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Working in Non-Traditional Employment Roles: Understanding and Breaking Down the Barriers to Gender Segregation

Women's formal networking: The relationship between networking activities and power

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Abstract

This article examines the networking that takes place within formally organized internal (organization-based) and external (industry-based) women engineers' networks. Drawing upon 48 interviews with women engineers, across a number of industries and seniority levels, mostly in the UK, the article contributes to the scarce empirical literature examining formal women's networking in engineering, in terms of its role in individual support and collective change. By adopting Allen's (1998, 1999) definition of feminist power and shifting the focus of analysis from merely instrumental to other types of networking activities, the study contributes empirically and theoretically to understanding how internal and external women's networking has the potential to help female engineers to stay in and change the profession. Despite the critiques that formal women's networks lack power and the ability to make a positive difference for women, when feminist conceptualizations of power are adopted, women's networking within these networks can be considered to empower them in a variety of ways. Our data identifies that wider networking within external women's networks can be particularly useful as a force for change.

KEYWORDS
collective change, feminist power, networking, social support, women engineers

1 | INTRODUCTION

Women comprise just 14.5% of all engineers in the UK (Women's Engineering Society, 2021). The male-dominated nature of the engineering profession has led organizations to function in ways that do not support women's career patterns (Acker, 1990; O'Neil & Bilimoria, 2005), thus maintaining and reproducing the gender-segregated status quo in formal or covert ways (Martin & Barnard, 2013). This is reflected in the networking patterns of women engineers, who sometimes struggle to secure support and gain access to social networks in the workplace (Roth, 2006). Successful networking has long been described as critical for women who want to break "the glass ceiling" (Forret & Dougherty, 2004) as it can increase job opportunities, performance and satisfaction, career progression as well as social, psychological, and professional support (Singh et al., 2006). In an effort to address the exclusion of women engineers from informal but influential male-dominated social networks that have access to power and resources (Roth, 2006), some organizations, professional bodies, and not-for-profit organizations have set up formal women's networks. For example, the Women in Science and Engineering (WISE) campaign was established in 1984 to support women in science and engineering (see Appendix 1 for other similar networks in the UK). These bodies have promoted formally organized networks, both internally (in-company) and externally (industry-wide) (see Section 2.2 for definitions), for women engineers, thus giving them the opportunity to network with and support each other.

However, as noted by Hersby et al. (2009, p. 427), "the differential status and power of women and men in the workplace are likely to influence how the networks are perceived and utilized". Research suggests that networking within women's networks is not used exclusively for instrumental reasons (i.e., career progression) but that women also network to learn through each other's experiences and strategies (Durbin, 2011; Singh et al., 2006); obtain social and psychological support (Villesèche & Josserand, 2017); increase their self-confidence (McCarthy, 2004); and engage with transformative change (Avdelidou-Fischer & Kirton, 2016) by involving groups already active on the same or related issues (Bleijenbergh et al., 2021). In other words, formal women's networks appear to foster a *different type of networking*, as women network not only for individual career enhancement but also for a collective strategy for gender equality in their organizational and professional contexts (Bleijenbergh et al., 2021; Hersby et al., 2009).

In order to understand *how* and *why* women network within formal women's networks, we need to carefully reconsider our theoretical lens, as "most gender-related networking research focuses on the differences between the networking practices of men and women" (De Klerk & Verreynne, 2017, pp. 477–478), thus ignoring that women's networking is, in this way, measured against male norms (Benschop, 2009). For example, there is an abundance of studies highlighting that networking, mostly or exclusively, in women's networks might not offer many career opportunities due to the lack of status and resources of the members (Blommaert et al., 2020; Forret & Dougherty, 2004; Greguletz et al., 2018). However, as Benschop (2009, p. 220) notes, "there is a dearth of critical feminist theories [...] that go beyond the identification of gender differences" and "enable reflection on the importance of networks" by questioning their underlying masculine connotations. What's more, as Khilji and Pumroy (2018) argue, we need to consider female engineers' agency and cease to see them as "passive" when they defy male norms and build resilience.

In this paper, we argue that if we overlook structural power inequalities and neglect the interplay between organizations, professions, and individual level processes (Acker, 1990), we will fail to counter structural gender inequalities (van den Brink & Benschop, 2014) (re)produced through networking practices and undermine the value of their outcomes. After all, career success and access to power are themselves shaped by power relations (Lukes, 2005) and are infused with masculinity (MacKinnon, 1987). In other words, in failing to move beyond a conceptualization of male power over women, career success for women and gender equality in the workplace continue to be viewed as dependent upon how entrenched male networks are and the willingness of men to accept women into them (Davies-Netzley, 1998). It is therefore necessary to envision ways in which women, both as individuals and as a collective, may challenge male power in organizations, which is our rationale for using Allen's (1998, 1999) multidimensional definition of feminist power that we use to consider how different forms of power enable women to advance their careers and challenge the status quo through their networking practices. Using Allen's theory, it is

possible to view power as a social relation that takes three different forms: "power-over" (acting to constrain others); power-to (achieving a means to an end); and power-with (acting together to achieve a common goal). In this way, we look more carefully at the dynamics and processes of networking, not from the single perspective of gender (i.e., in an unproblematized way, i.e., gender differences) but also consider the structural elements attached to networking and how agency is exercised for career progression and transformative change (Benschop, 2009; van den Brink & Benschop, 2014). This is particularly important for research on women in engineering as power relations are of paramount importance (Khilji & Pumroy, 2018). The paper, taking into consideration all the above and considering networking as a context-sensitive activity (Knappe & Lang, 2014) and thus differing in internal and external women's networks, is guided by three research questions:

(1) How do women engineers frame their networking practices (e.g., for instrumental, expressive, and transformative purposes) within internal and external women's networks?
(2) What types of power (i.e., power-over, power-with, and power-to) can be identified in women engineers' networking practices?
(3) To what extent do these different types of power and networking challenge gender inequality at organizational and professional levels?

This paper contributes theoretically to our understanding of women's networking in relation to three types of power. From a practical perspective, it demonstrates how networking, in particular forms, can enable women to take individual and collective action for change.

The paper is structured as follows. The next section explores the context of women in engineering, women's networking through internal and external networks and the theoretical framework exploring the relationship between power and networking. This is followed by the methods section, which explains how the research was conducted. The findings section explores internal and external women engineers' networking and how this relates to different forms of power. The conclusion sets out the empirical and theoretical contributions of the paper, readdresses the research questions, and suggests future research directions.

2 | LITERATURE REVIEW

2.1 | Women in engineering

Engineering is one of the remaining bastions of gender segregation. It has been traditionally portrayed as "male", tough, rational, and uncreative and thus unsuitable for women (Evetts, 1998; Faulkner, 2009; Hatmaker, 2013; Powell et al., 2009). Women engineers are often stereotyped as technically incompetent (Faulkner, 2009; Powell et al., 2009) and as a result, excluded by core knowledge clusters (Greed, 2000). Women engineers' coping strategies have been found to vary between conforming to playing by the (male) rules, negotiating those rules, or defying the rules to establish their own (Khilji & Pumroy, 2018). Despite these strategies, female engineers still often experience sexual harassment and pay discrimination (Fouad et al., 2017). The constant battle to gain professional acceptance and respect from male colleagues, the lack of meaningful and empathic support from managers or opportunities for formative, developmental experiences for career advancement are argued to lead many female engineers to leave the profession (Fouad et al., 2016; Powell et al., 2009). Women in engineering therefore encounter what Allen (1998, 1999) describes as male domination exercised by power-over. As Fernando et al. (2018, p. 481) highlight, despite the wealth of literature on the contribution of instrumental and emotional social support from supervisors and co-workers to job satisfaction, motivation, career progression, and retention, "these insights have not been applied to women in engineering". It is therefore important to understand where sources of support, resistance, and collective action for change will occur for women engineers.

2.2 | Women's networking within formal women's networks

While informal professional networks (e.g., relationships based upon interaction and/or friendships among those who choose to connect informally for work-related and/or social benefits) have long been recognized as an important factor in promotion outcomes for men in particular (Burt, 1992, 2000), they can also act as a form of gendered social closure to those on the outside (Durbin, 2011; Walby, 2011). This may mean that women have fewer opportunities to access promotion and build social capital (Kumar & Vinnicombe, 2010) and as women tend to occupy less influential positions with fewer resources, they are less able to engage in reciprocal relationships based on the exchange of those resources (e.g., Charles & Aull-Davies, 2000; Forret & Dougherty, 2004). As a result, women are at a disadvantage in terms of absence from the covert spaces where alliances are formed and critical organizational knowledge, which can lead to career progression (Greguletz et al., 2018; Ibarra, 1993). For these reasons, networking has been argued to be a consistent barrier for women (Topić et al., 2021).

To mitigate the limitations faced in informal networking, women may opt to participate in formally organized professional women's networks (Durbin, 2011; Roth, 2006). Women's formal networks can take two forms: internal or external. Internal women's networks are in-company/intra-organizational and created either by management or by female members of the organization (Villesèche & Josserand, 2017). Their main aim is to facilitate the inclusion and development of women through cooperative knowledge exchange in existing organizational frameworks and culture (Benschop et al., 2015; Villesèche & Josserand, 2017). External women's networks on the other hand, are inter-organizational/industry-wide (Villesèche & Josserand, 2017) and stem from groups representing women in mostly heavily male-dominated industries and professions where entry into roles was previously denied to them (Peritton, 2006). Internal and external women's networks, therefore, clearly serve different purposes for women. While the former network type is about mutual support, the latter is much more focused upon professional identity.

The networking activities and behaviors of individual women within these networks is our focus in this paper, rather than the networks themselves. As Benschop (2009, p. 221) notes, "a distinction between networks and networking allows us to study interdependent activities and the processes of forming relationships in networks, aspects that have remained relatively under-researched". We concur with Benschop (2009) that networks are socially accomplished and dynamic, with the practices that go on within them (people developing, entering, maintaining, altering, and leaving social networks in the workplace) being an important focus. These practices will vary greatly, depending upon the network type (Dennissen et al., 2019). For some, the focus is upon networking for career outcomes through the formation of relationships with those perceived to have the potential to assist with careers (Singh et al., 2006). This can be referred to as instrumental networking and includes gaining access to information and material resources. Durbin's (2016) study of senior women managers identified predominantly instrumental networking as fundamentally important to their careers, providing access to support, knowledge, and resources as well as opportunities for advancement. On the other hand, expressive networking is associated with trust, closeness, and friendship (McGuire, 2000). The difference between transactional (instrumental) and relational (expressive) networking is important in highlighting gender inequalities: Ozkazanc-Pan and Clark Muntean (2017) found that women technology entrepreneurs were excluded from the important and male-based transactional networks that had access to key information (e.g., business incubation) as they lacked access to individuals who had knowledge of this and because they networked predominantly for relationship building and to "give back".

Benschop (2009) usefully theorizes gender as an on-going dynamic practice in social network theory and how people "do" gender in networking practices and processes that create gender differences. Her focus is a critical feminist perspective examining how networking practices are gendering practices. We also take a critical feminist approach, but our focus is upon the relationship between networking and power, which itself is gendered. We see power as a social relation that takes different forms and enables women, by networking, to resist and challenge the (male) status quo in a number of ways. Our focus on power contributes a new conceptual framework with which to examine women's internal and external networking behaviors and activities. We now turn to our theoretical framework to explore the extent to which networking facilitates access to different types of power.

3 | THEORETICAL FRAMEWORK: WOMEN's NETWORKING AND POWER

In a feminist critique of the concept of power, Allen (1998, 1999) argues that power should not be viewed as one dimensional. Allen maps the relationship between domination, resistance, and solidarity, arguing that, while most feminist theories have focused on the exercising of power against women, women can experience empowerment individually, but power is more successfully achieved collectively. Allen (1998, p. 36) draws upon three overlapping forms of power: power-over, power-to, and power-with:

Power-over is the ability or capacity to act in such a way as to constrain the choices available to another actor or set of actors; power-to is the individual ability or capacity to act so as to attain some end; and power-with is the collective ability or capacity to act together so as to attain some common or shared end. Because it can include power-over, power-to, and power-with, our definition can accommodate feminists' interests in understanding domination, resistance, and solidarity.

It is important to note that power-to is a feature of individual resistance whereas power-with requires solidarity, which Allen (1999, p. 127) defines as "the ability of a collectivity to act together for the agreed-upon end of challenging, subverting, and, ultimately, overturning a system of domination".

Theorists of gendered power tend to consider power-over and power-to and neglect the concept of power-with (e.g., Haugaard, 2012). Lukes (2005, p. 63) warns us though, "how we think about power may serve to reproduce and reinforce power structures and relations". To build what she considers to be a more complete feminist theory of power, Allen draws on the theories of Foucault, Butler, and Arendt. It is not within the scope of this paper to provide a detailed analysis of the contribution of each of these theorists but in summary, Foucault provides a complex analysis of relations of power, while Butler places power relations specifically in a gendered context that promotes feminist agency. Arendt provides a collective dimension to an analysis of power that involves creating public spaces for the discussion of shared experience to build solidarity in the face of oppression, which Allen draws upon to develop a concept of power-with. Allen is keen to note that women can exercise all these types of power since some women have power-over other women and men because power-over can be exerted in relation to domination that is not solely based on gender but intersects class, ethnicity, age, ability, and sexual orientation.

In relation to formal women's networks, power is likely to be historically determined and may take the form of individualized attempts to replicate instrumental male networks or act as a collective defense against them (Perriton, 2006). Theorists who consider women's networks to be the most beneficial for individual women's careers (e.g., Ibarra, 1993; Singh et al., 2006) reflect power as a resource that can be more evenly distributed when women gain access to the (male) networks where it is held. Viewing power as a resource that simply needs to be redistributed though, fails to acknowledge power as a social relation reproduced by inclusion and exclusion from mechanisms where power is utilized. Allen (1998, 1999) argues that viewing power as a social relation of total male domination is nihilistic and, in western societies, is not the experience of most women since, although power is often located in informal male networks, it is difficult to conceptualize them as systems of total domination. In other words, viewing power as either a resource or as a system of total male domination might reflect the experiences of some women in some circumstances but it does not constitute a theory of power that encapsulates multiple forms of domination, subordination, and resistance. For this reason, Walker (2002) notes that power not only needs to be used in the maintenance of the status quo or as a defense against it but might also facilitate a movement for change.

Therefore, the collective dimension of Allen's theory means it is particularly suited to analyses of networking in internal and external women's networks and how networking activities might bring about both individual and collective resistance and change, as it will help us identify the different forms of power that enable women to challenge the status quo. Through using a "feminist power" lens, that is, a view of power not as domination, but instead as transformative and empowering, we hope to be able to challenge, and hopefully subvert, existing, unequal power structures and relations.

4 | RESEARCH DESIGN

4.1 | Participants, access, and research ethics

The participants in this study (*n* = 48) were recruited by the first author. The study used purposive sampling (i.e., women engineers active in external and/or internal women's networks) and access was sought via personal contacts, professional networks, and snowballing. More specifically, the researcher first contacted the communications and membership officers of major external women's networks as well as the Equality, Diversity and Inclusion special-ist of a major UK engineering professional body and asked them to advertise the call among their members. She then actively advertised the research on LinkedIn (through her personal profile) and asked her personal contacts in the industry to promote it to the internal women's networks in their respective companies and external women's networks. Lastly, many participants invited other colleagues from the networks they were active in, to participate.

Participation was voluntary and the main criterion for selection was that the women were professional engineers (47 of them with university degrees) and that they were active in formal external and/or internal networking. Taking into consideration that LinkedIn and professional bodies are networks and participation was voluntary, one could assume that all participants were positively predisposed toward women's networking. However, this was not the case as there were women who were skeptical toward women's networks mostly because of the negative comments they experienced by their male colleagues (Singh et al., 2006).

Most women were employed in the UK (45), mostly in the South-West, but also in Wales, London, and the North, while one worked in the U.S.A. and two in Australia. In terms of ethnicity, there were overall 44 White (31 White British and 13 "Other White"—including 4 from Spain, 1 from Greece, 1 from Bulgaria, 4 from Australia, 2 from the US and, 1 from New Zealand), 1 Black (Cameroon), 2 Asian (Taiwan, Malaysia) and 1 Arab (Dubai). The sample was repre-sentative of the wider engineering population in the UK as, in 2018, only 7.8% of engineering professionals were from Black, Asian, Minority Ethnic (BAME) backgrounds (Royal Academy of Engineering, 2008). The low number of BAME participants meant that it was difficult to conduct an intersectional analysis. In terms of their level of seniority, the sample included 10 early career/not chartered engineers (mid-20s/early 30s, from Graduate to Senior Engineers), 24 mid-career/chartered engineers (mid-30s/late 40s, from Senior Engineers to Associates), and 12 senior ones (early 40s to mid-50s, from Associates to Directors). Most of the participants (31) worked in Construction, 4 in Gas & Oil, 2 in Academia, 3 in Electronic/Software engineering, 2 in Nuclear, 3 in Aviation, 1 in Manufacturing, 1 in Shipping, and 1 in the Army. All the participants moved around companies (and some of them worked in different countries) throughout their careers. All participants have been given pseudonyms, to protect their identity. Seven participants were active exclusively in internal women's networks, 26 exclusively in external women's networks, and 15 in both. Their participation in networks depended mostly on the availability of such networks in their company and city of residence respectively as smaller companies and smaller/more remote cities did not offer this opportunity.

Ethics approval was granted by the university Faculty Research Ethics Committee. The research did not pose any ethical challenges and the large number of networks in the UK facilitated the anonymity of the participants.

4.2 | Research method and data collection

Acknowledging Denzin's (2017, p. 6) call "to push back, to resist", the present research could be defined as a Critical Qualitative Inquiry as it places the voices of women at the center, it attempts to "reveal sites for change and activism" and aims at getting critiques heard and acted on by organizations and senior management (*ibid*., p. 9). Taking into consideration that women's narratives not only encourage recognition of the history and actions of women but also give a voice to their often-silenced lives (Stuart, 1994), semi-structured interviews with some narrative interviewing elements were deemed the most appropriate method. The interviews drew upon three bodies of literature: women in engineering and the challenges they may face (see Section 2.1); networking activities (see Sections 2.2, 3.1 and 3.2),

and literature on career identity (not covered in this paper). The interview protocols were slightly modified during data collection to take advantage of the emerging themes (Spradley, 1979). The interviews were all conducted by the first author.

The interviews opened with questions on interviewee's careers in engineering and then proceeded with more specific questions about their participation in women's networking and its impact on their career identity as well as the general support gained (see Appendix 3). The interview process was flexible to allow participants to expand upon themes and issues not considered in advance. Regularly and at appropriate points, participants' responses were summarized and restated to confirm the validity of the data (see Appendix 4). The interviews took place either face to face or via telephone/Skype between January and May 2019 and lasted between 40 and 120 min (58 min on average). The length of the interviews depended on the availability of the participant. For example, if the participant had less time, the researcher tailored the interview schedule accordingly. Interviews were digitally recorded with the permission of the participants and transcribed verbatim.

4.3 | Data analysis

The data analysis began with extensive data immersion (Witz & Bae, 2011) when the transcripts were coded manually. The process involved analyzing data throughout the data collection phase and after, moving back and forth among transcripts and literature. Following Pratt (2009), the coding evolved in two stages. First order codes were derived from participant responses about how and why women networked in internal and external networks, the impact of networking on their career progression and identity, to get a general overview of the data. The first phase prompted us to develop a theoretical framework from which second order codes were drawn. From the codes, we identified emergent themes (Richards & Richards, 1994) such as trust, safety, belonging, and friendship as indicative of internal women's networking and "power-to", while forming professional and social identity as activism for structural change which were themes associated with external women's networking and "power-with" (see Appendix 5).

5 | FINDINGS

5.1 | Networking within internal women's networks and "power-to"

In line with other empirical studies, we found that some women networked within internal women's networks for professional advancement (Bierema, 2005; Dennissen et al., 2019; Vinnicombe et al., 2004). However, contrary to other studies (e.g., Dennissen et al., 2019), the main reason why most women chose to network was organizational change and to question the underlying conceptions of professionalism. Nevertheless, our findings suggested that this type of networking still did not appear to give women access to power-with and challenge long-established structures and behaviors prevalent in the wider industry. Instead, networking was for reasons of friendship, general and career support, and building resistance, for example, through the strengthening of communal values, indicating the presence of a "power-to" (Allen, 1998, 1999).

5.1.1 | Networking for friendship and support

Most women in the study appeared to network within internal women's networks with the aim of building reciprocal, close relationships with female colleagues as they struggled with the "laddish behaviors" (Luna, mid-career, Construction) that prevailed in and were often encouraged by their organizations. This networking aimed at building a "safe space" where they could confide in one another and be themselves, without feeling judged by their male colleagues,

especially around emotions: "men generally see [being emotional] as a sign of weakness [...] whereas women are a lot more accepting of that" (Luna, mid-career, Construction).

In other words, we argue that networking within internal networks was to an extent *reactive*: a response to the experiences of marginalization and inequality and an attempt to "survive". In order to do so, women sought to build close, meaningful relationships outside the gendered norms imposed by their organizations. Most of the women interviewed, and especially those participating actively in these networks, networked more for friendship building and saw openness and paying attention to other women, to *both* their lives and careers, as an integral part of it:

> [I missed] just like being able to chat over a cup of coffee about "oh my God my morning was a night-mare" [...] I just wanted to have like a network of friends really at work who kind of understood where I was really in my life. (Amelia, mid-career, Construction)

We observe that women within internal networks networked with other women in an open way that enabled them to share experiences from home and work, show their vulnerability; in other words, just be themselves:

> it's this bringing your whole self to work, you shouldn't leave your emotions at the door (Hope, early-career, Aviation)

In this way, networking within internal networks brought women together so that they could connect (Fried-man, 1999) and build relationships without having to conform to the majority culture (Bleijenbergh et al., 2021). Through networking with other women, the women in the study *resisted power-over* through offering each other emotional and inspirational support (Chang et al., 2021) and *worked toward power-to*, through strengthening their self-confidence and progressively toward *power-with* through recognizing each other's challenges and needs (Blei-jenbergh et al., 2021).

5.1.2 | Networking for providing and receiving career support

Although homophilous networks, such as internal women's networks, have been argued to offer little instrumental value (Ibarra, 1993), their "safe spaces" proved to provide a source of *power-to* that enabled the women participating to progress with their careers *through psychosocial support*, restoring confidence, mentorship, and career advice. More specifically, most women in the study mentioned how much they trusted and relied upon one another for "safe" career advice and boosting each other's confidence. As one interviewee explained, the advice from other women was a trusted source of support:

> What we have done is, we've provided support for each other at those crucial moments where [...] when your confidence might be waning [...] I know the advice they give is very safe, I don't have to filter any of the advice that they give, it's just very supportive. (Chelsea, senior, Army)

This highlights the importance of trust and how women, through networking within internal networks, managed to support and encourage each other when faced with doubts about their technical abilities (Faulkner, 2009; Powell et al., 2009) or even discrimination. Most women highlighted that networking within internal networks helped them

to understand better the organizational values and identity as well as get valuable information about what is expected in order to progress within the organization:

> it's given a little bit more clarity about the promotion procedure […] there's whispers here and whispers there about what you need to do to get to the next level, so it's been quite nice that we've been quite open about what everybody's had to do to get promoted (Amelia, mid-career, Construction)

Women in internal networks in other words, *also* networked for career purposes, albeit in a different way: through *supporting* each other (as opposed to competing against each other). Hence, networking in internal networks gave women "power-to" to act on their career progression and start resisting gendered organizational practices (Acker, 1990).

Senior women specifically appeared to network mostly with the aim to help more junior women to understand the norms and codes of the organization (Durbin, 2011):

> I feel that I can contribute to that [internal women's network], because you know I have been here for
> a long bloody time, I've been there, seen it, got the t-shirt sort of thing. (Sheila, senior, Construction)

In this way, senior women, especially those in larger organizations, who before the existence of internal networks "might have sit by the closed door" (April, early-career, Construction), were now visible and accessible to younger women in the organization.

Our findings indicate that networking for support can facilitate access to privileged strategic information (Bouty, 2000) by developing a positive culture of sharing within the network (Cross & Armstrong, 2008) and thus can contribute to career progression. Hence, female engineers, through networking for support were utilizing power-to for both expressive and instrumental reasons (Villesèche & Josserand, 2017) as they were seeking both emotional support and career-oriented resources at the same time (Bierema, 2005; Singh et al., 2006). In this way, we argue that networking in internal women's networks encouraged women engineers to actively challenge gender stereotypes, traditional roles, and persistent career barriers and actively employ empowering strategies that will enable them to progress their careers and navigate the organization (Clerc & Kels, 2013). As Khijli and Pumroy (2018, p. 1034) argue "for women to demand and/or exercise any career choice requires an immense amount of courage and resilience" and, for our participants, networking in internal networks facilitated the "power-to" achieve this.

5.1.3 | Networking for resistance

Most women in the study saw internal women's networks as their chance to "change the status quo" (Blanca, mid-career, Construction) because "[internal networks] exist because there is inequality so being involved with them is working to address that inequality" (Charlotte, mid-career, Construction). Through networking with other women and building reciprocal relationships, most women in the study, progressively co-constructed communal values (Evans, 2002) leading them to commit to working with others (Ballet et al., 2007) and pursue collectively the common goal: resistance against structural inequality within the organization. Therefore, unlike Allen's conceptualization of power-to as individualized resistance, women were actively trying to collectivity resist dominant power-over relations:

> I was kind of trying to make sure that there is a space where people can talk and where they can have
> some power […] that everyone feels they have a voice, but also like they're supported by each other.
> (Arianne, mid-career, Construction)

At this point, it is important to highlight that most women who left internal networks did so mostly because they felt that these networks just paid lip service to equality (Dennissen et al., 2019; O'Neil et al., 2011) and were not doing enough to bring about change. Despite the increased confidence and heightened sense of resistance and support in some of the internal networks, the women struggled to change the unequal power relations within their organizations and thus to bring about change:

> I'm not really sure where we stand in there to be honest with you. Because what we have done, we have done by ourselves, but we haven't seen any changes, any proposals, anything you know. (Blanca, mid-career, Construction).

The women who networked exclusively within internal women's networks appeared not to have access to power-with to achieve structural change because they remained dependent on organizational support and a lack of change in policies that support working women. They were therefore still subject to power-over:

> We've had the senior leadership supporting but when it comes to actually having financial support or having.... there's been very little of. [...] for example, they were looking at the parental leave, actually changing it and being paid, but that hasn't changed. (Carmen, mid-career, Aerospace)

There was also evidence of a strong male-dominated culture, as some male managers opposed efforts for change. In Arianne's case (see excerpt below), this happened when she tried to change the (male) gendered language in official documents:

> I remember like editing one of our documents, and I'd changed the language, I'd changed the male pronouns out of it [...] and he (i.e. male manager) took me to one side and like bollocked me for doing that. (Arianne, mid-career, Construction)

Networking within internal networks provided women engineers with an important source of *power-to* that helped them to survive and resist power-over through challenging long-established structures and behaviors. We concur with Bleijenbergh and colleagues (2021, p. 22) that "the dynamic character of women's networking" contributes to "bridging top-down and bottom-up mobilization toward gender equality, creating a new space for dialogue and negotiation within the organization". However, although "new spaces" might facilitate collective awareness and resistance, they do not achieve power-with if change is ignored or actively blocked.

5.2 | Networking within external women's networks: power-to and power-with

Women engineers networked with and used external networks in slightly different ways to internal networking. External networks provided women with significant psychosocial and career support, in a similar way to internal networks. In addition, by removing the dependence on organizational support, the networking taking place within external networks encouraged women to recognize the narrowness of organizational criteria of success, helping them to establish their broader professional identity and organize for feminist change.

5.2.1 | Networking to resolve identity concerns (power-to)

Networking in external networks appeared to play a very significant role in the lives and careers of women in the study who were a minority in their organizations and teams. Most said that networking in external women's networks

was "effortless" and "easy", and this helped them "make some headway" and "feel a little bit better about some of the struggles" they had "compared to male colleagues" (Elise, mid-career, Construction). This effortless networking helped them to "recover" their professional self when faced with identity threats, such as maternity, which was seen as incompatible with being an engineer:

> the [external network] made me feel like I was still....like I was still me, I was still the professional me who had done all this training, was capable of doing all this difficult stuff. Whereas all I ever do is the washing and breast-feed, and I'm capable of so much more. (Charlotte, mid-career, Construction)

Another interviewee commented that being a part of an external women's network made her feel like she belonged and that it was possible to progress her career:

> Being in a women's network has helped me think it was possible to stay, otherwise I might not have stayed, and helped me think it was possible to, you know get promotion, otherwise I might not have fought for that. (Nadia, senior, Construction)

In other words, through networking with other women, these women realized that they were not alone.

It was interesting to note that some senior and/or older women who previously used masculine criteria for career success stated that they found networking in external women's networks equally important. Lilian (senior, Construction), for example, said that when she was younger, she "would have denied any sort of feeling of being left out in a man's world". The older Lilian became, the less able she felt to fit in, "this 35–40 something male-dominated company" and the more she enjoyed being part of the external women's networks because, as she "got older it is actually nice to be in a group of women professionals". Connie (mid-career, Nuclear) on the other hand, said that by networking with younger women she has "learnt more from reverse mentoring… because what you had to do years ago isn't what you're able to do now". Despite her long career, Connie changed her behavior, becoming more assertive and confident. Therefore, networking within external networks encouraged younger and older women's resilience and agency alike by helping them to resolve identity concerns (Podolny & Baron, 1997).

5.2.2 | Networking for career progression in their own terms (power-to)

External networks, like internal networks, served both *instrumental* and *expressive* purposes, as they provided not only valuable advice, guidance, and role-models but also supported members psychosocially. However, power-to in external networks differed from that in internal networks by helping women to recognize their "market worth" and move beyond organizational confines to "cast [their] net out to other options and alternatives" (Grace, mid-career, Construction) by networking with women in other organizations. Wider networking gave women the opportunity to progress with their careers by raising their external visibility, for example, when winning various "Women in…" awards:

> Winning an award like that, it's quite difficult for a business to say, "yeah we're not going to give you a pay rise" (Charlotte, mid-career, Construction)

Women were also encouraged to expand their skill set and push their professional role boundaries by, for example, speaking to large audiences or organizing events and managing budgets, thus developing the necessary skills for their career when denied this opportunity in their organization:

> I just try and take on roles outside of work [in external women's networks and professional bodies] that also give me these kind of experiences [i.e., in project management] I guess [...] I'd quite like that kind of experience here but the opportunity doesn't seem to be opening itself. (Elsie, mid-career, Construction)

External women's networks provided women engineers with formative developmental experiences and emotional support that are argued to play a crucial role in their retention (Fouad et al., 2016; Powell et al., 2009). What was more important though, was that when networking with other women in external networks, the women realized that they can progress in their own terms:

> I think it's given me the inspiration and the encouragement that I needed. You know I'm not an exception, many other women have done it and people have done it and it's feasible, and it's not necessarily a race, it might be happening fairly slowly, but I can choose.... (Ama, mid-career, Construction)

Networking in external women's networks, therefore, gave *power-to* by encouraging members to develop "the individual ability or capacity to act" and to work toward an end goal (Allen, 1998, p. 36).

5.2.3 | Networking for professional change (power-with)

Most of the women participating in external networks did so also with a clear intention of taking an activist stance (Avdelidou-Fischer & Kirton, 2016) and saw external networks as a forum for advocacy work. In other words, women also networked for change in their industry. Networking in external women's networks gave women in the study opportunities to get closer to important external power structures (e.g., being invited to an all-party parliamentary group for women in STEM, or being on various Boards of Trustees) allowing them to directly influence equality and diversity policies as collective actors, for example, challenging the ways in which the male norms were present:

> with [external networks] I think a lot of that was about we wanted to make changes, and [...] we had a big push at having women's Personal Protective Equipment available, so high-viz vests and things like that that would fit women better, and just making women feel more welcome in the workplace. (Elsie, mid-career, Construction)

Networking within external networks therefore gave women power-with to challenge existing structures of male domination in their field (Allen, 1998, 1999). Although women were aware of the lower status of these networks within the industry, they consciously ignored the lack of formal legitimacy of women's networks in male-dominated organizations (Durbin, 2011) and established their own power relationships to "do business" on their terms. One interviewee explained how she has been proactive in setting up her own external women's network:

> I've decided to flip it on its head now. So, I've set up a [external women's network] lunch that I only invited 12 guests to, and I'm just going to see if I can trial doing business development more on my terms, breakfast meetings, lunches, and also target the females in the companies that I work for. (Ainsley, Senior, Construction)

External networks, therefore, provided the collective power-with to build an industry-wide critique of the dominant masculine discourses of leadership in an attempt to change it:

> I think in construction, like you still have the strong banging on tables kind of leaders and that's a way
> to get things done—I don't agree with it. (Danielle, Mid, Construction)

Importantly, external networks gave women a sense of solidarity and power-with to lead differently:

> actually no, there are these other voices, there are other ways […] I don't have to be kind of autocratic
> in the way I lead, I can lead in a different style (Sue, senior, Academia).

External networks thus contribute to sustainable feminist change in the industry as they encouraged the women involved to revisit how an engineer should be, relate to others, work, and lead. They also enabled women to exercise "power-to" in order to achieve change; and "power-with" where they acted together to achieve those goals.

6 | DISCUSSION AND CONCLUSION

This paper contributes empirically and theoretically to studies on women's networking activities in male-dominated occupations. The empirical contribution offers research data on the under-researched field of how and why women engineers network with one another in both internal and external women's networks. The theoretical contribution of the paper is the development of a framework that can aid understanding of formal networking between women. Our theoretical framework adopts Allen's (1998, 1999) feminist definition of power in conjunction with literature on women's networking and networks (e.g., Benschop et al., 2015; Dennissen et al., 2019; O'Neil et al., 2011; Perriton, 2006; Pini et al., 2004). Our intention is not to measure the outcomes of women's networking against male norms (Benschop, 2009). Rather, we explore the value of women's networking in relation to power and ultimately, how networking can help women to achieve a common end but also enable them to take collective action for change.

Our first research question asked, how do women engineers frame their networking practices (e.g., for instrumental, expressive, and transformative purposes) within internal and external women's networks? Our findings, in line with the literature (e.g., Schmitt, 2021; Villesèche & Josserand, 2017), confirmed that networking in internal women's networks acted as a source of both instrumental (e.g., access to mentors, role-models, career advice, and embodied organizational knowledge) and social (friendship, building relationships, and supporting one another) support. Internal networking facilitated the formation of social identity by cultivating a sense of belonging as well as expectations associated with one's role (Podolny & Baron, 1997). External networking, on the other hand, enabled women to connect with other women outside of their own organizations, which proved useful in many ways. Firstly, not all women had the opportunity to network internally as their organizations may not have a women's network or, indeed, other women colleagues. This means that networking externally can provide social, emotional, and career support, acting as a "safety net" for women who are isolated within their organizations. Secondly, external networking allowed women to develop generic skills and gain knowledge that had value outside of their own organization. In addition, this provided opportunities for awards of professional esteem that gave women engineers distinction beyond their own organization. In other words, networking within internal and external women's networks was both instrumental and expressive.

The transformative potential of networking was, in our study, largely limited to external networks because of different power dynamics, which we explore further in relation to our second research question: What types of power (i.e., power-with, power-to) can be identified through women engineers' networking practices? Analyzing women's networking activities using Allen's feminist theory of power, allowed us to see that the close proximity of power-over and male domination in internal women's networks required the creation of safe spaces, trust, and the reassurance

that other members of the internal network would "watch your back" within an organization where women engineers might be in competition, not only with men, but with each other (see Section 5.1.1). External networking, on the other hand, demonstrated that both power-to and power-with were not dependent on organizational support and were therefore distanced from power-over. Unlike Allen's contention that power-to resist power-over is individualized, we found that resistance in internal women's networking was intrinsically collective, but still lacked the ability to bring about change.

We explore this finding further in relation to our third research question, which asked to what extent these different types of power and networking behaviors challenge gender inequality at organizational and professional levels. As we noted above, although women's networking for friendship and support in internal networks is inherently collective and might be said to display solidarity in the general sense of the term, this tends to benefit individual women within the existing system rather than "challenging, subverting, and, ultimately, overturning a system of domination." (Allen, 1999, p. 127). As the women in the study indicated (see Section 5.1.3), their efforts for change were often actively blocked or not taken seriously, highlighting the dynamics of structural power inequality within organizations (Acker, 1990). We therefore consider internal networking for resistance to demonstrate power-to rather than power-with. Women's networking in external networks, although exhibiting elements of power-to, differed significantly from the power-to exhibited in the internal networks. Power-to in external women's networks provided women with a broader horizon and vision for the future that was not constrained by the proximity of power-over in their everyday male-dominated working environments. This appeared to us to be an intermediary stage between power-to and power-with as distance from male-dominated working environments made the leap from resistance to transformational change more conceivable. Networking for professional change in external women's networks provided the impetus for women engineers to lead differently and begin to put their alternative vision for the future for the engineering profession into practice. Furthermore, women's networking externally was more likely to take an activist stance, enabling the women to build bridges to professional bodies and national decision-making fora that helped them to influence policy and practice beyond the confines of their workplaces. Therefore, compared with previous studies (e.g., Pini et al., 2004), our findings indicate that women who network externally do not operate in isolation but attempt to engage collectively in order to address not only the symptoms of discrimination, but transform the professional culture by challenging the status quo across organizational borders. For these reasons, we would like to encourage senior leadership to acknowledge the value of women's networks and make sure that these networks feed directly into the organization's policies and practices. Furthermore, we also recommend that professional bodies should seek to collaborate with external women's networks in order to challenge and reshape the male-dominated professional culture and address structural inequality.

6.1 | Limitations and suggestions for future research

Recognizing the first limitation of this study—the sample comprising mostly civil engineers—we invite scholars to further develop research on formal internal and external women's networks, in different male-dominated sectors. Secondly, as we had very few participants outside the UK, it would be interesting to see comparative studies (e.g., countries but also sectors) to understand how each context impacts on how ties are formed, and power is exercised. Thirdly, although it was originally our intention, we did not obtain sufficient data to explore the extent to which intersectionality might impact on how women from ethnic minorities (or different sexual orientations and ages) might experience women's networks. For this reason, more research is warranted with a more explicit intersectional lens. Lastly, since our data came exclusively from semi-structured interviews, in the future it is important also to conduct ethnographic studies to examine more closely not only networking practices but also how different forms of power are exercised.

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APPENDIX 1: A NON-EXHAUSTIVE LIST OF EXTERNAL WOMEN'S NETWORKS OPERATING AT NATIONAL LEVEL IN THE UK AS AT MAY, 2021

BCS Women: https://bcswomen.bcs.org/

Equate Scotland: https://equatescotland.org.uk/

IEEE Women in Engineering (worldwide): https://wie.ieee.org/

IET Women's Network: https://communities.theiet.org/communities/home/77?origin=wnmyc?utm_source=redi-rect&utm_medium=legacyredirects&utm_campaign=2019relaunch.

Women's Engineering Society (WES): https://www.wes.org.uk/

Women in Aerospace: https://www.womeninaerospace.org/

Women in Defense: https://www.womenindefenceuk.com/

Women in BIM: https://womeninbim.org/

Women in the Built Environment: https://www.wibe.org.uk/

Women in High Performance Computing: https://womeninhpc.org/

Women in Science and Engineering (WISE): https://www.wisecampaign.org.uk/

Women in Security: https://www.professionalsecurity.co.uk/wis/

Women in Mining: https://www.womeninmining.org.uk/

Women in Nuclear: https://www.nuclearinst.com/Women-in-Nuclear-UK.

Women in Planning: https://www.womeninplanning.org/

Women in Property: https://www.womeninproperty.org.uk/

Women in Rail: https://womeninrail.org/

Women in Sustainable Construction and Property: https://womeninsustconstruction.wordpress.com/

Women in Sustainability: https://womeninsustainability.net/

Women in Telecoms and Technology: https://www.wittgroup.org/

Women in Transport: https://www.womenintransport.com/

Urbanistas: https://www.urbanistas.org.uk/

APPENDIX 2: LIST OF NETWORKS REPRESENTED IN THE STUDY

Internal networks	21 of which were from women participating in internal networks. Overall, these were represented by 12 internal women's networks. The companies participated cannot be named in order to protect the anonymity of the participants. All companies were operating at both national (UK) and international levels.
External networks	WES, WISE, women in BIM, urbanistas, women in property, the Army Service Women's Network, Women's Tech Hub Bristol (https://www.wthub.org/-regional network), women in nuclear, women in Subsea engineering (Australia)

APPENDIX 3: INTERVIEW QUESTIONS

(Introductions, going through the participant information sheet together, answering questions and signing the consent form)

Career history

- Can you please tell me when and why you chose to study engineering?

    o *How did you see "engineers" back then? (e.g., in terms of what they did, how they are supposed to behave/look, where they work… etc.)*

- How did you decide which career path to take? Who/what influenced you, that is, family, peers, friends, teachers etc.?

- Can you briefly tell me about your working life, up to the present and your experience of the transition to your current role?

    o *Start from school— which school/university?*

    o *Are you where you planned/wanted to be?*

    o *How satisfied with progression so far?*

    o *Experience of the promotion process here?*

    o *Recruited: recommended, headhunted, promoted through organizational champions, personal contacts*

    o *Transitions in and out of part-time work? Career breaks, etc.?*

- Have you encountered any challenges in your career so far? (probe esp. in relation to gender and/or ethnicity)

- What strategies have you employed to progress your career?

    o for example,.*who/what you know, moving around, etc.*

- How do you see your career progressing from here?

- Do you see any future challenges to that progression?

Networks

- Would you describe yourself as someone who networks formally and/or informally? Why?

    o *Informational/career reasons* for example, *career guidance for promotions, etc.*

    o *Psychosocial support,* for example, *feeling of belonging/acceptance, organizational commitment, friendship…*

    o *Ideological reasons*, for example, *activism/reaction to stigmatization/discriminatory climate?*

    o *Any other reasons?*

- In a typical month, what percentage of time do you spend networking?

- How would you describe your formal and informal network of colleagues inside and outside the company?

    o Who are the colleagues that you most often socialize with/spend time with? (gender/level of seniority/ department/company…)

    o Do you tend to seek out other women/people from the same ethnic background/age group/level of seniority as network contacts? Yes/No, why?

    o Do you seek out networking opportunities with either men or women for different reasons?

- Can you identify the networks of which you are a member of and why you joined?

    o Number? (How many of them are formal/informal; external/internal)

    o Describe and discuss each network in turn:

        o purpose

        o activities undertaken

        o nature: external, internal, community; formal, informal professional (e.g., related to your profession, women in business networks)

        o gender mix

        o status of other members

        o size of network

        o your role in the network

        o how long a member?

   o   Strength of ties? (Do you actively seek to strengthen specific ties (if yes with whom and why)? Is there reciprocity?)

   o   Quality of support received/which of these networks facilitate more the formation of mentoring relationships?

   o   Is the network supported by your organization?

- Regarding your participation in women's networks (WON's) specifically, how has your participation changed over the years? Why did you choose to participate in/leave the particular networks?

Career identity

- Has the way you define yourself as an engineer (i.e., your work identity) changed as a result of your participation in internal/external women's networks in any way? (e.g., attributes, professional experiences…).

- Has the participation in WN's opened up new career directions for you? (Yes/No, How)

- What else has it opened up? (i.e., new friendships; opportunities to be with others like yourself; share similar experiences as a woman, etc.)

- What are you doing in order to materialize these future work selves? (how/why?)

- How has each type of WN you participate contributed to:

   -   the clarity of your professional identity;

   -   your personal values;

   -   your awareness of development needs/patterns of behavior;

   -   motivation/career aspirations?

- Can you describe a picture of your future? What will you be doing career wise? What are your hopes for your personal life?

- What is your degree of certainty over your future career aspirations? And how has your participation in WON's contributed to it (if it contributed to it in any way)?

APPENDIX 4: EXTRACTS FROM THE INTERVIEWS SHOWING HOW THE INTERVIEWS WERE CONDUCTED

Example of allowing participants to expand upon themes and issues not considered before

Researcher: And do you think from your participation in women's networks specifically that they might have had an impact on the way you see yourself as an engineer, like on your career identity, or on this dual identity view is that you are both an engineer and a woman, like a woman engineer. Has this participation helped you to see yourself differently in terms of your professional identity, or not that much?

Participant: That's an interesting question. I don't know how I can answer that. But I speak to quite a number of groups about why they would want to set up a women's network and I always say, "well there are a number of reasons why you might want a women's network". One of them might just be so that women who have common issues can speak to one another about those common issues. So, it might be the menopause, or it might be childcare, or it might be the fact that you've found a breast lump or that you've suffered domestic abuse, or it might be any issue that is common to a group of women. And so a women's network is a way of having those conversations that you couldn't have with men. […] does that….ask me the question again.

(Continues)

Researcher: It was like if your participation in the women's only network influenced in any way the way you see yourself as an engineer in terms of professional experiences, attributes. Because from what you are saying I've understood that you see women's networks more as a source for support, so it could be that you felt more confident after participating in these networks, I don't know. What did you get out of participating in women's networks, that's the question really?

Participant: I suppose I get....yeah, a variety of things out of it. And I suppose they have kind of reinforced the fact that I know....it kind of has changed my view to think that we absolutely have to empower women to be women in engineering so that they can be sure that they are representing themselves as women. And I think for me, the fact that there are women's networks allows us to then think about the issues of women and how we then translate those issues of women into engineering and ensure that we are really thinking about those.

Example of restating/summarizing	Example 1:
	Participant: I suppose that the women's group has opened up more avenues for me to give back and support in STEM groups to try and ensure that people out there know what engineers do and that it is a rewarding career path. So yes, I suppose that is the main thing that it has done.
	Researcher: So, would you say that your participation in women's networks contributed more...like it was also to your personal values in the sense of to help and support younger women to enter the profession and succeed as well. And also for you it acted more as a psychological and social support, you know to help you go through....
	Participant: Yes, social support and a sounding board as well, to sort of sense check you know "this is what I'm feeling, should I be feeling this" and to do that in the women's groups you feel safe enough to ask that question without a male turning round and saying "oh you're just saying that because you're a woman". It's nice to take that equation out of it.
	Example 2:
	Researcher: So would you say that you see the women's network as....from what you've described you see the other networks as a way of getting an idea about what your next career step might be, and the women's network as something you do for the community in a way? Would this be....?
	Participant: Yes, but also something I do because it does provide me support as well and other women I can speak to, yeah, trusted colleagues I guess.

Examples of questions on the emerging themes

Example 1:

Researcher: I've heard from other participants about other networks and their male colleagues were kind of making....you know they didn't take them seriously.

Participant: Making fun of them, yeah.

Researcher: Yeah, they didn't take these other networks so seriously, yeah.

Participant: I haven't experienced that here. I've had comments from colleagues before in previous jobs who were like "well why do you need a women in property" you know, and it's like "well because everything else is men led so where else are we going to go if we feel we need something of our own". So yeah I've had comments before. Or men saying "oh I wouldn't go to one of those events because I wouldn't feel welcome". […]

Example 2:

Researcher: And in terms of your other female colleagues, how do they see these sort of networks, because I had some participants who were rather negative toward women's networks. Like how do you see these networks and how do your colleagues see these networks?

Participant: Yeah I think.....so every time there's an event that I'm inviting everyone to I just invite all the women in London, and as I say there's definitely one who just thinks they're nonsense and she's quite anti the concept, which is fine. And then there's a number who obviously don't really think anything because they never reply. And there's a couple who have been along with me to events and been generally interested but not necessarily interested enough to join or be keen on them themselves.

APPENDIX 5: EXAMPLES OF CODING

Internal networks networking

Raw data	First-order codes	Second-order codes	Theory-driven codes
"I know the advice they give is very safe, it's very....I don't have to filter any of the advice that they give, it's just a very supportive." (Chelsea, senior, Army)	Women networked in internal networks for support	Support	Power-to
		Trust	
"I do tend to seek for like women to support me rather than a man. Because just men generally see this as a sign of weakness really […] whereas women are a lot more accepting" (Luna, mid-career, construction)		"Safe space"	

(Continues)

Raw data	First-order codes	Second-order codes	Theory-driven codes
"I think these networks are great regardless of what your diversity background is, seeing someone more senior that you can relate to definitely shows it can be done for a start but it also gives you the inspiration maybe to push to do it." (April, early, construction)	Women networked in internal networks for career progression/ sponsorship	Career progression	Power-to
"So, one part of the network is, you get the opportunity to be seen by different people in your organization and other organizations, that you're being passionate about things and professional, and that's a really nice opportunity as well. So particularly for younger girls, I think that's a fabulous way for them to have some sort of champion as well that they see, champions or sponsors" (Connie, mid-career, nuclear)			
"It's given a little bit more clarity about the promotion procedure, because it's very…. there's whispers here and whispers there about what you need to do to get to the next level, so it's been quite nice that we've been quite open about what everybody's had to do to get promoted" (Amelia, mid-career, construction)			
"I feel that I can contribute to that, because you know I have been here for a long bloody time, I've been there, seen it, got the t-shirt sort of thing. So I'm hoping that I'm contributing to that and helping that and mentoring people where they want to be mentored." (Sheila, senior, construction)	Senior women networked in order to support	Solidarity	Power-with
		Support	

Raw data	First-order codes	Second-order codes	Theory-driven codes
"I remember like editing one of our documents, and I'd changed the language, I'd changed the male pronouns out of it [...] and [male manager] took me to one side and like bollocked me for doing that. And then at the end I kind of explained to him like what I was doing, and then he kind of understood and he was like "oh…" you know, he apologized and things."	Women networked in internal networks for change	Activism	Power-to/ Power-with
"Researcher: So, would you say like the reason why you joined that network was to change….		Solidarity	
Blanca: To try to put that point across to Human Resources (HR), because they say that they want to like balance things, and in order to balance these things they need to understand what the problem is. You know if they don't know what the issues are then….you know clearly, and then people don't want to ever speak up—and I know why because it's just very difficult and make your life impossible, so yeah I would not recommend it really. But it is necessary."			
"I owe it to the women who are below to kind of continue going on with it and to continue" (Arianne, mid-career, construction)			
"There is that lack of support, you know we might come up with some brilliant ideas of how to do things, but if it's not going to be accepted or if it's not going to be given the funding that it needs, it's not going to go ahead" (Amira, early, construction)	Change is blocked by senior management and HR	Transformative potential	Power-over

(Continues)

Raw data	First-order codes	Second-order codes	Theory-driven codes
"And we are trying in the company, my colleague and I are trying in the company at the moment to push for HR to be including some inclusive and equality things, that's really slowly kind of saying "yes, yes, yes" but then no progress is made, so…. we're pushing a boat uphill." (Nadia, senior, construction)			
So I'd say "oh I'm going to go to the women's network now" and they would text me like "oh how are your nails"—this is all jovial, this is because we are close friends. But they're like "oh how was your pillow fight" or "how was getting your nails done" and that's the way….I don't know. (Maddison, early career, construction)	How internal women's networks are viewed	Stigma	Power-over
"When I first joined, because I was working part time, I felt a bit silo'd. So because I didn't have contact with either internal clients or external clients I thought "how do I get to meet other people in different groups" and "maybe there are other women that are finding the same thing as me in that I'm being silo'd". Yeah just like being able to chat over a cup of coffee about "oh my God my morning was a nightmare", I don't want to have to bore my other colleagues who don't have kids with that. So yeah I just wanted to have like a network of friends really at work who kind of understood where I was really in my life. So yeah I just kind of started off." (Amelia, mid-career, construction)	Women networked through building relationships	Feeling of isolation	Power-to
		Friendship	
		Trust	

Raw data	First-order codes	Second-order codes	Theory-driven codes
"There's some young ladies that really inspire me. So, they're a lot younger than I am and starting out on their career, but so inspirational. And you're thinking "that's just absolutely brilliant", and they're fantastic role models. [...] I don't think their personalities would have been picked up and embraced the way they are now 20 years ago, I don't think that's possible. So, because they're in a forum where people listen, it doesn't matter how old they are, it doesn't matter how long their life experience is, their enthusiasm and how hard they work and their ideas about changing things, and everybody else is trying to keep up. [...] I've learned more from like reverse mentoring at them, because what you had to do years ago isn't what you're able to do now." (Connie, mid-career, nuclear)	Impact of networking in internal women's networks on women	Empowerment	Power-with
		Social identity (being a female engineer)	

External networks networking

Raw data	First order codes	Second order codes	Theory-driven codes
"I feel, when I was a young engineer I didn't really....I would have denied any sort of feeling of being left out in a man's world sort of thing and I enjoyed working with men and that sort of thing, on site and whatever. But I think as I've got older I'm sort of finding this 35–40 something male-dominated company a bit wearing really, if you know what I mean?" (Lilian, senior, construction)	Women networked in external networks for belonging	Belonging	Power-to
"And I think it gave me an opportunity to.... so since I've come back, and there were two other senior female members of staff in this office and they've both left, so I am just one my own now, and I think this network made me feel less isolated." (Ainsley, mid-career, construction)			

Raw data	First order codes	Second order codes	Theory-driven codes
"I think with women in property what we do more so than other sort of institution networking groups, is really focus on "well what are people going to get out of it", "is it topical", "is it useful", "are people going to want to go to an inner city site visit where you've got certain challenges"—yeah, "are they wanting to just go...", "what's the purpose of it if you're having a networking lunch", there's got to be a focus. Or there will be a presentation so you actually come away informed from that and hopefully you also meet a few people and there's some opportunities there as well" (Grace, mid-career, construction)	Women networked in external networks for professional development	Professional development	Power-to
"Because it does give you the opportunity to do things you haven't done. Because if you work for example, as an engineer in front of a computer, the likelihood of you speaking to an audience of 200 people—it's not going to happen. So actually there are several skills that I have developed quite well throughout that" (Carmen, mid-career, aerospace)			
"I passionately believe that women make good engineers and I'm really keen to get involved in things like STEM and those kind of networks, encouraging young women and young girls to go for engineering." (Cynthia, senior, Army)	Women networked in external networks for professional change	Activism	Power-with
"[External women's networks] have kind of reinforced the fact that I know....it kind of has changed my view to think that we absolutely have to empower women to be women in engineering so that they can be sure that they are representing themselves as women. And I think for me, the fact that there are women's networks allows us to then think about the issues of women and how we then translate those issues of women into engineering and ensure that we are really thinking about those." (Sue, senior, academia)		Transformative potential	

Raw data	First order codes	Second order codes	Theory-driven codes
"I think my sort of moral compass has always been set, but I would say that in my participation with women's networks my commitment to try and support others and trying to say yes to things—so coming back to that point about visibility that I made before—that's where through those women's networks that I've realized that that's where I can make a difference. And so that has changed my sort of values and my kind of action into "actually let's get out there and support others" and to try and be more visible, so yeah that's definitely a result of the women's networks." (Jade, senior, construction)			
"I would narrow it down to networking, support and visibility of [network]. So if now someone doesn't know about, you know "are there really [network]", because you can just see, you know you see these all men panels, but perhaps if they know there is some sort of organization—although I don't want to call it that—some sort of group called [network], maybe they can go to this person and say "oh, do you know anyone who works in that field in robotics that you can get me in contact with". So, I think eventually, not eventually, it can help with the visibility. And giving advice to younger generations, they can then perhaps know what to expect so they can gain more visibility" (Lena, mid-career, academia)	Women networked in external networks for career progression	Career progression	Power-to
"I've found that the events run by like women in engineering you seem to see the same people every time so it's easier to build a long term relationship. And also, they're a little bit less confronting and the topics I find often are interesting, so that's why I sort of send myself there." (Lia, mid-career, construction)	Women networked through building relationships and supporting each other	Friendship	Power-to
"[External women's network]'s certainly not envisaged as being one of the important ones. [...] but certainly a stigma attached to it that "probably no-one important will be there". (Elise, mid-career, construction)	How external women's networks were seen by organizations and colleagues	Stigma	Power-over

(Continues)

Raw data	First order codes	Second order codes	Theory-driven codes
"When I was a member of [external women's network], and I was only a member of [external women's network] exclusively at the time and I wasn't really aware and I was obviously in the early stages of my career, people didn't know what that was. And then when they found out "oh that's the Women's engineering society, they were all a little bit off put by that. And that was both women and men, they sort of thought "wow you're a feminist" but it was like "no I'm not a feminist, I'm passionate about engineering".			
"Being in a women's network has helped me think it was possible to stay, otherwise I might not have stayed, and helped me think it was possible to, you know get promotion, otherwise I might not have fought for that." (Nadia, senior, construction)	Impact of networking in external women's networks: Stopping the "leaky pipeline"	Retention	Power-to/ Power-with
"I would say that my involvement in the women's networks has absolutely cemented the self-belief that if I want to do it I can do it because there are people who are doing it. And that's about the role models and visibility piece, it's like "well if she can do it and I'm just as well qualified and I'm just as experienced, then I can definitely do it too". So that piece has definitely come from the women's networks." (Jade, senior, construction)		Role models	
"I've actually had quite a few job offers because of the networks. I haven't accepted any of them but I guess it could have influences in the future because I'm clearly more visible. I haven't applied for any jobs but people have come to me to offer me jobs." (Elsie, mid-career, construction)	Impact of networking on external women's networks individual career progression	Career progression	Power-to
"And again I was able to go "yeah I'm doing loads of really important work". And winning an award like that, it's quite difficult for a business to say "yeah we're not going to give you a pay rise", and I'm like "you are going to give me a pay rise, look, I'm giving you all this great positive publicity"." (Charlotte, mid-career, construction)			
"It wasn't changing my motivations but it gave me those role models and those inspirational leaders who I could identify with, and that was then inspiring to me and it gave me more kind of....yeah just pleasure in being an engineer, and proud really, yeah to be an engineer and to be in the construction industry too." (Lucia, mid-career, construction)	Impact of networking in external women's networks on identity (professional)	Empowerment	Power-with

Raw data	First order codes	Second order codes	Theory-driven codes
"[Participating in women's networks]'s made me realize that you do have to craft a bit of an identity for yourself and you do have to be quite....you do have to stand up for yourself" (hope, early career, aerospace)			
"[External women's network]'s helped me feel proud of [being an engineer], and mainly because I'm proud of what the group's doing." (Joy, senior, Gas & Oil)			
"And I think being part of a women's network allows you to think "actually no, there are these other voices, there are other ways, I can do things a different way, I don't have to be kind of autocratic in the way I lead, I can lead in a different style". So I think that's a valuable thing that you can get from a women's network, that kind of empowerment if you like." (Sue, senior, academia)			
"So with [external women's network] I think a lot of that was about we wanted to make changes, [...] for example, we had a big push at having women's Personal Protective Equipment available, so high-viz vests and things like that that would fit women better, and just making women feel more welcome in the workplace. So that was a driver for that." (Elsie, mid-career, construction)	Impact of networking on external networks on professional culture/practice	Transformative potential	Power-with
"We put on lunchtime lunch and learns, and so professional development, we try and do things at lunchtimes rather than evenings so that it encourages more women who have family responsibilities to be able to attend. We also do it in a location where if people are off on maternity leave they can bring their kids is and there's a little playroom they can put their kids in, or they can bring them into the meetings. We've started to develop some other sorts of projects, like developing agenda inclusion guidelines that we might role out to some small engineering companies as good practices and areas where they can get further resources and basically give them some tips and tricks from a bunch of women in the industry. We run programmes for school kids and university kids on basically providing them information on what engineering is and what types of roles they can get into in the off-shore industry with an engineering degree." (Joy, senior, Gas & Oil)			