The gender challenge in research funding - assessing the European national scenes

Sweden

Carl Jacobsson- November 2008

Gender and Excellence, Country Report: Sweden

1. Gender equality policy context in Sweden

In 1970 joint taxation for married couples was abolished and replaced with individual taxation. This decision had a considerable impact on gender equality as had other political reforms regarding the social insurance system (paid parental leave, available public child care), improvements in education, health and care sectors have contributed.

Since the 1970's successive governments have regarded gender equality as an area of priority. Gender equality is no longer a woman's issue – it is a policy area affecting all citizens and it requires active efforts by both women and men. Equality between women and men must be considered in all decision-making.

In order to be able to carry out better analyses of the situation of men and women in various regards and as a consequence of this to decide on reforms when needed an ordinance was introduced in 1992 stipulating that all individual based official statistics must be gendered.

Since 1994 the Government has had as its principle that the gender perspective should be mainstreamed into all policy areas. Sweden has also used the "double strategies" concept, however, which means that both mainstreaming and special measures are used to improve gender equality. For instance, in 1999 a new clause was introduced in the Higher Education Act which states that higher education institutions are to promote gender equality in education and research for which they are responsible. Similar stipulations apply to the research councils and the innovation agency.

Of great importance are also the Government's directives to the higher education institutions and research funding bodies that they must in their annual reports (and other documents) submit gendered statistics and report what measures they have taken to improve equality between the sexes. An example of such requirements is given below.

Goals for the recruitment of professors

In the late 1990's a new system was introduced whereby the Government sets a goal for each university regarding the proportion of women among (full) professors who are recruited by that university during three (later four) year periods. The Government stated that this was a long term measure. The underlying idea was – and is – that through setting a goal for recruitment on the highest level universities would have to make efforts to recruit women on lower levels who could eventually become professors. The goals for 1997-1999 were calculated on the basis of the proportion of women among associate professors on a national level. On a national level the proportion among new professors was 7 % in 1985-92 and 12 % in 1993-95. The goals set for 1997-99 for each university added up to a national goal of 19 %.

The outcome, 21 %, surpassed the goal. In addition, the share of women among new professors for all universities together was 21 % in the next period for which goals were set, i.e. 2001-2004. Thus, the goals seem to have had an effect on the number of women professors. Of course, there can be also other factors that influenced the outcome.

Boards of higher education institutions and boards of research councils

The Government strives to achieve gender equality in all its appointments. In boards and other bodies a distribution where both sexes constitute at least 40 % of the members is considered acceptable. The boards of higher education institutions are to a large extent appointed by the Government which means that they normally attain this goal.

The majority of the boards of the research councils are elected by the research community and not by the Government, but the nomination procedure guarantees nevertheless, in practice, an equal representation of women and men - a form of quota for women that is generally accepted.

Rectors of HEIs and heads of research funding bodies in Sweden

Rectors of HEIs and directors general of government agencies are appointed by the Government; in the case of a HEI after nomination by the HEI. Consequently, the proportion of women among rectors and directors general has gone up considerably during the last decade. There are 19 male and 11 female rectors today (2008, excluding seven small arts university colleges and one sports university college in Stockholm). The share of women rectors is thus 37 %. Among the 11 largest universities there are six male and five female (45 %) rectors. The directors general of research funding agencies are appointed by the Government. The heads of private research funding bodies are of course appointed in other ways. Among the heads of the more important research funding bodies, the majority of whom are appointed by the Government, there are today 12 men and 7 women (37 %).

Gender equality policy of the HEIs and the research funding bodies

All universities and university colleges have gender equality strategies and plans. This holds true also for the research funding bodies (possibly with the exception of some smaller private organizations). The following is a short description of the gender equality policy of the Swedish Research Council, which is the largest research funding body in Sweden with a research budget of some 3.6 billion SEK (about € 390 million)

The main task of the Swedish Research Council is to fund research characterized by high quality and innovation, including “potential for renewal”. A precondition for the carrying out of this task is that the council’s decisions on research financing are free from bias. Furthermore, according to its mandate, issued by the Government, the Council shall perform its functions in a way that promotes gender equality, i.e. equal opportunities for men and women to receive funding if their research is of the same quality. There should also be equal representation of men and women in the review panels and in the bodies that take the funding decisions, such as the scientific councils. The strategy for gender equality in research funding, the Swedish Research Council is based on the assumption that research capability can be found to same extent in women and men. Furthermore, research is promoted if both women and men participate and contribute with their competence and experience. Gender equality is also a question of equal rights; both women and men should have the same possibility to do research and to pursue a research career.

2. A short overview of the Swedish R&D system

As early as 1993 investments in R&D in Sweden exceeded the goal set by the European Council in Barcelona ten years later, i.e. that R&D investment should correspond to at least 3 % of the GDP. In 2001 such investments had reached 4.25 % of the GDP in Sweden, but have since then decreased to 3.9 % in 2005, putting Sweden in second place after Israel.

By far the largest part of Swedish R&D is funded by and performed within the business and enterprise sector. Companies carried out almost three quarters of the total volume of R&D in 2005, corresponding to SEK 77 billion (about € 8.3 billion – cf. the population of Sweden is 9 million). Most of these activities can, however, be characterized as development rather than research. It is instead the higher education institutions (HEIs) that are the main performers of research. At a rough estimate, research activities accounted for at least 19 billion of the total R&D expenditure of SEK 22 billion (about € 2.4 billion) in 2005. The institute sector is comparatively small in Sweden; its total R&D expenditure was about 3.2 billion SEK (about € 340 million) in 2005.

With regard to basic research the higher education institutions dominated even more. In 2005, 89 % of the Swedish publications found in the most widely used database of scientific publications - the Thomson Web of Science database - were authored by researchers at higher education institutions.

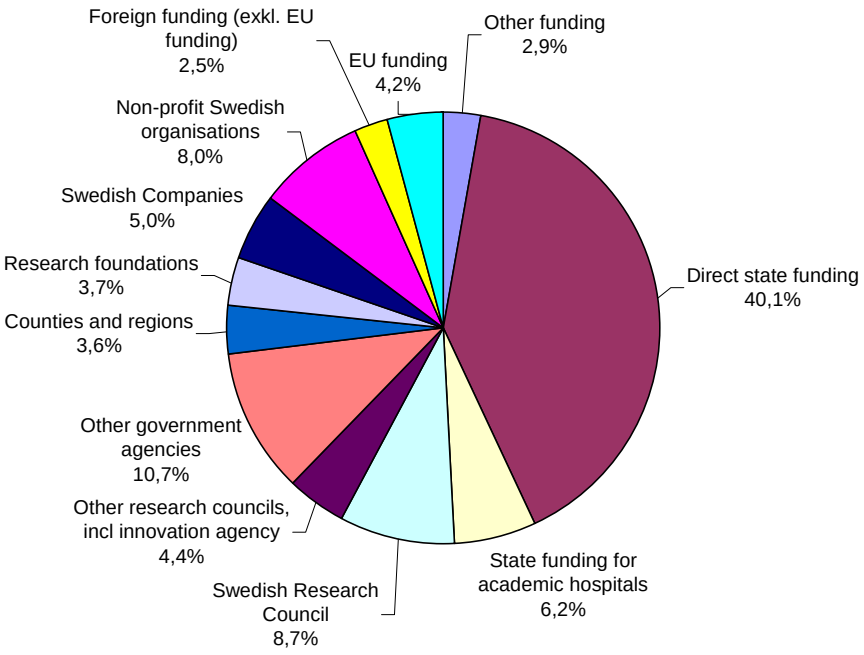
3. A short overview of research funding in the higher education sector

In total there are 38 higher education institutions in Sweden. There are 15 universities (including one non-governmental university), 15 university colleges (including two non-governmental university colleges), seven small arts university colleges and one sports university college.

Almost all the resources for higher education are provided directly by the state. Government allocations to higher education institutions are based on per capita remunerations for full time equivalents and annual performance equivalents which vary between subject fields; the lowest remunerations are paid to the humanities and social sciences whereas medicine, media and arts have the highest. The Government decides the maximum number of students for whom each institution is entitled to receive remuneration. To some extent, the HEIs sell education to private companies etc.

In contrast, direct government appropriations constitute only 46 % of the total research funding of higher education institutions. The remaining 54 % are funded by research councils (13 %), government agencies (11 %), research foundations that were originally set up by the government (4 %), private foundations (8 %), private companies (5 %) and foreign sources (7 %), mainly EU funding (4 %). The following figure illustrates funding in 2006 for research and postgraduate programmes.

Research funding, including funding of postgraduate programmes, of universities 2006 by source of funding



4. Major research funding bodies

There are three research councils and one agency for innovation systems:
Swedish Research Council, 3.6 billion SEK (about € 390 million)
Swedish Council for Working Life and Social Research (FAS), 350 million SEK (about € 38 million)
Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas), 550 million SEK (about € 60 million)
Swedish Governmental Agency for Innovation Systems (VINNOVA), funds research and innovation.

There are sixteen public research foundations, originally funded with state funds. Some of the more important are:
Swedish Foundation for Strategic Research (SSF)
Foundation for Strategic Environmental Research (MISTRA)
Knowledge Foundation
Bank of Sweden Tercentenary Foundation

All the above funding bodies must follow the Swedish law about public access to information, and so any decision must be made available to any citizen on request. (This law made the Wennerås & Wold study possible in 1995.) However, not all of them include success rates of women and men in their annual reports. The first three do, and to some extent so do the Swedish Governmental Agency for Innovation Systems (VINNOVA) and the Bank of Sweden Tercentenary Foundation.

The peer review groups at the Swedish Research Council are selected by the boards of each research council, and generally have an equal representation of men and women. The

distribution according to sex of peer review groups must be included in the research council's annual report to the Government. However, the peer review groups in the natural and engineering sciences at the Swedish Research Council have a lower representation of women, 27 %, due to the low proportion of women, 20 % in 2006, among university researchers, with a doctorate, in these fields. The peer review group members are paid. There are international members, but most are national. No rank is required, but most members are (full) professors.

There are also several private foundations for research; the most important is
Knut and Alice Wallenberg Foundation

There are several medical foundations collecting gifts for research from the public:
Swedish Cancer Society
Swedish Childhood Cancer Foundation, etc.

I have not found any success rate statistics for men and women for any private foundation. This does not necessarily mean that such statistics do not exist, but it seems that such statistics are not easily available.

Funding programme for women at the Swedish Governmental Agency for Innovation Systems
The Swedish Governmental Agency for Innovation Systems (VINNOVA) in 2007 started a new programme to support women future research and innovation leaders. About 100 women will get support in the programme. The total amount of funding 2007-2014 is 500 million SEK (about € 55 million) of which VINNOVA contributes about 300 million SEK.

5. Success rates for men and women applying for grants from the Swedish Research Council 2003-2007

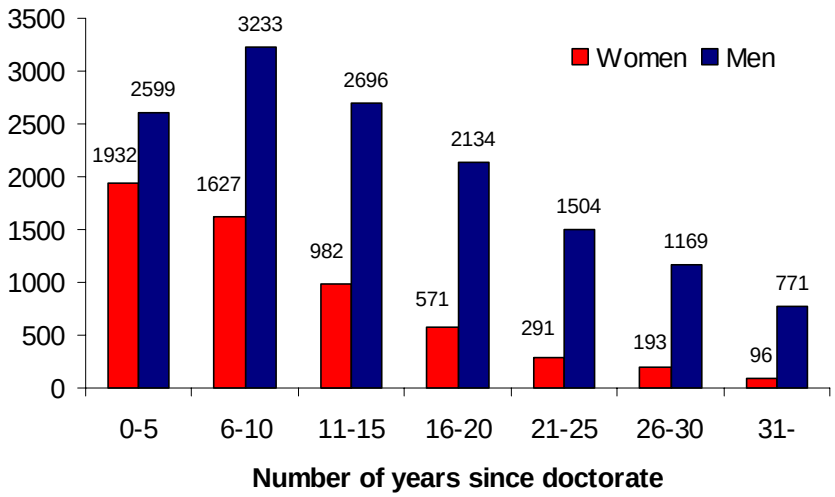
The success of men and women who applied for support from the former Swedish Medical Research Council was the subject of a study by Wennerås and Wold which was published in Nature in 1997 and attracted much attention. A total of 114 applications for assistant professorships received in 1995 were studied with bibliometric methods. It was found that women had to publish significantly more than men to receive the same scores from peer reviewers.

When the Swedish Research Council (SRC) was founded in 2001 the Medical Research Council was integrated into it. In 2006, a study of all the applications that the Swedish Research Council received during the period 2003-2005, in total 17 500, was published (in Swedish; a short English version was published in 2007). Moreover, in 2008 a study was published (in Swedish) adding the about 11 000 applications received in 2006 and 2007. The studies were carried out in a gender equality perspective.

Success rates for men and women applying for project grants at the Swedish Research Council 2003-2007

When the success rates of men and women applying for project grants were studied, consideration was taken for the differences in "career-age" (number of years since the applicant attained the doctorate degree) and in subject field. The next figure illustrates the differences in career-age among the almost 20 000 applications for project grants received 2003-2007.

Applications from women and med for project grants 2003-2007 by the number of years since doctorate

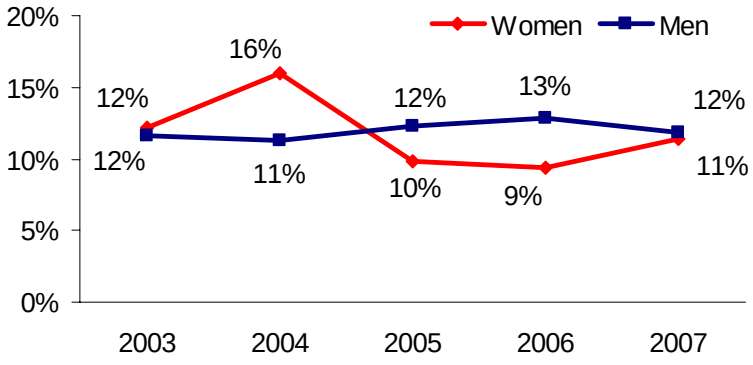


This situation is the same for all areas of research; the share of women in the lower career-age groups is much higher than the share of women among the higher career-age groups. This is the result of the career-age distribution of women and men among the teachers/researchers with doctorates at the Swedish HEIs, which in its turn is a consequence of the increasing share of women among new doctorates in Sweden – in 1986 only 21 % of the new doctorates were women compared to 46 % in 2006.

Both men and women with higher career-age have higher success rates than men and women with lower career-age. Thus, in the case of project grants it is reasonable to compensate for the differences in career-age between men and women applicants.

The success rates of men and women have varied during the period 2003-2007 for the about 1000 applicants per year to project grants in the **humanities and the social sciences**. For the entire period the success rate was 11.6% for men and 11.0% for women.

Success rates for men and women - project grants in humanities and social sciences



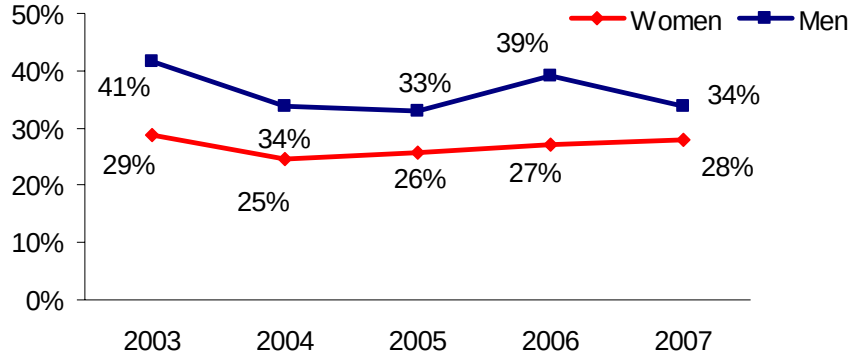
	2003	2004	2005	2006	2007
Appl. from women	345	339	398	424	421
Appl. from men	618	610	629	616	631

However, if you compensate for the differences in career-age, women had the expected success rates (11.0% compared to expected 10.9%).

The share of women among the applicants 2007 was 40 %. This figure can be compared with the share of women among teachers/researchers in humanities and social sciences with doctorates at Swedish HEIs in 2006, which was 39 %. Thus, the share of women among applicants was about the same as the share of women among the potential applicants.

In **medicine**, men had considerably higher success rates than women during the entire period 2003-2007; in average men had a success rate of 37.0 % and women 26.9 % (an actual difference of 10 %). The expected success rates, when compensating for the differences in career-age, were 34.9 % for men and 29.3 % for women (an expected difference of 5.6 %).

Success rates for men and women - project grants in medicine



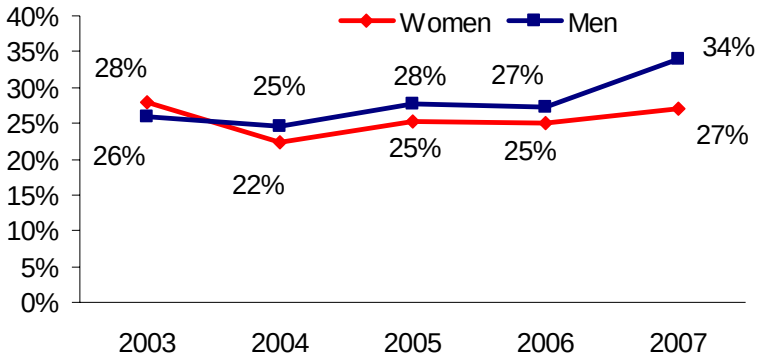
	2003	2004	2005	2006	2007
Appl. from women	275	305	399	335	433
Appl. from men	617	597	697	667	719

Thus, in the field of medicine, about half of the difference in success rates between women and men in 2003-2007 can be explained by the differences in career-age. The probability that the remaining difference is due to chance alone is 2.4 %. It should be noted that the peer review groups in medicine at the Swedish Research Council consists of about 50 % women and that the groups are informed of the council's gender equality policy. Encouragingly, in 2007 the differences in success rates for men and women applicants to project grants in medicine were smaller; the success rates were about equal, when you compensate for the differences in career-age.

The share of women among the applicants 2007 was 38%. This figure can be compared with the share of women among teachers/researchers in medicine with doctorates at Swedish HEIs in 2006, which was 46%. Thus, the share of women among applicants was somewhat lower than the share of women among this approximation of the potential applicants. However, in medicine many applicants are employed at a hospital and not at a HEI, and so the group of "potential applicants" is a bit different from other subject fields.

In **natural and engineering sciences**, the success rates were a little higher for men than for women applying for project grants. In average over 2003-2007 the success rate was 27.7% for men and 25.5% for women. The expected success rates, when you compensate for the differences in career-age, were precisely the same.

Success rates for men and women - project grants in natural and engineering sciences



	2003	2004	2005	2006	2007
Appl. from women	269	296	292	304	263
Appl. from men	1468	1620	1480	1259	1264

The share of women among the applicants 2007 was 17%. The share of women among teachers/researchers in natural and engineering sciences with doctorates at Swedish HEIs in 2006 was 20 %. Thus, the share of women among applicants was a little smaller than the share of women among the potential applicants.

In **educational sciences**, women in average had a higher success rate (16.1%) than men (15.7%) for the about 300 project grants per year received during the period 2003-2007. The success rate for women was higher than expected if you compensate for the differences in career-age (16.1% instead of expected 15.0%). The probability that this difference was due to chance alone is 37%. The share of women among applicants was 50 % in 2007.

Success rates for men and women applying for grants for research infrastructures at the Swedish Research Council 2003-2007

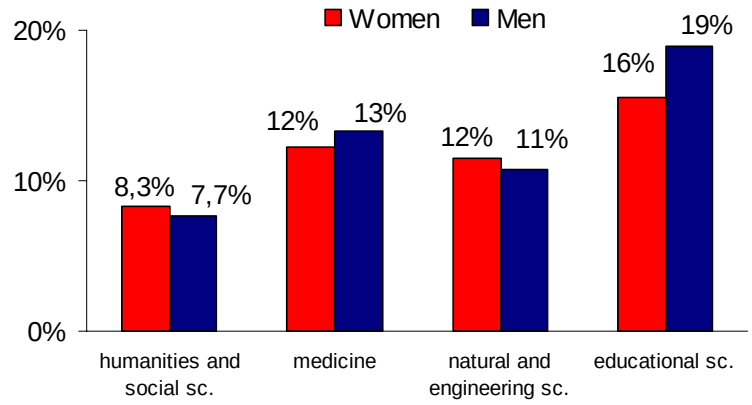
Among the 120 applicants per year to grants for research infrastructures during the period 2003-2007, women had a higher success rate (35.1%) than men (28.3%). The probability that this difference was due to chance alone is 23%. The share of women among applicants was 19%, which reflects the share of women among teachers/researchers in natural and engineering sciences with doctorates at Swedish HEIs in 2006 (20 %).

Success rates for men and women applying for assistant professorships at the Swedish Research Council 2003-2007

During the period 2003-2007 the Swedish Research Council received 3 700 applications for assistant professorships. Of these applications 42 % came from women. An applicant must have a doctorate no more than five years old. Thus, we can compare the figure 42% with the share of women among new doctorates in Sweden during the period 2002-2006, which was 45 %. We see that the share of women applicants was about the same as the share of women among the potential applicants.

The success rates varied considerably between the different subject fields, but were about the same for men and women within each field, as can be seen from the following figure. In average over all subject fields men had a success rate of 11.2% and women 11.6%. If the success rate had been equal within each subject field, we would have expected a marginally higher success rate for women. The probability that this difference is due to chance alone is 87 %.

Success rates for men and women - assistant professorships 2003-2007



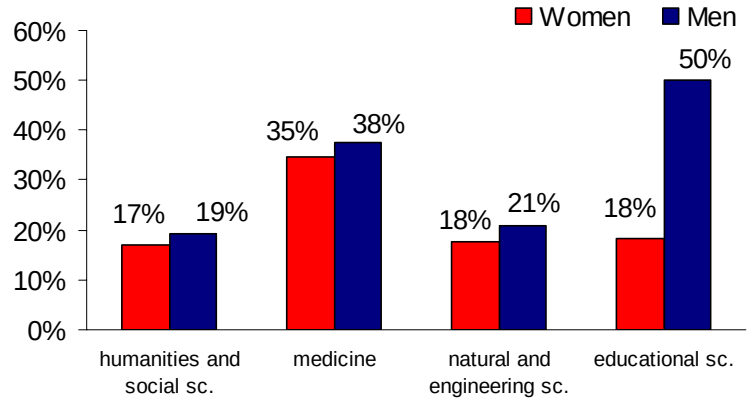
Appl. from women	276	810	390	90
Appl. from men	325	603	1 160	58

Success rates for men and women applying for fellowships for a postdoctoral research period abroad at the Swedish Research Council 2003-2007

During the period 2003-2007 the Swedish Research Council received almost 1 400 applications for fellowships for postdoctoral research periods abroad. Of these applications 40 % came from women. An applicant must have a doctorate no more than three years old. Thus, we can compare the figure 40 % with the share of women among new doctorates in Sweden during the period 2004-2006, which was 45 %. We see that the share of women applicants was a little bit lower than the share of women among the potential applicants.

The success rate varied considerably between the different subject fields, and was higher for men than for women within each field, as can be seen from the following figure. Note that the high success rate for men in educational sciences is based on two applications only. If the success rate had been equal within each subject field, we would have expected 10 more women to have been funded (146 instead of 136) and 10 fewer men (191 instead of 201). The probability that this difference is due to chance alone is only 28 %.

Success rates for men and women - fellowships for a postdoctoral research period abroad 2003-2007



Appl. from women	77	222	249	11
Appl. from men	115	189	516	2

The difference in success rate is almost entirely due to the much higher success rate for men than for women in 2005. A bibliometric study of the applicants 2005 in natural and engineering sciences and in medicine revealed no noteworthy differences between the group of women applicants and the group of men applicants. Thus, the bibliometric methods used in the study could not explain the difference in success rate between women and men in 2005.

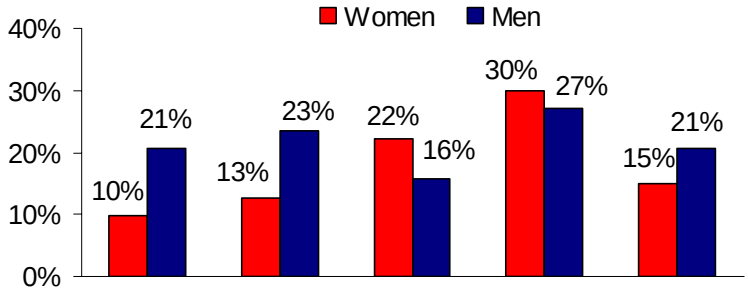
However, in all the other years in the studied period, the success rate of men and women were about the same within each subject field.

Success rates for men and women applying for the new large Linnaeus "research environment" grants at the Swedish Research Council 2006 and 2008

The 202 female applicants 2006 had a lower success rate, 15 %, than the 748 male applicants, 21 %, for the new large (up to about € 1 million annually over ten years) Linnaeus research environment grants in 2006. The probability that this difference was due to chance alone is 12 %. Also, the share of women applicants for Linnaeus grants 2006 was lower, 21%, than for other types of grants and lower than the share of women among professors/associate professors with doctorates at Swedish HEIs in 2006 which was 30 %. It should be noted that the applications were evaluated by international experts only.

As can be seen in the figure below, the success rate for women was considerably lower than for men in humanities, social and educational sciences and in medicine. In natural sciences and engineering sciences the success rate for women was higher than for men. Moreover, a study of the career-age distribution revealed that women applicants with high career-age were few and had little success.

Success rates for men and women - Linnaeus research environment grants 2006



	humanities, social and educational sc.	medicine	natural sc.	engineering sc.	SRC in total
Appl. from women	91	47	54	10	202
Appl. from men	179	171	273	125	748

Encouragingly, in 2008 the share of women among the 970 applicants was higher, 29 %, and women had almost the same success rate as men did: 18.9 % compared to 19.4 %.

Concluding remarks on success rates at the Swedish Research Council

Whether the above-mentioned differences in success rates depend solely on differences in the quality of the applications or if they are also a result of an unconscious bias on the part of the evaluators and decision-makers of both sexes is a subtle issue, which is not easily investigated. The Swedish Research Council's clearly-expressed ambition is, of course, to

avoid all bias in the evaluation of applications for research funding. The council also has the task to promote gender equality.

As a consequence of the gender equality study in 2006, the council in 2007 adopted a sharper gender equality policy and decided to make further follow up studies of the success rates of women and men. These studies can then be a basis for future actions to promote gender equality in the Swedish Research Council's funding decisions. As noted above, the differences in success rate between men and women were small in 2007 (when we take the career-age into account in the case of project grants). Moreover, the gender difference in success rate was small for the Linnaeus grants in 2008.

6. Success rates for men and women applying for funding from other funding bodies

The two other, smaller, research councils - the Swedish Council for Working Life and Social Research (FAS) and the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas) - have made similar studies of the applications received (without career-age considerations, however). No noteworthy differences in success rates between women and men were found 2006 or 2007, but some differences favouring men have been observed earlier (2004-2005) at the Swedish Council for Working Life and Social Research.

The share of women among applicants for project grants was 41 % at the Swedish Council for Working Life and Social Research (FAS) in 2007, which was higher than the share of women among teachers/researchers in humanities and social sciences with doctorates in 2006 (39 %). The share of women among applicants for project grants was 37 % at the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas) in 2007.

The share of women among applicants was 22 % at the Swedish Governmental Agency for Innovation Systems (VINNOVA) in 2006, which reflects the share of women among teachers/researchers in natural and engineering sciences with doctorates at Swedish HEIs in 2006 (20 %). In average, the success rate for women was higher than for men (25-27 % of the funded applications were from women in 2006).

The share of women among applicants was 42 % at the Bank of Sweden Tercentenary Foundation in 2006, which is higher than the share of women among teachers/researchers in humanities and social sciences with doctorates at Swedish HEIs in 2006 (39 %). The success rate for women was lower than for men in 2006 (36 % of the funded applications were from women in 2006). However, in 2005 the success rate was higher for women than for men (39 % of the applications and 44 % of the funded applications were from women in 2005).

References

Web sites
Statistics Sweden www.scb.se (statistical data etc.)
Swedish National Agency for Higher Education www.hsv.se (statistical data etc.)
Swedish Research Council www.vr.se
Swedish Council for Working Life and Social Research (FAS) www.fas.se
Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas) www.formas.se
Swedish Governmental Agency for Innovation Systems (VINNOVA) www.vinnova.se
Bank of Sweden Tercentenary Foundation www.rj.se
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Annual reports, statistical reports and other reports from the web sites listed above, e.g., www.vr.se .