heterosexual) couples in the Netherlands is a situation in which the man has a fulltime job, and the woman a part-time job. This situation is more often true when couples have children. Most Garcia case study countries denote high levels of women's part-time working, particularly amongst mothers of young children. Therefore the division of domestic labour and unpaid care activities remains unequal in most if not all of the Garcia countries, with women taking responsibility for almost 80% in some country cases of daily household chores (Slovenia). However, despite the part-time character of female work upon the general labour market, women with a university degree tend to work much more often in full-time jobs. The same goes for women working in the research/academic sector. Yet, female assistant and associate professors work much less often than their male colleagues in full-time positions. At the same time, the gender difference for full-time jobs is small at the level of full professorship. It could be argued that climbing the scientific/academic career ladder does not permit part-time character, thus also requiring a full-time presence or work the higher you climb. According to the results about experiences of doctorate holders in the CDH studies and other nationally conducted studies, motherhood is still regarded as little compatitible with research/academic work by male colleages and environment for women. Women are perceived to be hindered in their scientific work by family chores and less valued by supervisors. This can be confirmed by the results obtained by the narrative part in the work/life balance policy report WP4 4.2.

Generally speaking women earn considerably less than men, thus confirming the *persistance of a gender pay gap* in most Garcia case study countries. Female doctorate holders employed as researchers earn in some cases less than their male colleagues and those not employed as researchers earn even lesser than their male colleagues, especially in STEM sectors. The

whole labour market has also been strongly feminized, but here too classical phenomena of horizontal segmentation (between sectors and trades) and vertical (employment and responsibility levels) are present, although they are decreasing. For example in Iceland, despite the high ratio of women's education and labour market participation women have less opportunities at the labour market and the gender pay gap remains considerable. Moroever, women in most Garcia contexts, are more often working in the public sector such as health care, welfare and education, and men more often in the private sector.

Another argument in terms of work ethics influenced by external and internal work regimes is the existence of a particular organizational logic or culture, whereby interrelated phenomena to leaky pipelines and glass ceiling are produced. There is an ever increasing workload transferred to individuals, which neccessitates high demands of institutional commitment, not only in terms of political or governing involvement of individuals alongside their main work of research and teaching, but also an important increase in logistic, governance and administrative tasks, and of finding own funds, which research centres and faculties are not able to supply in sufficient amounts. There is a form of entrepreneurship (self-regulation and funding) required on unit-and individual level, without adhering to managerialism (see Belgian chapter). Parallely to this we can count in the effects of the university as a greedy institution (Coser, 1974; Grant et al., 2000; Hendrickson et al., 2011; del Rio Carral, Fusulier, 2013) in that research and teaching demands are today increasing in complexity and availability of the researcher/academic: the researcher/academic needs to be entirely invested in his work. According to Ule (2002) referred to in the Slovenian analysis, academic institutions are —at least for the matter of power, influence, prestige, reputation and money— still social spaces strongly determined by specific masculine academic culture in which two types of characters prevail. One refers to a scientist fully engaged just in his professional work but anything else, and the other one to a scientist manager who in informal male networks negotiates the sharing of research money, positions and division of power and authority in science. In both these profiles, as Ule argues, female scientists hardly can situate themselves. They are not able to do that because of the nature, but because of the culture to which they belong. For them, the first option is not possible, since women scientist needs to be engaged in many things in their everyday life, while in the other case they are excluded from a network of men's clubs, because of men-friendly norms that lead to gender biased key decisions. However, as Ule argues, because of greater attention to women position in science nowadays, this practice is losing its explicit character and has become much more subtle, hidden and implicit in the nature of its workings. In the Austrian case, a study for the Vienna University of Technology (VUT) shows that women have a significant higher drop out risk than male students —academic integration does not reduce this risk for women to the same extent as for men. Only those women who conform and adapt to the dominant culture and environment are able to succeed in their careers (Haas et al., 2011). Recruiting decisions are influenced by unconscious gender bias and women receive less support through informal mentoring and are offered less development perspectives than their male colleagues (Keinert-Kisin et al., 2012).

Therefore, the nature of policies aimed at Gender equality are often superficial and not touching these inner and implicit workings in the work and organizational cultures, as can be shown in the next subchapter.

Women (and men) therefore not only have to meet high demands in research/teaching, but in addition also adhere to an important institutional investment and presence in terms of integrating into a hyper-complex system of bureaucracy and institutional culture. Moreover,

this type of organization requires a significant *actual physical presence of individuals*, because decisions are made in meetings, deliberations and through a heady process of negotiation. There seems to be an increasing requirement of «*omnipresence*» in all three pillars, of which each pillar has increased in levels, demands and complexity of required personal engagement. It can be argued that this can represent important issues to work/life conciliation or balance or having a family life, and that wanting to climb the career ladder also means important choices and pressures in terms of personal life. Highest posts attained by women are often filled by women with a certain type of profile (without children or couple life) (Italy, Belgium). It would be therefore interesting, beyond a mere tracing of glass ceilings and leaky pipelines to research the type of profiles that women and men in management and other posts have currently, to see whether certain types emerge as recurrent and more favorable to integration in the local culture and structures of organization, but less favorable to family or private life.

3. THE TYPE OF POLICY RESPONSES CURRENTLY DEPLOYED: LIMITATIONS AND STRENGTHS

In view of these interrelated and complex phenomena working simultaneously upon gendered pipelines and organizations, it is therefore hardly surprising that research institutions today are struggling to integrate effective or even address Gender equality policies and measures in the various different Garcia national and institutional contexts. Especially considering that the gender aspect has identified not only issues for women, but generally a signfiicant gap in the way work/life balance is organized and how this respectively affects work intensity and culture in the research institutions, whereby both men and women are affected. However, various measures and responses are existing and it is interesting to see the how organizations are responding to the issues of leaky pipeline and other phenomena that have partly already been identified. There are some policies and measures, which remain quite superficial and only brush the surface of the complex processes and mechanisms at work; others however take into account the complexity and multiple layers of gendered organizational workings. We outline briefly both limitations and strengths of certain examples of policies introduced in Garcia contexts.

In terms of *tackling the gender regimes of work/family conciliation*, certain states and institutional contexts have responded by increasing some childcare facilities, but with limited funding and the now reduced economic means in the era of austerity. However, some countries, such as in Iceland, women are active on the labour market and fertility rate is high. In recent years reforms have been enacted in Iceland in welfare and family issues such as the parental leave, which was reformed in 2000, and the leave extended from six months to nine with three months' non-transferable father quota. The reform is considered to be a success leading to *increased child care involvement of fathers*. Furthermore, day care facilities are now available for the majority of pre-school children although there is a gap between parental leave and pre-school that has not been dealt with. However, here too there are also important budget cuts in welfare state areas that are seen to probably affect child care systems. Moreover, division of family work remains unequal. In the Swiss case, child care remains very expensive and can only be enabled with parents having higher incomes and more stable positions, which makes the situation for doctorates and postdoctorates quite precarious.

Moreover, one important result obtained is that in most country cases, maternity and especially paternity leaves are not recorded or taken much by researchers and academics in the Garcia institutions. Of course the limited time frame of the groups recorded may not be sufficiently representative for this development. The results from the web survey reveal that parenthood is still one of the signficant factors of work/life interference, with work affecting negatively family life and vice-versa. However, this was the case throughout the Garcia institutions, which does point out that there may exist research/academic work and organizational cultures that probably favour work over family and put pressures upon people to continue work and take lesser leaves, especially in men. Policies therefore in research and academia remain rather discursive rather that reflecting real institutional practices.

Although family-friendly policies are numerous in various Garcia contexts, the *particular logics of the policies are sometimes rather uni-dimensional*: a logic of mainly defamilialization measures via early childhood care, but lesser decommodification logics of reducing working hours or of increasing paid leaves. Care alleveating policies are rare. Taken together with the greedy institution effects, researchers and academics struggle considerably with work/life balance, despite the flexibility of the work in terms of space/time which is often expressed as an attractive professional feature (more for men than for women, the latter for which the negative effects overpower, see WP4 4.2 report).

With respect to the leaky pipeline and lesser participation of women, often in many Garcia contexts, such as Iceland or Austria, *the rich participation of women on the labour market is often interpreted as de facto equality*. Despite high gender equality ranking, gender equality laws and machinery, large gender disparities remain. Women are largely underrepresented in decision making positions, in politics and finance. Currently, unemployment rates reveal that educated women are make up the largest group of unemployed people in some countries, such as Iceland. In some cases, such as in Slovenia or Belgium, management of research institutes and universities, rather blinded by rising figures, particularly on the level of Garcia case study institutions, do not see the need to introduce any action-based gender policies, focussing more on mapping and relying on previous studies that emphasize macro-level analyses of leaky pipeline, considered beyond institutional reach, or else are reassured by introducing discursive labels of gender equality with little actual institutional changes.

However, in some country cases, such as in UNIL (Switzerland) and Radboud University (Netherlands), and in Austria, some Gender equality measures or plans have shown some success, and also take to some measure account of the complexity of gendered organizations: At UNIL, the Equality Office, in collaboration with the Statistics Office of UNIL and several other services like Human Resources is establishing a monitoring of gender equality between men and women for all the various bodies by adopted a Gender Equality Action Plan 2013–2016 which sets an objective of hiring “at least one women for every four men” when recruiting for professorial positions until 2017 (Canton de Vaud, 2013). This action plan was validated in 2014 and allows the university to take part in the Swiss Government’s new federal programme entitled “Equal opportunity of women and men at universities/gender studies” for 2013-2016. Moroever the domains of action are varied, including: the establishment of gender equality in the university’s structures as part of quality management; increasing the proportions of women professors (including assistant professors) and of women in academic decision-making positions; introducing Support for young academics; introducing or taking into account work-life balance, with respect to studying at the university or pursuing an academic career, in combination with family and personal responsibilities; promoting gender equality among undergraduate students and

enlarging their choice of study fields (to combat horizontal gender segregation); gender equality in human resources management and organisational development. It remains to be seen whether these different domains are being implemented.

A successful policy to increase the number of women at professorial level was introduced in 2005 by the Austrian Ministry of Science and Research: the programme Excellentia provided bonuses for universities who appointed women professors. During the runtime of the programme € 4.706.520 were paid to Austrian universities for 121 promotion of women professors. Between 2003 and 2009 the share of women professors at Austrian universities has increased from 13% to 19%. Although the objective to double the proportion of women professors was not reached the slight change recorded was considered a success (Wroblewski, Leitner, 2011). However, it remains to be seen whether such policies would not rather contribute to a hollow effect of increasing competition between universities rather than tackling more complex effects of leaky pipelines and of gendered organizations. *Increasing quotas of women in higher posts remains a controversial measure*, which evokes many questions in terms of whether this will contribute in gaining access for women, or else shatter in the face of the complex interrelated workings of work and organizational culture(s) and lack of work/life balance in mainly male-conceived work ethics, which no longer apply to either sex in today's social contexts. Indications from the reports is that despite growing figures in favor of women in in both STEM and SSH, women are still less represented in desicion-making positions than their male colleages; there are few measures that address this phenomenon. Moroever, often previously conducted studies adress the issue as being located in higher posts of decision-making and power, but the Garcia reports show that one of the aspects of precariousness of doctorate and postdoctorate or lower research assistant positions is a serious lack of involvement in decision-making for this group, where women are overrepresented.

In the example of Netherlands one of the main instruments to institutionalise equality is the Vision 50/50 project. Under this heading, the Rectorate has asked all Deans to develop gender equality action plans for their faculties. There is moreover, an important role for national stimulation grant "Vernieuwingsimpuls" ("Innovational Research Incentives Scheme"), including 'Veni', 'Vidi' and 'Vici'grants: 75% of Veni laureates was a postdoc and 45% of them went on to a higher position after the project (mostly Assistant Professor). 36% of Vidi laureates was postdoc and 80% of them went on to a higher position after the project. The biggest part of Vidi laureates was Assistant Professor and moved on to associate or full professorship. However, the Dutch report points out that earning a Veni or Vidi grant is a great stimulant for the career prospects of early career researchers within the Netherlands, but still only attainable for very few academics.

The same applies for the FNRS grants in the case of french-speaking Belgian universities, such as UCL, where fundings are highly based upon ideal-type and political selection criteria, although the funding policy is geared toward helping doctoral and postdoctoral stages. Unfortunately, there is a general lack of monitoring and evaluation of these policies and their effectiveness (van den Brink, 2010). Research on the Dutch academic sector does show that measures are not fully applied everywhere, and success depends on committed initiators (van den Brink, 2010).

As discussed above, *special fixed term assistant professors or fixed term researcher posts* are created in some Garcia contexts (Italy, Belgium, Switzerland). This however, contributes to an effect of womens' percentage increasing in these "low status" posts due to transfer of

many temporary posts into fixed term research postitions, wherbey the academic ladder remains mainly masculine.

A financial budgeting issue is the case in quite a few of the Garcia case study countries and institutional contexts: often a very small part of the budget of the university as a whole goes into the general diversity policy. Also, as discussed, funding allocations and budgeting is different according to sectors, with STEM having more funds and ressources rather than SSH, where more women are to be found. However, *gender budgeting policies are slim to none in Garcia contexts*, where often budgeting is not associated with gender equality, as can be seen in WP5.1 report.

4. RECOMMENDATIONS

Drawing from this interpretative analysis on the one hand and the particular recommendations drawn from the different reports, we would recommend that there should be an *increased focus upon the doctoral and postdoctoral stage of the research/academic careers on behalf of research institutions and research itself*: in terms of the complex layers of precariousness that affects this growing crowd of "invisible" research and teaching corps. This could be done on multiple levels:

a. On the level of access to PhD and purposes of the PhD and postdocs: research institutions should responsibly ask themselves why and whether they need a growing number of doctorates and postdoctorates indiscriminately, without considering carefully the further employment and stabilization of this group and without considering the kind of consequences for the future of this floating corps.

b. The shift from employership to enterpreneurship should be more carefully measured and weighed in terms of institutional obligations towards the work force and research/teaching corps, and in the kind of permanent positions and status that are created.

c. There should be a higher focus upon work/life balance issues and interference in terms of work and organizational culture by introducing more active policies that permit a non-censured culture of "care leaves"; of increased child care and support; of reduction of working hours; of a more attentive work ethics involving deadlines for teaching/research projects and institutional engagement/involvement (introducing policies at departmental and centre levels for meeting hours, regularity and density of meetings, avoiding overlaps of targets or work tasks, etc.)

d. Educating women and men PhD candidates about the gendered context of academia; and more transparency from the beginning of the purposes of PhD and postdoc, but also the question of career and employment; a part of this can be tackled in mentoring programms.

e. Focussing on hiring more women PhD candidates in STEM fields.

f. Loosening the criterion of international experience for postdocs, and taking into consideration that it can have gendered consequences, and that international networks and collaborations can be obtained in many different ways.

g. Create postdoc positions that contain the possibility to do teaching that is duly recognized, accomodated in time and pay. For example, a postdoc position that has funding for three years fulltime research can be extended to a four-year contract when the postdoctoral researcher has 25% teaching duties. The teaching time is paid for by the

department (if the budget allows). This way the postdoc gets valuable experience in teaching and also has a longer secured position.

h. Developping a talent follow up system to trail talented women PhD candidates and postdocs after they leave, and offer them a position after a number of years (also recommended in the Delft project). Generally introducing more follow up data possibilities in HR for persons leaving institutions, enabling the retaining of networks and the importance and visibility of each person as a researcher.

i. Leaky pipeline research should focus equally on why there are many men in STEM sectors and lesser in SSH, as well as looking at why women are fewer in STEM and SSH the higher we climb: social pressures for men as breadwinners and as prestigious fields, as opposed to less valued sciences in SSH and why women are more represented here. If we have been able to change science stereotypes in a way so that a woman is now more likely to choose to a line of study within STEM, is it then not possible to change masculine stereotypes so that a man may be less likely to do so and instead move into an SSH related field, which will nurture him with the socially or culturally saturated knowledge for which he craves? A point of self-reflection might be to ask ourselves whether we also fall in the trap of lending more importance to STEM fields, which we have learned to think of as more prestigious and important. Why else would we focus so much on improving the status of women within STEM and not so much men's status within SSH? After all, these fields are of equal importance: Consequently, based on the quantitative data, we recommend implementations that seek to break down stereotypes both within SSH and STEM, not to merely provide equal attention to men in a debate on gender equality in science, but to ensure that men do not flock to STEM fields or avoid certain SSH fields because they are stuck in a rut of traditional masculine ideals.

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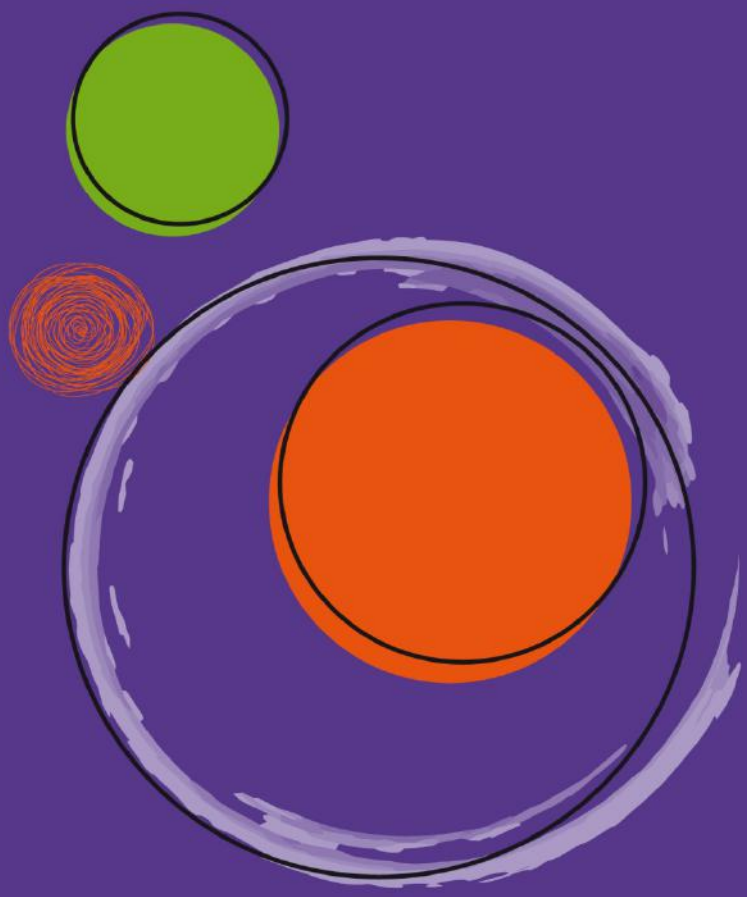

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