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The European sciences: How “open” are they for women? A review of the literature

1 The EU’s gender equality promotion

Article 2 of the Treaty on European Union says: „The (European) Union is founded on the values of respect for human dignity, freedom, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities. These values are common to the Member States in a society in which pluralism, non-discrimination, tolerance, justice, solidarity and equality between women and men prevail” (Council of European Union, 2008, p. 20).

The European universal goal for *gender equality* is meant to be achieved by equal participation in political and public life, in education and by active participation in the labour market leading to the economic independence (Walby, 2005).

Following the Eurostat statistical data on education in western European countries since the 1970s there has been an overall increase in the number of women who gain tertiary education and as a result are “qualified” for participation in the academic labour market. Ever since then the prevailing model of male main breadwinner and female primary care taker has been challenged in most of the European countries.

Article 145 of the Treaty on European Union states: “Member States and the Union shall, in accordance with this Title, work towards developing a co-ordinated strategy for employment and particularly for promoting a skilled, trained and adaptable workforce and labour markets responsive to economic change with a view to achieving the objectives defined in Article 3 of the Treaty on European Union” (Council of European Union, 2008, p. 146). In

1 I would like to thank the editor and the anonymous reviewers for their helpful comments and remarks on the earlier drafts of this article. A shorter earlier version of this article in German language was published as Tüür-Fröhlich, 2011b.

other words: The European Union policies are meant to be *promoting gender equality* in the name of the *economy*, meaning *highly educated and skilled* women are now recognized as valuable labour force (Lewis, 2006).

2 The reality: Vertical and horizontal segregation

The imbalanced contingents of researchers and scientists in leading positions and the clustering of male representatives in certain disciplines (i.e. natural sciences, technology and engineering) are notable in all European countries.

According to the statistics (European Commission, 2009) on higher education graduates, the contingent of highly qualified female academics in the labour force is increasing. According to Eurostat education statistics on the European Union's 27 member states, in case of social sciences 47% of all PhD graduates are women, but only 18,6% women have reached the highest academic rank (full professor) in social sciences (European Commission, 2009, p. 51, p.79).

While comparing the situation of women in the European Union member states, the European Commission publication "She figures" (European Commission, 2009) reveals the following data (Table 1): even though the proportion of female students and graduates exceeds that of male students and graduates, women are underrepresented in the highest academic rank (the full professor) compared to their male colleagues, which is an indicator for *vertical segregation*.

Country/Title	Full-professor	Senior researchers	Newly/ PhD Graduates	Others
EU-27 average	19 %	36 %	44 %	44 %

Table 1: Proportion of female academic staff by rank /grade (2007)

Source: European Commission 2009, p. 75.

Although the European Union countries categorize their academic staff differently, more women are to be found in *the lower levels* of academic rank, either as associate professor, senior assistant or lecturer.

According to statistics presented by the European Commission (2009), women are more often occupied in the academy either as postgraduate students not yet holding a PhD or are employed in positions which require no PhD such as assistant, either for teaching or research activities, which indicates the still persisting so-called *glass ceiling*.

Besides the vertical segregation, strong gender segregations across different fields of sciences are found (European Commission, 2009). The female presence is higher in the “soft sciences” such as humanities, educational and social sciences, while men dominate the “hard sciences” such as natural sciences and engineering. Therefore European academia can be described as representing *horizontal segregation*.

3 The reality: Jennifer fever, lack of support, mentors missing

Another gender bias phenomenon adds to the previous findings. It is called the *Jennifer fever* and describes how the financial and senior collegial support for junior (female) staff career development is limited to a certain point, literally age. Limitations are encountered as the majority of scholarships and fellowships are offered only up to the age of 35.

Findings of several researchers (Puuska, 2009; Schiffbänker & Reidl, 2009; Baker, 2008; Ledin et al., 2007; Keogh et al., 2006; Blickenstaff, 2005; Rothstein & Davey, 1995) have shown that *young female* scientists *receive less professional support* from a mentor than their male colleagues. From the mentors’ point of view, female scientists’ skills and achievements are often overseen, also considered to be not qualified enough and are judged to be below those of male colleagues’ (Fuchs et al., 2001). Women are usually excluded from informal contacts that contribute to mentor-protégé alliances. Men have reported (Baker, 2009) that at the beginning of their careers they published together with (male) supervisors. According to Milem et al. (2001) mentors prefer male young researchers over female researchers when providing them with access to scientific networks. Towers (2008, p. 15) states that in physics young female researchers publish *3 time* more than their male peers, but the female contribution to the collective work is often overseen and women were offered less conference presentations. Their male colleagues are favoured and get promoted based on presented publications. These findings show serious gender discriminations in sciences.

Due to the low numbers of women present in high academic ranks there are fewer women who are in positions of power and able to provide mentoring functions. Additionally, young female scientists do not accept senior academic women as desirable role models especially if they are single and/or childless. Various research data indicate that more female than male full-professors are single or divorced and have no children (Le Feuvre, 2009; Husu, 2005).

Liisa Husu (2002) found “the support for women’s career either from department or unit in academia was scarce.” (ibid., p. 205). As a result of rare mentoring, resp. supervision by mentors and competitive behaviour of their male colleagues, women perceive feelings of *isolation* and *intimidation* as well as a *loss in self-confidence* (Husu, 2002; Ledin et al., 2007). Therefore, female (young) scientists’ career aspirations are strongly hindered.

4 Precarious employment status of female academics

Šatkovskiene et al. (2007) have explored the situation of female academics in Estonia and Lithuania. These findings correlate with research results concerning the Netherlands, Germany, Portugal, the UK and Northern America (Metz-Göckel, 2009; Monroe et al., 2008; Santos & Cabral-Cardoso, 2008; Lind, 2007; Vogel et al., 2004; Glover, 2002; Huisman et al., 2002; Bryson, 2004).

They all state that employment status of female scientists remains precarious due to:

- irregular labour relations and working conditions,
- marginal income compared to senior (male) colleagues and
- diffuse regulations on career tracks (mainly temporary work contracts and prohibition of consecutive employment contracts).

Considering the fact that the majority of atypical employment forms are carried out by women within the European Union (Eurostat labour market data) precariousness of these employment patterns (re)produce gender inequalities.

It is therefore not a surprise that Moor’s (2002) study on female academic career showed that the up-wards mobility of women scientists is *slower* compared to that of their male colleagues. The slower career development affects negatively the actual income and in the long-run the financial security (i.e. pensions). Moor’s study also states that for a woman, it takes longer in years to reach full time permanent position in academia. Various studies (Towers, 2008;

Layzell, 1999; Loeb, 2001) allocate that women with children are considered by academic managers not committed enough for sciences, therefore overseen for promotion or recognition by colleagues.

5 Funding: Smaller, lower, shorter; nepotism, sexism

The European Commission Gender Equality Report (European Commission, 2008a) shows: “Female researchers were scientific coordinators of 17% (1797) Framework Program 6 funded projects. Looking at the statistics for both scientific coordinators and scientists in charge, it is clear that female researchers were more likely to have responsibilities for the *smaller* instruments, such as Specific Support Actions and Coordination Actions, than for the larger instruments like Integrated Projects and Networks of Excellence“ (ibid., p. 14).

Myers (2008, p. 4) found that women, when applying for funding, requested *lower* amounts and for a *shorter* period of time. This is reflected in the amount of funding they actually received. But this has according to Sonnert a negative effect on their tenure or career development as “in academia, scientists are conventionally judged by the volume: the sheer number of papers they have published or grant money they have attracted” (Sonnert, 1995-1996, p. 55).

The Swedish female biomedical researchers Wenneras and Wold (1997) found *nepotism and sexism* prevailing in the Swedish Medical Research Council. The MRC decides upon grants for medical post-doctoral fellowships. The major outcomes were:

- female applicants *had to publish 2,5 times more* to prove their competence,
- a *‘friendship bonus’* was working – applicants affiliated with a committee member were evaluated higher.

The findings of Wenneras and Wold (1997) are no single case. Bornmann et al. (2007, p. 226) report: “The findings of a meta-analysis of 21 studies provide an evidence of robust gender differences in grant award procedures. Even though the estimates of the gender effect vary substantially from study to study, among the grant applicants men have statistically significant greater odds of receiving grants than women by about 7%”.

6 Balancing partnering-parenting with scientific careers

Several researches in European countries and in Northern America (Acker & Armenti, 2004; Laas, 2007; Ledin et al., 2007; Tibes & Beuter, 2006; Vogel et al., 2004) have found that women sacrifice their career development to suit their partners' and/or families' responsibilities. European Commission (2008b, 2008c) survey on *Family life and the needs of an ageing population* in the 27 EU Member States brought up the gender bias considering the policy measures to improve family life: "While women were more likely to answer that longer paid parental leave and incentives for fathers to take parental leave should be given high priority in their country, men more frequently regarded each one of these possible measures as low priority." (European Commission, 2008c, p. 8).

Lower proportions of EU citizens agreed that longer paid parental leave or incentives for fathers to take parental leave were important policy areas: still, 47% of EU citizens said policy measures supporting longer parental leave should receive high priority and 40% said the same about policies offering incentives for fathers to take parental leave (ibid.).

Results for incentives for fathers to take parental leave showed a large variation across countries: while only 23% of Latvians thought that incentives for fathers to take parental leave should be given high priority, more than twice as many Greeks were of this opinion (56%). The proportion of respondents, who thought that longer paid parental leave was a policy area that should receive high priority, in most EU-27 countries just about half of the respondents thought such a policy should be given high priority. Furthermore, while respondents in the Nordic countries were among those giving the least level of support for longer paid parental leave, which is very common in these countries due to their welfare system model they gave some of the strongest support to the idea of fathers taking parental leave. Incentives for fathers to take such a leave as a policy action, received the least support in post-communist countries in Eastern and Central European countries like Latvia, the Czech Republic and Hungary. Austrian respondents were most likely to say that such incentives (fathers taking parental leave) should be assigned low priority (33%) which reflects the continental welfare system that strong emphasis is still on the male breadwinner and female care giver model (European Commission, 2008b, p. 20-26).

Being able to balance a demanding career like an academic one with parenting & partnering depends on the structures and networks available for individuals to combine work and partnering & parenting. Men can rely on their female partners (or mothers and sisters). In contrast - as the child rearing is considered to be the primarily individual's (women's) personal responsibility

by most of the contemporary societies - women are forced to depend on public support for *parenthood* – child care institutions, parental leave options, financial benefits.

Another side is that the development of EU legislation for maternity rights is aiming actually to protect and promote the rights of *working mothers* (Walby, 2004; Guerrina, 2002). Pascall & Lewis (2004) notice: “EU Policies for getting women to do more paid work have been more extensive than policies getting men to do unpaid care work” (ibid., p. 383). There should be more emphasis on *parenting* to promote fathers’ participation in care. Even though men employed in academia have flexible working hours compared to other occupations, men still are lesser involved in childcare or household duties (Baker, 2008).

83% of respondents in the study of Ledin et al. on women’s problems and barriers to pursue a career in sciences (2007, p. 986) said that “their institute offered parental leave of some kind.” Measures that help parents, such as *tenure clock-stop* (in the U.S) or temporary relief from teaching duties, were present only in 12-29% of the respondents’ institutions (ibid.).

Vandemeulebroecke & Munter (2002) have found that in Belgium *men worry less about balancing family and work* and are more led by their future career perspectives. Women take into consideration in case of care duties the geographical distance of the social network such as relatives and friends. The lack of support at work and at home are the reasons for female doctoral students in Belgium to give up their studies. In contrast, male doctoral students abandon their studies mostly due to new career possibilities at the national universities.

Hantrais & Ackers (2005, p. 211) suggest: “At the EU and national levels, policies need to be shaped by an understanding of women’s and men’s family needs, not just by narrow and short-term business needs”.

There is a striking similarity between female and male scholars’, resp. scientists’ perception on *balancing career and family* obligations: neither female nor male scientists perceive absent child care *opportunities* as a structural obstacle. Family responsibilities are considered as a “private matter” (Monroe et al., 2008; Santos et al., 2008; Laas, 2007; Šatkovskiene, 2007; Acker & Armenti, 2004).

Anu Laas (2007) concludes that in several cases single women in the exact sciences have *regretted their career emphasize*. Female academics have admitted to having psychological problems or disorders such as *burn-out, exhaustion* and *anxiety* due to overload of mainly administrative work, in higher numbers than their male peers: “Behind a successful woman researcher are supportive family members and a social network or a missing family” (Laas, 2007, p.185).

Therefore, the implementation of work-family balance policies alone is not enough. Academia should tackle institutional and structural discriminations of balancing partnering & parenting with scientific careers and support a positive culture to enable such a balance.

7 “The dark side of mobility” (Melin, 2005)

Mobility of the highly skilled professionals is, according to Millard (2005, p. 345), important “to promote the access to gain formal and informal networks of scholarly power.” Therefore, a younger generation of scholars has already accepted mobility as *the norm* to make progress in their careers, especially in the beginning (Ackers, 2004).

For that reason mobility is no choice, but a necessity. A curriculum vita without documented international mobility is of less value. Academics and their families are moving with very little corporate support (Ackers & Oliver, 2008). Female scientists are active in the academic labour market, but private life events, such as finding a partner or becoming a parent are severe challenges to the future of their careers. Children, loss in income and forced mobility are the main reasons why young female specialists choose to leave academia (Melin, 2005; Van Anders, 2004). In case of dual scholars partnership each couple of years there is a huge issue of question of *where next?* As Dupont (2011) remarks: women often give up their academic employment too easily in favour of (male) partners’ career options. Several universities have recognised the problem and implemented the dual-career management services.

The EU promotes the free movement of citizens, but the European Union member states have developed *different welfare* systems. For instance, child or elderly care services are a prerequisite for female participation in the labour market. Consequently, the scientist and his/her depending family members from another EU member state have the same rights on quality of service provisions as are available to nationals in the host country. As a result it might be the case that a host country has a welfare system which is less favourable than that in the state of origin, for example regarding institutionalized child care. Yet, female participation in the labour market depends heavily preferably on public care provision either for children or elderly. Therefore mainly female scientists are the ones who give up pursuing the career or accept a *second best choice* to balance work and family duties (Dupont, 2011).

There are factors punishing mobility and career development of male and of experienced researchers, too. A study based on a sample of 3,365 persons summarized that *pension rights* emerged as being a major concern for experienced profiled researchers. For instance, an Austrian researcher said: “you lose (pension rights) every time you cross the borders of your country ... that means you are punished for mobility when you are old.” (European Commission, 2008d, p. 47).

“The normalisation of temporary or fixed-term contacts in academia as labour market sector means that scientists wishing to progress have little option but to move for this kind of work as science, especially life and natural science are highly specialised and opportunities for employment are often concentrated in internationally recognised “clusters” or centres of excellence, i.e. CERN.” (Ackers, 2004, p. 193). These atypical employment patterns negatively affect not only single scientists, but also their depending family members:

On the one hand, atypical employment patterns negatively affect the social security of a *single scholar*. The transition from full-time to part-time work has a financial impact: the decrease of an individual’s capacity to contribute to occupational pension insurance schemes leads to financial uncertainty in the future. These issues associated with pensions may hamper researchers’ mobility. Following Ackers & Oliver (2008) contemporary education systems in the EU member states have extended pre-employment qualification period, which delay the opportunities to engage with national pension schemes (contributions). High levels of precarious employment, such as the high rate of fix-term contracts, leads to uncertainty over future careers, whereas secure permanent employment generally discourages engagement with voluntary pension schemes.

On the other hand, *depending family members* are disadvantaged. Following Stalford (2005, p. 366) “All family entitlements are generated and sustained through a relationship of financial dependence on the EU migrant worker. In that sense, the migrant researcher’s employment status determines the family’s access to the host state support. The temporary nature of contract researchers often necessitates moving between a number of different member states to embark new projects or to entail protracted periods of unemployment between contracts.”

To conclude: the European Union science and research policy and the national social policies of the EU member states are in conflict. The EU demands mobility for career development, the member states demand contributions to their national social security systems, negatively affecting scholars’ personal and depending family members’ social security.

8 “Publish or perish”: Productivity depends heavily on social capital

Research has shown that academic promotion and rewards are heavily based on publications – productivity and impact. The ideology of *publish or perish* together with the persisting glass ceiling in academia (un)consciously contributes to a gender pay gap.

In the long run, the conditions at scientific institutions are working against female academics. This insofar as the dominating precarious employment pattern involves mostly teaching responsibilities, which leave less time, energy and resources for research, hence results in fewer publications.

Notably, the discrepancy in publication productivity and family responsibilities is found only for female scientists (Fox, 2005). While women take up the majority of the child/elderly care responsibilities, their productivity decreases (Ledin et al., 2007). Male scientists admit that the success of their academic career lies on the shoulders of their wives as they act as (not paid) *proof readers* and *critics* on top of all the domestic duties (Tibes & Beuter, 2006). In contrast, it is illusionary to assume that all female academics are invariably supported by their partners in their career aspirations.

Critically following Pierre Bourdieu, Gerhard Fröhlich (1996) stressed the importance of the social capital in the scientific fields. Social capital is defined as the resources rooted in memberships in groups and networks. In the scientific fields social capital is accumulated by mutual citations, invitations for lectures or publications, engagements in scientific societies. A specially efficient and enjoyable strategy to gain more social capital is to attend scientific conferences, and especially their informal gatherings, often late night, over dinner or drinks (ibid). In relaxed atmosphere important informal information (scientific gossip) about grant proposals, employment options, book projects, invitations etc. is exchanged – long before the official announcements. In the era of big science, productivity is a result of successful co-authorships.

As mentioned above, due to the persistent traditional unbalanced division of care duties between the men and women, female scientists, if they have depending family members, have less time for the informal communication. Literally female academics cannot spend the whole night for “après-conference” because of their care duties – the “double shift”.

Yet, it is not all black and white. It has also been established that “Women who have children seem to be equally or even more productive in publishing than childless women” (Puuska, 2009, p. 4; also Baker, 2008; Lind, 2007). The publication productivity of married or cohabiting women with children

exceeds that of never married, separated or divorced women. On the contrary never married men have the lowest productivity among men. Still, men's productivity is always higher than that of women with the same family status. Family composition and children do remain significant determinants of productivity for mainly female scholars (Fox, 2005).

Academic promotion systems generally recognise seniority within the rank, which is another structural discrimination against women as parental leave is taken up mostly by women. When (re)-entering an academic employment after their parental leave women tend to have shorter careers. Previous research (Baker, 2009; Moore, 2002) indicates that men typically have more years of full-time academic employment as well as more publications and citations, which leads to higher visibility and greater peer esteem and recognition in their scholarly community.

Rossiter (1993) called the principle of cumulative disadvantage '*Matilda effect*', which refers to *systematic under-recognition* of female scholars in the academic world (Puuska, 2009, p. 4; Loeb, 2001). Female academics of New Zealand have reported to be given a disproportionately low amount of credit for their publications if these were written in cooperation either with their husbands or male colleagues (Baker, 2008, p. 5).

Robert K. Merton (1938) demanded *universalism* in scientific communication (Fröhlich, 2009a; 2009b). Under universalism is meant that each scientist can contribute to the science regardless the race, sex, nationality or culture. The value of a scientific message may not depend on the personal characteristics and position of the transmitter. The gender bias in publishing therefore undermines the imperative of universalism.

9 Women: sceptical against Free/Libre Open Source Software (FLOSS)

Research has shown: only 1.5% (!) of FLOSS community members are female (Nafus et al., 2006). As in science FLOSS women tend to be more concentrated in less valued sections - they are involved in documentation, translation, teaching and tutoring which all are less valued than are technical aspects of software development (Lin, 2005; Lyman, 2005).

Literature on gender inequality in science and FLOSS reveals that women feel intimidated by the "*chilly climate*" (Levesque & Wilson, 2004). Science and FLOSS both can be described as working cultures emphasizing independence, individualism and high competition (Levesque & Wilson, 2004; Lay-

zell, 1999). These characteristics are perceived as male and therefore as inappropriate to female behaviour: Following Powell (2009) women prefer to participate in the community within a collaborative environment.

Additionally, the majority of women admit feeling *insecure* when they are asked to describe their computing skills (Hargittai & Shafer, 2006; Liff & Shepherd, 2004). Women tend to engage with computers at a later age (Powell, 2009).

In an interview (Tüür-Fröhlich, 2010) carried out in Germany and Switzerland in 2008/2009, the following remarks were made. A female ICT expert said: “*Men tend to use computers to play, have fun. Women consider computers as tools to execute an assignment, work*” (Tüür-Fröhlich, 2010, p. 54).

A male expert gave the following opinion: “*We have in our organisation 350+ team members and up to 10 programmers are female. They seem to me to be too conformist in their programming skills to take up an initiative for innovative solution*” (ibid., p. 54)

Still it is not appropriate to make generalisations on computer skills based only gender. Another male OA expert told me: “*I have noticed in our institution that the works of established male colleagues are uploaded to the repository by young females*” (ibid., p. 55).

10 How open are the “open initiatives” for women?

The female professor of media informatics Debora Weber-Wulff from Berlin was asked in a German-language interview: “Wikipedia – medium with gender parity or democratic illusion?”

Debora Weber-Wulff answers (author’s transcription from Radio FRO 2011, shortened) rob any kind of illusion. There are too few women participating as authors in Wikipedia. A recent international study on Wikipedia confirms the gender gap. 13 % of Wikipedia contributors are women, and that is too little (apparently, Weber-Wulff refers to Glott et al., 2010 – TTF).

Asked about the why of this underrepresentation of women in Wikipedia, Weber-Wulff said: “A major issue is the aggression. Beginners, both male and female, are treated very rudely. There is a very rough atmosphere. People who are just beginning to write for Wikipedia may see their contributions immediately deleted, changed or modified.

The problems especially in the German Wikipedia are the relevancy criteria. The relevancy criteria are written by nerdy young men who have no kids and live in urban areas. Wikipedia contains their stories. In this way, Wikipedia

presents a skewed picture: it reflects the perspective of its mainly male contributors. Because there are so few women contributors, female topics are so underrepresented.”

Even worse is the situation in the plagiarism-wikis (GuttenPlag, Vroni-Plag). To my knowledge, there is only one woman (Debora Weber-Wulff) participating.

11 Open Access and gender

Tullney (2011), member of a German gender studies group, resumes: “In the German-language gender research, there are virtually no Open-Access publications.”

Generally speaking, there are two streams of publishing research. On the one side, there are many empirical studies about editorial board or authorship and gender (for instance Addis & Villa, 2003; Sassen, 2009) - but so far, open access mode of publishing has not been taken into consideration from this angle. On the other side, there are several studies on attitudes and practices of scholars towards open access publishing. Yet only in one survey, that of the Deutsche Forschungsgemeinschaft (DFG, 2005) on open access publishing strategies, *gender data* is analysed in some form. One has to consider, that the respondents of the DFG (2005a, 2005b) survey have successfully gained a grant by the DFG, the largest German research funding institution. Therefore the respondents represent a selected group of all German academics. The female and male respondents’ attitudes and practices hardly differ. But more females (45%) than males (29%) wish to receive more training in open access and publication techniques (DFG, 2005b, p. 169, Tab. 26a). Henchel’s (2007) master thesis investigated the Open Access at the Humboldt University Berlin. The awareness of Open Access movement (Berlin Declaration, etc.) amongst female and male academic staff was represented in a diagram. According to that, slightly less than 80% of men, but only just over 60% of women have „heard of the Open Access movement is.“ (ibid., p. 34).

Weishaupt (2008, p. 59) does describe the number, sex and age of the participators (authors who had already published open access) in the German-language online survey in a graph. The respondents were mainly male: in the age groups (21-60 years), three to four times as many men as women and at the age of 61 virtually only men replied. Unfortunately, Weishaupt refrained from any further gender-related analysis in her study.

The interface of gender and open access publishing is still marginally investigated. The study (Tüür-Fröhlich, 2010; 2011a) on the *potentials* of open access publishing to enhance the visibility, consequently the careers of female scientists in social sciences, was conducted as a scientometric analysis of three German social science journals – Forum Qualitative Sozialforschung (FQS), Zeitschrift für Qualitative Forschung (ZQF) and Sozialer Sinn (SoSi) - on authorship patterns and structures.

According to the already mentioned statistics in European countries the social sciences show high numbers of female researchers, therefore it was expected to find equal share of contributions written by women and gender equality amongst editors, board members and referees.

Summarizing the results: all three journals publish contributions on similar social sciences themes and their authors employ mainly qualitative methods. The journals' major difference was the mode of publishing: Forum Qualitative Sozialforschung (FQS) is the only online and open access journal, Zeitschrift für Qualitative Forschung (ZQF) and SozialerSinn (SoSi) are paper-based journals with some forms of closed access online presence. All journals are released in Germany, but FQS is the only multi-lingual journal (German, English and Spanish). The majority of contributions published in ZQF and SoSi are in German language.

Comparing the total sum of all contributions (N=1557) including articles and reviews in all journals, the definite leader is FQS with N=1133 publications. One explanation is definitely the unlimited space for online journal. ZQF and SoSi are limited in their dimensions due to the emphasis on paper-based publishing. The open access journal FQS is the only one that has a female editor-in-chief and has the highest share of female board members. Both other journals are male dominated (date: September 2009). The open access journal FQS has the highest share (79%) of all female contributions (articles or reviews) from all three journals. The highest rate of *female single authors* are represented in FQS (n=432), which is 4 times higher than ZQF and SoSi. It is possible attribute to open access publishing in this (generally quantitatively female dominated) field the predicate "women friendly". But it is not clear if these findings are transferable to other fields of research and methods. Therefore further research is needed.

12 But still...

The extensive literature on gender inequality in work-life balance and domestic labour division showed various disadvantages women face in scientific careers. It is high time for the scientific and social policy makers to recognize the problems female scientists face in the academic labour market and implement structural reforms, e.g. *dual career management as an obligatory action* at the academy.

The previously mentioned various open initiatives (FLOSS, Wikis and Wikipedia) bear for women various chances to participate. In order to create a change, women must take active roles e.g. to write instead of only consume at Wikipedia.

The Open access mode of publishing embodies for scholars following options for better work-life balance:

- the contributions can be searched for, downloaded, read, commented and new ones uploaded independently from time of the day, time zone or geographical location (e.g. at home, while the depending family member takes his/her nap after the Christmas feast).
- The horrendous costs (up to 30 euro per 5-10 pages) for online articles can be saved, even eliminated due to barrier-free access. Free access for all contributes to better public control mechanism, discovering and preventing plagiarism.

These are just some reasons why I am still convinced that the various “open” initiatives include advantages for women to overcome gender discrimination, and most important to enhance female voices in scientific and science communication, @-internet and mass media.

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