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SET Women and Careers:
A case study of senior female scientists in the UK

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Introduction

This short article is an overview of case study research conducted in 2008 with thirteen female senior scientists in a UK, public sector organisation, referred to throughout as Scienceorg, a global research institution offering services to government and commercial organisations. Scienceorg is a male dominated organisation with a total headcount of nineteen hundred, women representing just one fifth of all senior mangers, ranging from Heads of Department to Senior Project Managers.

To set this into context, women comprise almost half of the UK labour force but this has not resulted in gender equality in terms of the jobs that men and women perform (horizontal segregation) and the levels at which they operate (vertical segregation). In the case of the latter, women remain under-represented in senior management positions in the UK (Sealy *et al.* 2008) where vertical gender segregation is most pronounced. Whilst a third of managers and senior officials are women, only a few have broken through the glass ceiling into senior management. In 2008, women held just 12 per cent of Directorships in FTSE 100 companies, an increase from seven per cent in 1998, indicating that progress has been extremely slow (Sealy *et al.* 2008). In cases where women do make it to senior positions, they often exist as 'tokens' (Kanter 1977).

This situation persists, despite the regulatory route for transition to a public gender regime in the UK[1], one in which women's access to employment is facilitated by the legal removal of discrimination, regulation of working time so that it is compatible with caring and policies to promote social inclusion (Walby 2004). This poses a problem, as it is at these senior levels that crucial decisions are made and leadership exercised around critical strategic issues. If women are not promoted to senior posts this will continue to act as a barrier in defining career choices for women leaving higher education (European Commission 2006) and will do nothing to improve the already relatively low numbers of female science graduates taking up science, engineering and technology (SET) employment.

This article offers an overview of the careers of thirteen female scientists at Job Levels A (just below Board level) and Job Level B (the first senior management grade) who have progressed to senior positions within a single case study, male-dominated organisation. The careers of these particular women are of interest because they represent a group who have accessed senior management positions within their scientific disciplines, despite their organisation and profession being male-dominated, at every level and within almost every function. The women interviewed straddle three occupational groups: senior management, SET management and science professionals, reflecting their scientific status and progression into managerial roles within their own scientific disciplines. All have reached senior positions but have yet to reach the highest echelons of their organisation, which means that they exist as 'tokens' within an environment that remains male-dominated.

[1] The public gender regime is based, not on excluding women from the public, but on the segregation and subordination of women within the structures of paid employment and the state, as well as within culture, sexuality and violence (Walby 1997: 6).

Background: Women in SET

In 2008, SET occupations [2] represented 3,142,127 of the UK workforce (595,606 female and 2,546,521 male). In the same period, there were a total of 1,112,483 SET managers [3] (153,951 female and 958,532 male) and 133,665 'Science Professionals'[4] (52,615 female and 81,050 male) (UKRC, 2009). Men are six times more likely than women to be employed as SET managers and one and a half times more likely to be employed as Science Professionals. Across seventeen EU member states, just three can boast a rate of over 40 per cent for female representation on scientific Boards (Norway, Finland and Sweden) while the UK figure is 31 per cent (European Commission, 2006). In their study of SET employees, Wynarczyk and Renner (2006) report that just two per cent of women held senior managerial level jobs in SET, which is far lower than for women in other sectors. With an estimated shortfall of 300,000 SET recruits over the next few years, this will have 'huge ramifications' (The Independent 2008).

The women interviewed for this research have been successful in securing senior positions to a point but the majority still have to reach the most senior levels (e.g. Job Level A and the Board). How have they achieved their current status and what do they still need to do to progress further? These questions are explored through investigation of the career histories, challenges and strategies of thirteen senior female scientists. To achieve these objectives, three related themes are examined. Firstly, career backgrounds, including career challenges and career progression strategies are explored. Secondly, the extent to which mentors have played a role in their progression, in the context that mentoring is perceived by the government and SET networks,

[2] SET occupations include: SET Managers; Science Professionals; Engineering Professionals; ICT Professionals; Teaching Professionals; Research Professionals; Building Professionals; Science and Engineering Technicians; Draughtspersons and Building Inspectors; IT Service Delivery Occupations (based on the 4 Digit SOC2000 Definition).
[3] The 'SET Manager' definition includes research and development managers.
[4] The 'Science professionals' definition includes physicists, geologists and meteorologists.

such as the UK Resource Centre for Women in SET, as an important activity for women's progression in SET (Helsinki Group on Women in Science 2002). Thirdly, the potential for senior women to act as mentors and role models to other women in SET organisations is examined. The aim is to gain a sense of the challenges faced by senior female scientists and the social conditions that underpin these.

There are a range of government initiatives aimed at tackling women's under-representation in SET. The reasons for government interest are that it recognises SET as important for economic growth in the UK, that women's skills are under-utilised in this area of the economy and because of an increasing feminisation of the UK labour market. Several reviews of the situation in the UK have been conducted: The Rising Tide Report 1993, the Helsinki Group on Women and Science in 2002, (after which the 'Promoting SET for Women Unit' was set up at the Department of Trade and Industry in 1994) and The Roberts Review (2002). More specifically, the Greenfield Report (2002) included the setting-up of working groups to tackle different stages of SET careers for women, including senior management.

As a result of these reviews, the UK Resource Centre for Women in SET was set-up in 2004. Recommendations included, encouraging more women into science teaching and addressing the under-representation of girls in science subjects at school. This could be an important initiative early in a woman's career given that careers in science tend to begin at an early age, with an educational course that forms a progression of study (Fox and Stephan 2001). Recognising the 'vital contribution' that women make to UK competitiveness, the government claims that it is committed to raising the profile of women in SET careers and to ensuring that women reach the highest levels (Greenfield Report 2002). Yet in 2009, little has changed at the strategic leadership level and women remain poorly represented.

Another important reason for women's under-representation is the low retention rate, post-childbirth, of women in SET. Figures cited by the Independent (2008) clearly demonstrate this retention problem: after giving birth to their first child, just 8,000 women returned to SET employment, compared with 24,000 women in the general workforce[5] which has been partly blamed on a lack of proactive HR policies. It is claimed that women are considerably more likely than men to exit professional scientific jobs in their first two years of employment, the median tenure for women in their early thirties in professional scientific occupations being just under four years, compared with ten years for men. Returning to work is more difficult in science-based employment than in other fields (Blackwell and Glover 2008). One explanation for this is a lack of a family-friendly culture within SET which does little to encourage women back.

If, as Wynarczyk and Renner (2006) and Blackwell and Glover (2008) claim, family formation is likely to affect retention, then resources should be directed at changing the attitudes and perceptions of employers towards female employees with children, although evidence suggests that women engaged in scientific fields tend to be younger and relatively fewer of them have children compared with other female employees. An additional explanation for the lack of returners could be that the nature of the work and the pace at which science evolves, means that women may feel that they have lost touch with their scientific disciplines and that their skills have become outdated.

There are some initiatives to encourage women back into SET including, 'return to work' courses (Herman and Kirkup 2008) one of the main aims being to help women to advance their careers and continue practising their professions. There are also a wide range of networks aimed at women in SET, with over seventy of these in the UK alone (Greenfield *et al.* 2002) e.g. Promoting SET for Women Unit (PWSET). These organisations offer career

[5] Although the time period in which this took place is not stated

development advice, job search links and networking hints and tips. Mentoring is another important initiative as mentors are recognised as being able to identify opportunities for training and development, explain and raise awareness of the 'political landscape' of the organisation, provide access to privileged information, make introductions into important decision making networks and convey norms of behaviour and the values of the organisation. Mentoring relationships can open up networking and career opportunities for the person being mentored.

In summary, SET is an occupationally segregated area in which women are under-represented, despite attempts by the government and SET support networks to encourage more women into the profession. Science careers tend to start early, with an educational course that forms a progression of study (Fox and Stephan 2001) but there exists a dual problem: there are relatively low numbers of women entering SET and many of those who do so, do not stay. Mentors are perceived as one of the answers to the problem but one that has not resolved it. Equal opportunities policies are mainly ineffective but some women in SET are reluctant to engage with more radical feminism, through fear of being 'labelled'. The outcome is a highly gendered profession, within a gendered organisation (Acker 1990) where careers are different for men and women (Evetts 2000).

Findings

Interviewees were asked a series of questions related to their careers. The first question explored significant career challenges. Responses to this question highlighted challenges that are similar for other SET women (Wynarczyk and Renner 2006). There were some gender-related issues, such as managing work and home life, being a woman in a male dominated area and a general lack of confidence to progress, whilst the challenge for some women was getting through the assessment centre, a critical step in the promotion process:

> "I suppose with my private life in mind, it's juggling and giving enough time and attention to my children and giving enough time and attention to my job, and I think that balance is very, very difficult; never successful with that, you can never please both sides, you know. So I think that's definitely the biggest challenge."
>
> (Respondent K, Head of Department)

Interviewees were then asked about the extent to which they had been pro-active in their career development and the type of strategies they had adopted. Many interviewees stated that, 'being good at my job by building a reputation' was an important strategy (Evetts 1998). Other strategies included developing new skills, taking on new challenges and 'visibility'. Researching a role before deciding to take it on was also a popular strategy.

At the time of the research at Scienceorg, no official mentoring scheme was in place, which is perhaps surprising given the government initiatives mentioned above. Official policy was that all interviewees should be allocated a mentor while going through the assessment centre for promotion. This relationship normally ended upon completion of the assessment centre and promotion to senior levels. Despite the importance placed on the role of mentors for career progression touched upon earlier, the women interviewed had mostly achieved senior status without the assistance of a mentor. For those who had been allocated a mentor, their experiences were varied and not altogether positive.

Those who expressed a wish to be mentored said that they would prefer to find a mentor outside of the organisation, although one interviewee could see the value in having a mentor both internally and externally to the organisation. Interestingly, just one interviewee articulated the advantages of being mentored by a scientist which could indicate that the use of non-science,

external mentors may be preferable. Most interviewees had received a good level of support from past and present line managers, who had encouraged them to progress their careers and to think about longer-term career strategies. The statement by Greenfield (2002) that many women who had made it to the top have had supportive bosses would appear to apply here.

Related to this, interviewees were asked about the advice they would offer to other women looking to progress within the organisation. Most felt that at the most basic level, it was important to be 'doing a good job'. However, it was also recognised that this in itself was not sufficient to move up to senior levels. Interviewees said that they would advise other women to attempt to gain more exposure to senior staff within the organisation in order to influence a wider group of people, perhaps through project work; to pick up and develop a specialism; to enhance their skills, to raise their profiles by becoming recognised as the best at what they do, to gain a broad understanding of how the organisation operates and to network with others within the organisation. Self-promotion was perceived to be important. There was a clear recognition that the onus is on the jobholder to be pro-active, to put themselves forward and to get themselves noticed. Personal career strategies were much more about being good at their job, seizing opportunities and taking on new challenges, with some mention of the importance of visibility and self-promotion at the executive level. Other women aspiring to senior positions in Scienceorg could learn from these strategies.

Finally, interviewees were asked how satisfied they were with their careers so far and about their future career aspirations. The majority expressed a high level of career satisfaction, irrespective of their job level and employment status. Comments ranged from feeling 'reasonably ok', 'quite satisfied' to 'very satisfied'. However, interviewees also recognised that future career progression was a limited option, given the relatively small numbers of women employed at these levels and the presence of a male-dominated board with

just one female role model. The structure was described by one interviewee as a 'pyramid shape that is very narrow at the top'. Three possible options for career progression were mentioned by interviewees: an expansion of their current senior role with increased responsibilities; making a success of the current role (although eventually, most would wish to move up to the next level) and leaving to join another organisation (although this option would appear limited, largely by choice).

Conclusions

The paper makes a contribution to the already-established SET literature but also extends and develops knowledge and understanding of a relatively under-researched group of women who are not only under-represented in their chosen professions but also within their own organisations. The reality for these women is that at each stage in their careers, they are operating within a context which continually reinforces the, 'think scientist, think manager, think male' scenario – from education through to employment and beyond. While government initiatives exist to encourage more women into SET, these fail to tackle the underlying problems of gender stereotyping and the ways in which careers are gendered. While it is acknowledged that these underlying problems are not easily surmountable, this conclusion discusses three main points that have emerged from the research.

The first point to note is that although these women's experiences varied, most dealt with working in a male-dominated organisation by identifying with their work and attaching importance to reputation-building, a strategy that Evetts (1998) found amongst female engineers. This is evidenced by the ways in which these women were determined to perform well and remain motivated. These women also became managers of scientists, despite having work-family responsibilities, a finding contrary to Evetts (1998).

Secondly, what also separates this particular group of women from other women in SET is their unusually long length of service, coupled with an unusually high retention rate post-childbirth, which is contrary to the findings of Blackwell and Glover (2008). This may be a reflection of the supportive, public sector environment in which they operate, with decent terms of employment and generous flexible working practices. It may also be the case that given the geographical location of Scienceorg and the specialist nature of the research, there are limited career opportunities outside of the organisation, aside from a few small, private sector organisations.

This means that the women interviewed had developed their roles within an internal labour market over an extended period of time, within an organisation that they felt was supportive but lacking in career opportunities past a certain senior level, such as the Board. Some interviewees said that they felt 'stuck' when discussing career progression and that their options appeared limited. A long length of service amongst employees generally means that turnover is not sufficient to facilitate the movement of women into more senior roles once they become vacant.

Thirdly, mixed views were expressed by interviewees on the role of mentors. There was a desire to be mentored by other senior women outside of Scienceorg and not specifically by scientists. Most interviewees were positive about the support from line managers. This is perhaps an area where Scienceorg, as well as government and support networks, could focus their efforts in supporting women in SET. Where women had been specifically allocated mentors, this tended to be less successful and would indicate that senior women should be given the opportunity to seek out their own mentors, both inside and outside of Scienceorg. The women interviewed have significant potential to act as mentors and role models for other women in science, both within their own and other SET organisations, which fits with their desire to reputation build and improve their personal visibility. However,

that few of them had active mentors seemed to influence their perspective on becoming a mentor themselves.

The efforts by various bodies to encourage women into SET employment, largely through the UK government, have been largely unsuccessful and appeared to have little bearing on the Scienceorg women. During discussions about networking membership, none of the interviewees made reference to any of the UK-wide networks cited above. In general, networking tended to be carried out informally and within Scienceorg.

SET organisations need to become involved in not only encouraging more women into the profession but also nurturing them once they are there.

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