Networks of exclusion: job segmentation and social networks in the knowledge economy

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Abstract

Purpose – This paper aims to highlight the need to understand the mechanisms of inclusion and exclusion in the workplace which are often embedded in micro-level work practices. It explores how social networks and the resources contained within them function differentially among workers to reinforce existing patterns of preferential access to the most desirable positions in the labour market.

Design/methodology/approach – Using in-depth interviews of electrical engineers in a case study firm in the IT industry in Cambridge, England, the paper outlines the strong gendered and ethnic patterns of segmentation within the engineering occupation.

Findings – The paper finds significant inequalities in access to, and awareness of, the resources contained within some social networks in the workplace.

Originality/value – The study critiques the extension of social capital theory into the workplace due to its conceptual and methodological focus on positive outcomes.

Keywords Social networks, Social capital, Labour market, Gender, Communication technologies

Paper type Research paper

Introduction

This study highlights the need to understand the mechanisms of inclusion and exclusion in the workplace which are often embedded in daily micro-level work practices: informal chats, friendly gestures, sporting "partners", and powerful figures who want to help the next generation of employees. However, these micro-level work practices help create bonds of reciprocity, obligation, and trust that provide access to information, shared working norms and practices, and narratives which function to frame the experiences of the workplace. These practices create and sustain social networks in the workplace, the benefits of which are unequally distributed and result in the reproduction of labour market inequality. This paper explores how social networks function differentially among workers to reinforce existing patterns of preferential access to the most desirable positions in the labour market. This occurs both through gendered and ethnic differences between occupations and between the jobs within an occupation.

Labour market segmentation is the social division of workers into skilled, relatively secure, elite, core occupations and unskilled, insecure, non-elite occupations with little or no labour market mobility. Many scholars argue that this segmentation is strongly gendered and there is overwhelming and persistent evidence that female-dominated

occupations pay less than male-dominated occupations, even when skill, experience, and working conditions are controlled for (England, 1992; Tomaskovic-Devey, 1993; Women and Work Commission, 2006; Browne, 2006). Simultaneously, the jobs within an occupation often display enduring gendered and racialised patterns in pay, position, and prestige. Although many studies look at occupational stratification, or the differences between occupations, fewer studies explore job segregation, or the barriers to equal advancement and reward to jobs within a particular occupation. We focus on the latter by analysing the gendered and racialised patterns of social networks at work. We argue that the structure and functioning of these social networks are one of the mechanisms in the workplace that serve to reinforce differentiation in the labour market.

We argue that analysing the ways in which the micro-level practices of gendered and racialised social networks result in differential returns in the workplace is key to understanding inequality within occupations. Social networks function to enable access to information and knowledge and to create job opportunities, but at the same time, function to prevent others from gaining access to such privileges. Crucially, we analyse the social relations that are central to understanding both of these functions.

The paper proceeds as follows. First, we provide an overview of the job segmentation and social network literature arguing that much of the literature is overly optimistic in assuming a positive outcome to individual's investment in social networks. This is particularly so in the recent expansion of social capital literature into labour market analysis. Second, we review our methodology. Finally, we present our findings, emphasising that social networks are not equal in the workplace but function differently depending on worker's position in the firm hierarchy and that this process is deeply gendered and racialised. While successful use of networks can result in a positive outcome for some, for others, use of networks does not result in a return in pay, status, and prestige in the workplace.

Segmentation in the labour market

Labour market segmentation theorists challenged the neoclassical economic conception of the homogeneous labour market by focusing on economic segmentation as the basis for explaining social stratification. Early segmented labour market theory took the form of "dual labour market theory", which distinguished only between "core" and "peripheral" labour markets (Doeringer and Piore, 1971). However, this concept of dualism rapidly expanded into a larger debate over the number and types of segmentations in labour markets (Baron and Bielby, 1984; Edwards, 1979; Kaufman *et al.*, 1981). Labour market inequality based on gender and race are explained by groups' over- or under-representation in particular segments of the labour market. However, many scholars criticised the early forms of segmentation theory for the simplistic representation of the market and demand-side orientation (Cooke, 1983; Wilkinson, 1983; Harrison, 1994).

Feminist accounts of segmented labour markets explain the strong gendered patterns of inequality by pointing to widespread and persistent phenomenon of occupational segmentation, where occupations are devalued because they are dominated by women (Humpheries and Rubery, 1995; Crompton *et al.*, 1996; Acker, 1989; England, 1981). However, increasingly research is exploring segmentation between the different jobs that comprise an occupation in order to explore inequality within an occupation. In this case, the entire occupation is not devalued because it is predominately occupied by women or ethnic minorities but women and ethnic

minorities are assigned jobs in the occupation that are lower paying and less prestigious, regardless of who performs them (Reid, 1998).

Job segregation within an occupation, the topic of this paper, is accomplished through decisions regarding promotion that are supposedly fair and objective, but remain subject to the biases and preferences of advantaged groups that are already dominant in desirable positions within the firm. For example, career advancement may be linked to an individual's "promotability" or their ability to "fit into the culture". These practices of "particularistic manipulation" in promotion subvert ostensibly meritocratic procedures by relying on vague criteria (Baldi and McBrier, 1997, p. 479; Federal Glass Ceiling Commission, 1995; Wilson, 1997). Such a pattern of discrimination tends not to be found at the point of recruitment, which is often heavily monitored by the firm and subject to litigation, but rather in the less formal, and less regulated, promotion process (Federal Glass Ceiling Commission, 1995).

Social networks in the workplace

Another element of the explanation of gender and racial inequalities in the labour market comes from social networks scholars. They also challenged the neoclassical economic conception of homogeneous labour markets by stressing the extent to which job acquisition and promotion is embedded in informal social networks (Granovetter, 1974; Boxman *et al.*, 1991; Drentea, 1998; Braddock and McPartland, 1987). Early work by Granovetter (1974) shows that information gleaned from informal social networks provide access to valuable labour market information, such as what positions are open or the characteristics of a potential boss or colleagues, that is unavailable through more formal means, such as advertisements or job fairs. Granovetter argues that people who have found their jobs through informal methods such as social networks find higher prestige jobs, greater job satisfaction, and higher earnings.

Related to this, effective social networks are also thought to affect job stability and better promotion prospects. Intra-firm networks are thought to provide information that is fundamental to career success (Braddock and McPartland, 1987; Davies-Netzley, 1998; Hanson, 2000; Gray and James, 2007). The theory is that social contacts (particularly "weak ties" or acquaintances, old college friends, ex-workmates, or employers) are more likely to include people in different occupations and social positions (Granovetter, 1973; Burt, 1992). These networks are likely to transmit original or unique labour market information from one network, or community of knowledge, to another. Thus, having better access to these "weak ties" does not just make work go more smoothly, it contributes to long-term survival and success on the job. Powell and Smith-Doerr (1994) suggest that employees recruited by informal means may experience faster mobility and, in turn, tend to recruit additional employees similar to themselves.

Debates have also centred on the nature of social networks in the labour market and the extent to they are characterised by closed or open networks. Coleman (1990) argues that social resources are created by a closed network of people who are strongly interconnected and who share high levels of trust and mechanisms to impose sanctions on transgressors. Coleman illustrates this with the example of the tight knit community of diamond traders in New York City who have developed strong norms and potential sanctions which allow extremely high levels of trust. Burt (1992), on the other hand, asserts that social capital is created by "brokering" or "bridging" between distinct but open groups, which allows information diffusion between the groups. He suggests that "structural holes" are the spaces between groups and that the bridging or

brokering function is what creates value. The overly dualist nature of this debate precludes other approaches. We argue that most networks are better conceptualised as exhibiting a spectrum of openness or closure, where the members of a closed network can simultaneously act as brokers or intermediaries for other groups. Nor is there a static value to open or closed networks; open networks may be necessary for people to realise value from networks at some points in their careers while closed networks lead to value in other situations. Indeed, Burt himself in his later work tries to resolve the contradiction by suggesting that brokerage across groups "is the source of value added, but closure can be critical to realizing the value" (Burt, 2005, p. 31).

Likewise, there is an assumption in the literature that the contacts in an individual's social networks or the "bridges" between different groups automatically lead to information diffusion. This assumes that shared norms and high levels of trust that may be displayed in a closed network are equally present in open networks (Putnam, 2000). Thus, numerous studies try to measure social capital in the workplace simply by measuring the number of contacts or the names of people with whom an individual communicates. However, Erickson (2005, p. 154) suggests that there are "culturally specific scripts for information exchange" which functions to make it more likely to keep information within closed groups. Thus, it is highly unlikely that all members of a social network, no matter how highly placed in the hierarchy, will share information indiscriminately with all members of the network. Indeed, Portes and Landolt (1996) suggests that information diffusion may be particularly unlikely in competitive situations, where one person's social capital advantage may mean another person's loss.

Exclusion and social capital

Most recently, many social network scholars have attempted to expand the notion of social networks in the labour market to include the notion of social capital (Lin, 2001; Lin *et al.*, 2005a; Fernandez *et al.*, 2000; Marsden, 2005). Although related ideas, social capital is argued to incorporate both the social relationships in the labour market (the networks themselves) and the resources contained within these networks. The worth of social networks is approached in two ways within the social capital debate. The first stresses the resources in networks while the second highlights the network itself as a resource. Some scholars, such as Burt (1992), stress the importance of resources found within social networks, while others, such as Lin (2005), also highlight the value of the network itself, in addition to the resources contained within the network. For example, Erickson (2005) argues that employers often require employees to have large and active social networks as a qualification for the job. Thus, in some occupations, she finds that employers may hire for networks as well as through networks.

However, there are many fundamental problems with extending the notion of social capital into an analysis of labour markets (see Kadushin, 2004). Perhaps, the most important is the assumption of a positive outcome for those who are part of a social network. Most theories of social capital stress the positive externalities of social connections which are theorised to result in trust, shared norms, solidarity, and civic mindedness which reveal their theoretical heritage in Putnam's (2000) attempts to understand civic society, even if the social capital scholars pay homage to Bourdieu's (1985) attempts to use social capital to help understand the system of class reproduction (Lin, 2001; Halpern, 2005). Although numerous theorists point to possible negative outcomes (Putnam himself has a chapter on the "dark side" of social capital),

the vast majority of work tries to conceptualise and measure the beneficial and harmonious outcomes from social capital in the workplace.

Although the notion of social capital in the workplace extends the metaphor of "real" or financial capital into the social realm, there is little corresponding analysis of the unequal distribution of social capital, deferred consumption, the potential struggle for resources and social position, or the possibilities of an investment losing value (Fine, 2001; DeFilipis, 2001). For example, in Lin *et al.* application of social capital to the labour market, they explicitly state that a coherent theory of social capital needs to "demonstrate how social capital is capital, or how it generates return or gain" (Lin *et al.*, 2005b, p. 59), thus ignoring the possibilities of individual returns or collective externalities that are negative. In a similar vein, Lin (2001, p. 21) focuses on how individuals "access and use resources embedded in social networks to gain returns in instrumental actions or to preserve gains in expressive actions". Thus the metaphor loses value by not truly being extended to discuss possible negative outcomes. The extension of social capital into the analysis of the workplace is no exception and results in slightly tautological studies that seek out signs of trust and connection in the workplace rather than any negative outcomes (Marsden, 2005; Erickson, 2005). Often social capital is identified where and when it works, but not when it does not function or who may be excluded from using this asset. Thus, the extension of social capital theory into the analysis of the workplace, like neoclassical economics itself, assumes away conflict and power-struggles with assumption of harmonious outcomes.

Another fundamental problem with the extension of social theory into the analysis of labour market outcomes is that it ignores the earlier insights of social network theory into labour market inequality. Social network research in the last decade suggests that the composition, range, and geography of women's networks of social contacts differ from those of men. First, most social networks show strong signs of social homogeneity. Marsden (1987) finds that people tend to interact and establish relationships with others that resemble themselves on characteristics such as age, class, gender, occupation, sexuality, politics, family status, where they live, or leisure pursuits. Kanter (1977) makes a similar point in her theory of "homosocial reproduction" in the workplace. According to this theory, sponsorship is crucial to career advancement within the workplace, and sponsorship tends to be "homosocial" – that is, people tend to establish sponsorship ties with people who resemble them closely in terms of characteristics such as race, gender, and social background.

The effects of these high levels of homogeneity in social networks are multi-faceted for women. Drentea (1998) argues that it promotes further occupational segmentation since the women who use informal job search methods are more likely to end up with gender segregated jobs (e.g. female-dominated jobs that are typically lower paid and offer less prestige, less authority, and fewer benefits). Other scholars' works support this finding. For example, in their study of the local labour market in Worcester, Massachusetts, Hanson and Pratt (1991) find that most women use local networks of other women to exchange labour market information and that this results in women finding jobs in women-dominated occupations. Thus, segregation in networks reinforces occupational segmentation in the labour market. This suggests that for women, using informal job search methods is a potential constraint when searching for gender-integrated or male-dominated jobs (such as engineering).

Social capital theory also ignores the insights into the gendered nature of social networks in internal mobility or promotion prospects within the firm. The Federal Glass Ceiling Commission in the USA has identified "information isolation", or the lack

of access to diverse information networks, as one of the main barriers that blocks the career advancement of women, as well as ethnic minorities, particularly in the private sector (Federal Glass Ceiling Commission, 1995). Similarly, Gray and James (2007) find that being excluded from informal networks of knowledge in knowledge-intensive firms affect women engineers' ability to advance in the workplace. A number of studies have found (Moore, 1988; Ibarra, 1992; Davies-Netzley, 1998; Fisher, 2006) that women who do make it to elite positions are often "outsiders on the inside", that is they are less integrated in informal discussion networks and outside the influential, central circle of high-level contacts. This isolation means that women are excluded from top networks and informal relationships that are necessary for further career advancement.

Related to this, many women and ethnic-minority social networks may be ineffective in placing members in high-end jobs because there are fewer high-status contacts in the network. McGuire (2000) argues that high-status employees usually occupy command and control positions within their networks that facilitate their access to resources. Ethnic minorities and women were less likely than whites and men to have the resources and positions that would put them into contact with high-status employees and, therefore, they miss out on critical information and sponsorship. McGuire shows that structural exclusion from high-ranking and resourceful positions, not a lack of networking knowledge or skills, prevent women and ethnic minorities from forming ties to powerful network members. She argues that high-status employees may not have to personally exclude women and ethnic minorities from their networks because their organisations are already doing it (McGuire, 2000).

Thus, although social capital is often deployed by theorists to interpret social phenomena when accounting for processes of inclusion, we argue that social capital can only be fully appreciated if we understand the mechanisms of exclusion as well. This approach is at odds with much of the social capital literature where the positive outcome of social relations in the workplace is assumed. We argue that social networks (and the resources they contain) are simultaneously both open and closed systems. Workers who try to benefit from it unsuccessfully, or those who claim not to understand how networking (promotion) functions are in the same position; they are excluded. In these spaces of exclusion we find gender, ethnicity and forms of cultural capital at work to maintain the distinction between inclusivity and exclusivity in the workplace.

Our approach

Unlike other studies of social capital in the workplace, which employ quantitative methods to model the strength and composition of network ties (Flap and Boxman, 2005; Erickson, 2005; Marsden, 2005), this study applies a qualitative approach to gather data with company employees in focus groups and in individual interview sessions lasting approximately one to two hours. Using their CVs as an aide memoir, our interviewees gave snapshots of their career histories, in particular focusing on the social relations that led to job acquisition and promotion. We are concerned to account for the way people experience and conceptualise their relationships in the workplace. We asked specifically about how workers viewed the functioning of these mechanisms and their role in these networks. In other words, our approach enables us to capture the core mechanisms that structure social capital in the workplace.

In our view, social networks and the resources they contain and represent are not unitary concepts in the lives of workers, rather it is understood in a complexity of ways. Therefore, we are attuned to the use of language within the firm (at times

differentiating between management and workers) that reflect shared norms, identity, and values. Through a deconstructionist approach we then identify the various ways in which social networks are talked about, by whom and in what context, in order to provide a nuanced analysis that separate out the impact of cultural and workplace norms, from dominant narratives used in the media, as well as the complex ways in which the meaning of social networks/capital can be interpreted by status, age, sex, and ethnicity.

Our case study focuses on an international company that license intellectual property in the Information Technology sector, based in Cambridge, UK. By focusing on one firm it is our intention to get to know the firm well, thus, drawing out the culture of the firm, i.e. a particular sense of self, norms, conventions, and work practices. Such an in-depth methodological approach allows us to study the micro-practices of social networks and their relationship to promotion. In so doing, it becomes possible to observe informal work practices that are at times intangible, particularly as these practices take place over time.

We singled out one profession, engineering, as the core occupation within which we explore promotion, prestige, and differentiation within the firm. Our sample consists of a total of 32 engineers: 16 men and 16 women, from both an ethnic and non-ethnic background (including immigrants both from within the EU who have relatively easy access to the UK labour market and from outside the EU who have to meet much more complex legal requirements in order to work in the UK). This sample represents all of the female engineers in the firm, matched with a sample of their male counterparts. As part of this, we interview a full range of engineering occupations (testing and technical support; projects and product managers; software engineers and hardware engineers). In addition to the 32 engineers, we interviewed a sample of the administrative occupations within the firm, including the human resource manager, top technical managers, lawyers, financial managers, and secretaries to gain insight into firm culture, the official narrative around promotion, and the structure of pay and rank within the engineering occupation. Much of the information in our analysis is based on highly personal, although formalised, discussions. We have used pseudonyms for each individual and describe respondents' positionalities as far as possible within the boundaries of anonymity. We also refer to firms by pseudonyms (CHIPS) to protect the confidentiality of our sources.

Furthermore, we have summarised the details of our interviewees' personal circumstances where possible, but we have done so without significant loss to the meaning conveyed in our analysis. While we have taken a reflexive approach to this analysis in order to describe any patterns in our data some degree of generalisation has been inevitable. However, in this context a note concerning the use of the term ethnic minority is necessary. While our sample appears to be representative of the high levels of international migration to the UK, which also reflect a sector specific government policy in the recruitment of foreign labour to supplement skills shortages, we do not claim to holistically represent the experiences of ethnic minorities in the IT industry. This is because our sample of interviewees exemplifies a diverse range of positions in terms of migration and personal histories. Our ethnic minorities' countries of origin range from the Far East, South East Asia, West Africa, Caribbean, to Western and Eastern Europe. The wide range of countries notwithstanding, these individuals also represent various migrant types including temporary, return, and repeat migration. Capturing people at various points of arrival or stay (short or long run) in the UK has implications for our analysis insofar as it is a significant variable that produces

differential outcomes to their employment experience. Other sources of variation we accounted for which effect a person's amount of, and skill in using, social networks was the individual's family background, including economic and cultural factors which is represented by parental occupations, educational and employment trajectories, aspirations, and marital status.

Social networks and career advancement
Segmentation in the engineering occupation

Numerous studies of the ICT industry show that women are strongly under-represented in technical occupations such as science and engineering (Pantelli *et al.*, 2001). The IT industry represents a classic case of gendered occupational segmentation in the labour market, where women are over-represented in administration and service occupations while men are dominant in engineering and technical occupations. However, few existing studies are able to differentiate between the different types of jobs that exist within the engineering occupation. Like many occupations, engineering is better understood as a series of related jobs with differing amounts of autonomy, prestige, and pay. Although engineers often work in teams, there are clear demarcations between individual members with varying levels of remuneration, status, and opportunity for career advancement. In the firm we studied, the "design engineers" (of CHIPS) are on the top of the occupational hierarchy, and are supported by a number of "support" engineering jobs, such as verification, validation, and customer support. We argue that treating the engineering occupation as a homogeneous entity (as the firm itself does in its own data collection exercises) depoliticises the strong gendered patterns within the occupation and masks the extent to which high pay, status, power, and prestige are segregated and reserved for those who occupy particular job niches in the engineering occupation.

When we charted the occupational patterns within engineering, we found severe levels of gendered segmentation among the jobs within the occupation (Figure 1). Among engineers, we found that women overwhelmingly dominate the "support" engineering jobs, whereas only a few male engineers are found in jobs at the bottom of the engineering hierarchy. However, a few women do occupy more senior roles – for example, one women is a design engineer, another is a project manager, and another a product manager (the last two both low level management positions which require social skills as opposed to direct engineering skills).

Ethnic patterns of job allocation show a more complicated configuration although one closely aligned to the gendered patterns. Half of our interviewees are engineers with an ethnic background, although a few were born and educated in the UK, most are

	Ethnic Women	EU Ethnic Women	Non-ethnic Women	Ethnic Men		EU Ethnic Men	Non-ethnic Men
				Born UK	Immigrant		
Top Management • Division manager • Vice Presidents • Director of Research					Arjun		Derek Nigel
Middle Management • Manage staff + use technical knowledge				Edwin Colin	Talvin	Juan	
Lower Management • No staff management • Product/customer knowledge		Ulla				Luca	
Senior Engineer	Wei			Steve			
Mid-level Engineer	Qian		Bridget		Omar		
Low-level Engineers • Technical support • Customer Support • Testing	Mary Aisha Lei	Katrina	Kirsty Victoria				

Figure 1.
Sample of the occupational structure of interview participants at CHIPS

first generation immigrants educated abroad or in the UK. The intersection between gender and ethnicity is stark. Ethnic female engineers are mainly concentrated in the "support" jobs within engineering. This often represents both cultural and gender assumptions about skill, the value (and legitimacy) of foreign educational qualifications, and job experience. However, there are anomalies to the general trend of ethnic female engineers concentration in support jobs. For example, the only female design engineer is from East Asia and one of the females in lower management is of western European origin.

We found much more variation in our ethnic male engineers' jobs. First, none of the ethnic male engineers were found in "support" jobs (although some started in "support" engineering), many were employed as design engineers, and some had progressed into the highest levels of engineering management. Our ethnic male engineers also mentioned initial problems with the validation of their education and work credentials, but seemed to surmount that barrier and were quickly promoted out of "support". Crucially, the "double disadvantage" of being female and being from an ethnic-minority background resulted in much stronger patterns of job segmentation than ethnicity alone. Thus, as much of the literature would lead us to expect, we find not only occupational segmentation, but also strong gendered patterns of job segregation within the engineering occupation, although there is more variation with regards to ethnicity. This finding is important because each job niche within engineering represents a specific level of hierarchy within the occupation and is attached to different levels of status, power, pay, and prestige.

In the following sections, we explore some of the micro-practices of the workplace, specifically narratives around promotion, the structure of social networks and mentors, and the loss of resources that help to explain these occupational patterns.

Intra-firm social networks
We argue that informal and powerful social networks depend on relational proximity, or social closeness – including shared norms, routines, and working practices – that can exist either within a firm or within an industry. Although a few participants found resources in their professional and industrial networks outside of the firm, the networks which were most valuable for our interviewees were overwhelmingly found within firm-specific networks. The resources found within a firm-specific network were not always obviously linked to promotional opportunities or career advancement. Such resources might include knowledge of the politics of the firm and of willing mentors; opportunities for new skill acquisition; opportunities to demonstrate one's skills; informal gossip and knowledge about colleagues' intentions and career moves; encouragement leading to positive self-appraisal; affective communication; knowledge useful to gain a competitive edge over one's contemporaries as well as more specific information on potential job openings or the reputation of potential managers and colleagues. In addition, membership in the firm-specific network itself can be a resource if those enmeshed in these social relationships can accrue a high level of legitimacy and prestige within the larger organisation.

All the engineers in our study thought of themselves as possessing social networks, but the resources contained within these networks and the extent to which these networks themselves can be viewed as resources (that is, the extent to which we might think of these networks as containing or creating social capital) were unequally distributed amongst our interviewees. Many of our female respondents were part of industry or regional "mentoring groups", but lay outside of the powerful informal

networks within the firm. Social networks in this case function as a firm-specific resource, access to which is experienced differently according to gender, this comes across clearly in the language interviewees used to describe the structure of the firm as well as the promotional process.

Most often our female respondents had networks of peers in "support" engineering, but few of their networks contained powerful figures or "structural bridges" which could provide access to resources and other networks. The overwhelming majority of female interviewees, regardless of ethnic background or position, did not describe powerful mentors and networks containing resources in the firm. Rather, they explained their position in the occupational structure as an effect of CHIPS' "very flat structure" with few avenues for upwards mobility since there was "no opportunity for promotion". As one female respondent put it:

promotion is an arcane mystery. The attitude here at CHIPS is that everyone is very much in charge of their own career. So that if you want a change, you have to push for it yourself for it, people don't really help you forward .... It's very secretive in CHIPS. Sarah (first level manager, female, non-ethnic minority background)

Reinforcing Gray and James (2007) insights on gender and knowledge diffusion in the ICT industry, many female respondents spoke of being "out of the loop" or excluded from important, if informal, information flows about career advancement. Interactions that take place informally have meaning and can be more consequential to labour market outcomes than formal decision-making. Thus the informality of the promotion system particularly disadvantages those without well-placed mentors with powerful social networks. This is captured in the following comment by a female "support" engineer:

. . . I'm sure that a lot of jobs that come up get snapped up are never advertised. Because all of the sudden you get an email saying so-and-so is doing this job. And I think, that's exactly what I wanted to do, but I never saw it advertised anywhere. Mary (validation engineer, female, ethnic minority background)

Thus, although our female respondents could discuss their social networks at work, often these were divorced from discussions about promotion, job opportunities, mentors, or knowledge of the firm or of the technology. They were often either unaware of the strong networks that existed in the firm, and the resources contained within them in, or were aware of them, but felt unable to access them.

One of the few exceptions to the strong pattern of gendered segmentation we found was Ulla, a mid-level female manager from Germany and the highest-ranking technical women in the firm. After two years with CHIPS, Ulla found out about a new job opportunity via information passed on by her manager, who was the head of the whole group, who she frequently went jogging with:

He told me about the job and I complained about my [current] job, that I wanted to do something new. He said, "what about this one?" Really? So it was like an informal invite? Yes, it was formalised and I applied formally, later. But the initial suggestion came informally. So was the post created for you? No, no. The post was available. But it was advertised internally in CHIPS and so I applied at that point. But I knew about the post beforehand. And nobody else applied for it, as far as I know. I was lucky, I had the information beforehand. I think they wanted me to get it.

This shows the importance of Ulla's networks to her career advancement and how the informal nature of information exchange is grafted onto the formal system of

promotion. However, Ulla's experience and her networks are striking in their contrast to the majority of female respondents and places her closer to her male colleagues than the other female interviewees.

While most of our female respondents' narrative was about the firm's flat hierarchy and the resultant static career structure, our male respondents consistently refer to the opportunities provided by the firm. Our male respondents refer to the firm structure as "fluid", "multi-levelled", and as "an oasis of promotional opportunities". For example, one male engineer from a non-ethnic background said " . . . we've got quite a lot of levels of hierarchy in the organisation. Some would say it's too many". In the same vein, a male senior engineer from an ethnic-minority background said, "job roles come up fairly frequently. [The firm] is good at creating internal opportunities for different roles".

Intra-firm mentoring and the active sharing of network resources characterised many of our male respondents experiences. One way this strong social network is shown is in the creation of new positions to accommodate promising individuals and in efforts to steer the career and secure the loyalty of key individuals who follow behind the current elite in avenues of promotion. For example, our top male manager, Derek, was extremely well mentored by the current CEO, David, and his promotion has been rapid. However, as Derek has progressed in his career, he in turn, has mentored a number of other managers below him, and at times the firm has created new posts to "stretch and challenge" those he mentored.

> So [Derek] was my boss at the time. He was Engineering Manager. And [Derek] was promoted to become the Director of Engineering. They advertised [Derek's] previous role – and opened that up as a vacancy. I think [Derek] had asked me several times in the past whether I would want that role. I fairly consistently said, no. It's taking the focus away from [my work].... So I fairly consistently said, no. But when it actually happened and [Derek] was promoted to Director of Engineering, "this role is now vacant, are you going to apply for it", well, I thought I should do. There was no natural progression; I actually had to apply for that role and go through some internal interviewing . . . So one of the guys I knew well and at the time both he and I were reporting into [Derek]. We both went for the job. I got it. Then the other guy ended up reporting into me. Which was fine, and we worked like that for the next 12 months. Then he's now been promoted ahead of me – he's got Director of Engineering. And I'm now reporting to him!! So what is [Derek] now? He's been promoted up again! And he's now VP of Engineering. He reports to . . . the VP of Operations [who] . . . reports to the Chief Operations Officer. (Nigel, top management, male, non-ethnic background).

The other two top managers at CHIPS we interviewed considered Derek an excellent mentor who helped them advance rapidly in the workplace. One of his mentees, now a top manager, says of him,

> he's very, very good. I would say he's been very influential in my career. Very influential . . . . [he] gave me the chances, I took them . . . .he set the highest standards, I met them. He's been very influential. (Arjun, top management, male, ethnic-minority background).

We found that senior managers have a clear idea of what it is to be mentored, can talk about their mentors, and all refer to their mentors as "someone very influential" who encouraged them, created opportunities for them, and "pushed me to expand my role". Together, the elite managers formed a self-referential group of men, a dynastic brotherhood, defined by the exclusivity of the network. Their network is imbued with a shared history that is expressed through a dominant narrative around the development and growth of the firm itself and a sense of a shared future in the firm (given material

form through stock-options). The factors outlined above are the key motivations for investing time, energy, emotion, and expectations in these workplace relationships.

We also found that the more resources that the social network contained, the more respondents created a closed, secure, trusted group with a clear sense of belonging. We found a strong and interlocking network of elites in the firm, or what we refer to as "nested mentoring". This illustrates the mentoring relationship in the upper hierarchy of the firm. The mentoring lineage goes back to the key entrepreneurs who set up the firm almost ten years ago, these men are now chairs or chief executives and have a global as well as regional reputation in their industry. They, in turn, mentored the top managers, who in turn, mentored those below them (Figure 2). Beneath them are at least six generations/layers of managers.

We found ample evidence to support Kanter's (1977) theory of "homosocial sponsorship", that is sponsoring people who closely resemble ones' self. For instance, one 25-year old male engineer, Toby, was already an engineering leader for his group and "was given a lot of responsibility for a big project". Toby's manager and informal mentor, Nigel, explained Toby's appeal succinctly, saying "he reminded me of myself at that age" and praised his "proactive" and "aspirational" qualities. In this way, elite men in the firm actively mentor and share their network resources with select individuals who resemble them.

However, while masculinity is an important bonding factor in the group formation of the network of elite management, ethnicity is more fluid and we found men from an ethnic-minority background in the technical management at all levels. For example, Arjun, a member of top management was born in West Africa to first-generation migrant parents. His description of his promotional paths and relationship with mentors strongly mirror the discourse of the other top managers described above. Arjun says of his mentor,
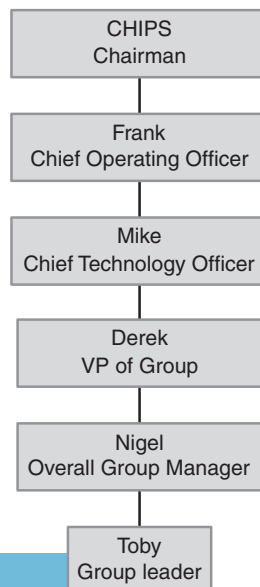

Figure 2.
Male mentoring lineage
at CHIPS

I was delivering on time with good quality . . . I think he respected that and he could see the difference I was making . . . when he got promoted I got promoted as well". "I respect [my mentor] a lot and I hope, I know, that he respects me too. I have a lot of time for [my mentor] and he gave me the opportunities, but . . . he wouldn't have given me those opportunities if he didn't know I could do them.

Thus, although all of the engineers in our study thought of themselves as possessing social networks, the extent to which these networks themselves can be viewed as resources (that is, the extent to which we might think of these networks as containing or creating social capital) varied substantially and showed strong gendered patterns. Many of our female engineers were part of industry or regional "mentoring groups", but lay outside of the powerful informal networks within the firm, which left them severely disadvantaged in the workplace.

Uneven returns of social networks
Another way to view the unequal distribution of the benefits of social networks (and the resources contained within them) is to examine the mechanisms that can minimise the value of an individual's existing social network in the workplace. Again, this approach differs from much of the social capital literature where scholars assume positive gains from social networks. We argue that to understand how social networks function as a resource embedded in social relationships, we have to examine loss of value as well as gain.

Informal and powerful social networks that depend on relational proximity, or social affinity, can exist either within a firm or an industry due to the strong level of embeddedness of social networks. However, some network resources only express their value in particular circumstances (often bounded in time and space) and can lose their value outside of the originating firm (or industry). Others resources, although specific, retain value outside of the setting in which they were created (Podolny and Baron, 1997). Thus, an individual's labour market mobility (moving between firms) can devalue the resources in and of these firm-specific or even industry-specific networks.

We found that gender divisions in labour mobility impact the resources our female respondents possessed in their workplace social networks. Although our analysis of career trajectories (controlling for age) did not find large gender differences in labour market mobility (or the frequency of changing jobs), we did find significant qualitative differences in the nature of that process. Our female respondents changed jobs almost as often as their male counterparts, but often not for their own personal career advancement, but to accommodate their partner's career moves (also see Gray and James, 2007; Dex, 1987). Hardhill refers to this highly gendered phenomenon as the "trailing spouse syndrome" (Hardhill, 2002).

Crucially, gaining access to powerful social networks, gaining trust and finding willing and well-place mentors becomes more complicated when an employee changes firms. The resources found in networks may retain worth when employees remain in the same sector or move into similar sectors where the reputation of previous mentors and the worker's competencies are equally valued. On the other hand, frequent transfers between occupations and sectors can serve to devalue the social networks of relationships between employees. Thus, the more frequent career changes, often to jobs in other sectors, often served to devalue the social networks that our female respondents built up over time. For example, Qian, a female engineer from China, immigrated to the UK with her husband who was studying for a PhD. After moving, she suffered from years of under-employment in unrelated jobs (working in the

manufacturing sector) until she was employed as a "support" engineer at CHIPS. The relationships in her previous social networks in the workplace were first disrupted by her move to the UK to support her husband's further education and then were further disrupted by her inability to gain employment in electrical engineering in the UK.

As this suggests, another mechanism that can function to strip away the value of social networks and realising the resources within them is the downgrading of immigrants educational qualifications and the spatial dispersion of their educational network. First, our immigrant respondents who attended university abroad often found employers unable to judge the worth of their educational background. Many interviewees who were immigrants felt that UK firms found it difficult to weigh the prestige of foreign universities and the reputation of a mentor or referee and this made it more difficult to obtain an appropriate position in the UK labour market. This is seen in the experience of Lei, a female engineer from Malaysia, who was educated in Singapore and came to the firm with a strong degree and substantial experience in embedded software programming, but who felt that her skills and education were not valued in her current position:

> What is your job title now? It's not software engineer. It's now support engineer. So I don't do software anymore, basically. Have you spoken to anyone about this – that you don't want to do support work? I think if I say, "I don't want to do support", then I can't get a job here. I can't get the job. Because they think I should be in support and not in the [design] development team. . . . Until I prove myself, they say it's not a [skill] match . . . . Especially you're going to an education that is different. They don't know whether your education is good enough for them or not. Until you work for them and prove it, that you can do it. (Lei "support" engineer, female, ethnic-minority background)

We found our female immigrant respondents particularly susceptible to the devaluation of their educational qualifications because fewer of our male immigrant respondents received post-graduate training abroad, but instead moved to the UK in order to pursue higher education opportunities.

A second, and inter-related, factor is that educational degrees are often used not only as a marker of knowledge and skills, but also to provide the applicant with a ready-made social network in the industry. Many of our male immigrant respondents moved to the UK to pursue higher education and, consequently, were able to build up UK university-based networks in the industry. Therefore, they often entered the firm at a higher level than our female respondents since they were able to use their industry-wide connections, receive references from trusted sources, and had a better knowledge of the job market.

Thus, we argue that certain types of labour mobility, particularly interindustry mobility to accommodate a spouse and international migration, can function to devalue the resources (or returns) embedded in social networks (or social capital). Our findings suggest that the likelihood to experience this type of labour market mobility is unevenly distributed in the firm. This remains a particular problem for many of our female respondents, and particularly our female immigrant respondents, who are still more likely to relocate for their partners' career needs and who can easily lose the value of their educational networks.

Conclusions
This study highlights the need to understand the mechanisms of exclusion as well as inclusion in the workplace – mechanisms which are often embedded in daily micro-level work practices. This paper explores how social networks arise out of these

micro-level practices and function differentially among workers to reinforce existing patterns of preferential access to the most desirable positions in the labour market. This occurs both through gendered and ethnic differences between occupations and, the topic of this paper, between the jobs within an occupation. Studies which fail to differentiate carefully between the levels of segmentation (or pay and prestige) found within the occupation would miss the great variation in worker experience and labour market outcome, thus increasing the likelihood of a harmonious outcome.

In this paper, we have critiqued the dominant tendency within the social capital literature to assume that the functioning of social networks results in a positive outcome in the workplace. This body of literature downplays the earlier social network research which analysed the gendered and ethnic patterns of network formation, and, instead, focuses on the benefits of social relationships. By analysing the strong gendered and ethnic patterns of segmentation within the engineering occupation in our case study firm in the information technology industry we have outlined significant inequalities in access to, and awareness of, the resources contained within some social networks in the workplace.

All the engineers in our study thought of themselves as possessing social networks, but the resources contained within these networks and the extent to which these networks themselves can be viewed as resources varied substantially. Further, we have also outlined how these gendered and racialised inequalities result in varying labour market outcomes whereby some workers gain resources, and others are excluded from this, or indeed, lose the resources previously created. It is clear, then, that in discussing social networks, information diffusion is selective and not automatic, networks may be open when creating value and closed when maintaining value, and benefits are unevenly distributed both individually and collectively. As an analytical concept and methodological tool social capital potentially enables research on structural inequalities in labour markets and within firms, but in practice, it limits critical analysis of the distribution of power and resources in the workplace. The metaphor could either be dropped or extended to encompass concepts of loss, devaluation, conflict, and power.

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