Gender and technology culture: Points of contact in tech cities

Abstract

This article considers several features of tech cities and masculine technology culture, and their impact on the conditions of work and interactions of professionals working within them. It uses interdisciplinary perspectives of gender, technology culture, and professional identity and status to understand work in tech cities. Using focus groups involving 60 women and men across different professional backgrounds at three tech city sites in the UK and USA, the paper examines the extent of change in work roles and status norms in a highly male-dominated sector and physical space. Professional life in tech cities is shaped by 'points of contact', characterised by heightened knowledge and awareness of masculine culture that restricts women's progression. Three such points of contact are identified. As increased scholarly and policy attention is paid to the lack of diversity in tech, this study contributes to a much-needed shift in tech culture. Attitudes and professional identities built around work and social networking in tech cities reveal the importance of professional communities and networks in supporting women to manage rejection and career barriers.

Introduction

The increased impact of digital technologies on social, economic and human rights has prompted governments to advance industrial and economic strategies to enable access to employment and business opportunities in the tech sector. In 2018 the United Nations assembled the first Digital Experts Panel, tasked with finding ways to use the benefits of digital technology more effectively, protect against negative impacts and strengthen international cooperation. Globally, the terms of commerce of the 'digital economy' have been identified as a key policy focus for development and international business (Castells, 2014). The impact of digital technology on employment will be significant; in particular, automation will affect 50% of the world economy – 1.2 billion employees and $14.6 trillion in wages (Manyika, 2018). While the countries leading advances in tech – China, India, Japan and the US (ibid.) – differ in level of investment, economic structure, relative wage levels, and workforce size and dynamics, the impact of increased efficiencies and innovation brought by the tech sector will be global (Brynjolfsson and Saunders, 2009). However, the 'digital workplace' and 'innovation economy' also enable new divides concerning skills, education and inclusion (Richardson, 2018), underlined by global investment by the most advanced economies in quality technology infrastructure, skills and innovation. Aligned with the change to workplace structures and skills, the World Economic Forum's Networked Readiness Index (NRI), measuring how well economies use information and communications technologies to boost competitiveness and wellbeing, recorded a 33% increase between 2015 and 2016 in the economic impact score for the top ten most advanced economies; Europe remains at the technology frontier, accounting for seven of the top ten NRI countries along with Singapore, the United States and Japan (Baller et al., 2016: 8). Such striking advancement is partly a result of government investment in the tech sector, and the establishment of tech clusters such as Silicon Valley, USA, Silicon Roundabout, UK, and Cloud, Germany. One aspect of these new territories which has not yet received sustained attention from social theorists and practitioners, but which has a profound impact on education and career progression, is how interactions and professional engagement within and around tech clusters provide opportunities for new ways of working and relating. This study aims to bridge critical gaps in policy and international initiatives around tech, in particular those concerning diversity and experiences of working in locations seen as world-leading for investment in digital innovation.

This paper is located within work in sociology, gender studies, and labour and occupations on the significance of professional identity in shaping roles and responsibilities – and notably the impact of lack of workplace diversity. Recent studies of male-dominated industries such as construction, transport, forestry and media emphasise overt everyday sexism and stereotypical associations with 'masculine' and 'feminine' work, showing how gendered norms constrain workplace interactions and career advancement (Corcione, 2018; Wright, 2016), and even resistance to gender equality interventions (Johansson et al., 2017). But such approaches gloss over the impact on women professionals in male-dominated sectors of encountering overarching masculine culture in their negotiation of networks and physical space. This paper seeks to rectify this, based on longitudinal study of tech city sites. The context of space and contact is important to how professional identities are formed and performed across these sites. The masculine culture of tech has received significant, sustained scholarly attention (e.g. Cockburn, 2009; Wajcman, 2007). The new working methods enabled by digital connections have led to renewed emphasis in this area – notably in Massanari's (2017) and Cockayne's (2018) work on community dynamics and toxic technocultures – alongside an emerging body of work around digital-presencing and the gig economy (Duffy and Pruchniewska, 2017; Richardson, 2018; Shade, 2018). Maalsen and Perng's (2016) work on digital craft skills is unique in addressing how masculine skills (coding) are being learned by women, starting to pull apart the intersection of gendered tech culture, skills and spatiality. Building on this research, this paper examines the *points of contact* and collective experience of female and male professionals in making decisions around individual identities and negotiating interactions in tech cities.

Empirical data is drawn from three case studies, in London, New York and California, in which group discussions reveal participants' relational experiences of mobility, difference, prejudices, roles and responsibilities in the studied sites. I begin by positioning the studied sites in the culture of tech and critiquing work celebrating urban renewal and tech investment, before considering the spatial boundaries of work and their impact on attitudes and values relating to gender and tech culture.

Tech cities

Territories and characteristics

Tech cities are commonly based in run-down areas on the fringes of, or occupying undesirable spaces within, urban areas, often supported by government grants to promote growth and demonstrate investment in the digital sector. For Nathan et al. (2018), such investment demonstrates that tech cities should be treated as unique locations in terms of the business and work opportunities located within them. Well-known tech cities include:

1. *California, Bay Area – Silicon Valley and SoMA (South of Market)*
2. *New York City – Silicon Alley*
3. *East London – Silicon Roundabout*
4. Cloud, Berlin
5. Cap Digital, Paris
6. Santiago, Chile
7. Multi-Media Super Corridor, Malaysia
8. Tel Aviv and Silicon Wadi, Israel.

The first three – currently the most significant technology clusters globally (TechNation, 2018) – are the case study sites for this research. Given the level of capital funding and investment, tech cities should be seen as significant sites of growth and part of an emerging digitally enabled global civil society (Sassen, 2016). Technology companies in Silicon Roundabout have received £6.9 billion in venture-capital funding since 2010 (London & Partners, 2017). In terms of specialist creative digital clusters within specific urban economies researchers are starting to address the unique attributes of these sites and the plurality of 'co-creative' labour therein (Pareja-Eastaway, 2016; Nathan et al., 2018). However, the inequalities and behavioural factors that contribute to the different experiences and opportunities of work in these spaces have not yet been scrutinised.

Re-shaping diversity in tech
Some (e.g. Sassen, 2016) see tech clusters as signalling the move from local city initiatives to government intervention in support of cross-border dynamics, as these spaces begin to form global culture and citizenship. In contrast, Florida et al. (2017) identify the city as an 'innovation machine' and study the effect on regional structures with similar characteristics to tech cities. While these accounts take very different perspectives on the dynamics of the creative class, they usefully highlight the global economic fortitude of

the creative job sector and how this is unique to the physical places of tech cities. But this scholarship fails to capture gendered differences in experiences of professional life or to analyse interventions aimed at neutralising the dominant masculine work culture. While there are several comparative analyses of women's and men's earnings within broad categories of work, including tech (Acker, 1990, 2006; Olivetti and Petrongolo, 2008; Weichselbaumer and Winter-Ebmer, 2007), research examining gender differences within a defined spatial and cultural context often focuses solely on barriers within the workplace, interpreting discriminatory policies and practices as the main causes of women's workplace disadvantage (Damaske et al., 2014; Prokos and Padavic, 2002, 2005). Lim and Cortina's (2005) work on sexual harassment highlights the impact of toxic organisational culture and unites patterns of resistance to an array of coping strategies enacted beyond workplace boundaries. This context is important, as it confirms the hidden biases in male-dominated industries (such as engineering and construction) that continue to contribute to toxicity alongside overt victimisation and sexualisation of women (McLaughlin et al., 2012; Ness, 2012; Watts, 2009). In attempting to reshape the diversity of the tech industry, it is important to investigate gender relations within tech cities: how do women and men position themselves relative to professional spaces, roles and responsibilities, and the work they carry out? These forms of interaction are analysed as points of contact in light of participants' attempts to shape new meaning and actions within tech cities.

Points of contact

The above creative-city context is not new; classic theorists have suggested the increasing significance of the high-tech industrial districts that have replaced the post-Fordist economy (Castells, 2014; Piore and Sabel, 1984). What are new are the differing practices that constitute 'work' emerging under the umbrella of digital capital. The change of occupational clusters might present new 'relational opportunities' in collaborative workplaces (Ettlinger, 2003: 145), demonstrating a shift in work culture owing to the dense concentration of creative and, more specifically, digital producers (Gandini, 2016). Indeed, the way in which work can occur independent of organisational structures and the shift towards 'entrepreneurial practices' (Cockayne, 2018) characterise many of the professional relationships explored here. The structure of tech cities encompasses physical (architectural, superstructural) and immaterial (digital, social, cultural) boundaries.

Recent scholarly interest in physical movements within workspaces suggests heightened worker visibility in ideological constructions of work and gender-related status (Polletta and Tufail, 2016; Vallas and Christin, 2018), creating conditions in which 'defined gender expectations have significant consequences for the labour process'. (Payne, 2018: 347). Far from being freeing, therefore, digital workspaces intensify male hegemonic work practices, solidifying boundaries. Indeed, tech cities' apparently innovative work dynamics form part of the new contextual boundaries of 'maker cultures' utilising digital networks and gender difference (Rosner and Fox, 2016). While tech cities and the digital economy might be held up as examples of democratisation enabled by desirable creative work, this is by no means universally available. Working across global contexts, professionals experience considerable autonomy in tech cities. With such innovation and creative organisational efforts, including developing worker relationships, what forms do professional identities take, and how influential is masculine tech culture? Below I describe the study's methods, and examine in more detail the three sites studied, before discussing its findings on these questions.

Methods

This paper is based on research which forms part of a longitudinal study (2014–2018) analysing the professional lives, roles, careers and business experiences of tech sector professionals (Hardey, 2019). It involved a two-stage investigation. First, a questionnaire survey was conducted with 865 professionals who were members of tech networking groups, about their experience of tech culture and whether they felt there were equal opportunities for professionals. Qualitative research was undertaken to further understand the patterns identified in the survey. Correspondence following the survey identified participants for three focus groups at the three case study sites. Participant recruitment and data handling meet the ethical and consent criteria of [anonymous for review] University.

Participants and places

Co-working spaces at each tech city site agreed to host the focus groups – one located on a campus of a well-known tech organisation (California, Silicon Valley, SV), the second in an urban area of high social and economic mobility (London, Silicon Roundabout, SR), the third at an inner-city location of mixed commercial use and socio-economic

status (New York, Silicon Alley, SA). Each group involved 20 participants; participant characteristics are summarised below:

- Equal numbers of women and men
- Aged 19–57; average age 38
- Occupying a range of professional positions, from high-level management to low-level temporary contract work
- 34% single, 52% married, 14% in a relationship
- 100% university-educated
- In post four years on average
- 65% had at least one child aged 0–12
- 43% had had a career break for family reasons

Focus groups

Observation field notes from each site, along with survey responses, were used to identify key themes to be developed in focus groups. These were semi-structured, covering a range of issues to do with opportunities for new career roles and new practices aimed at reordering spaces and identities. Each discussion began with a 'point of difference' exercise adapted from a group role-play technique: groups were given scenarios involving different professionals and were asked to talk about the relative roles, responsibilities, opportunities and barriers of each, and to indicate where they believed each professional might be placed relative to the others in terms of seniority and status. This exercise built group rapport and allowed investigation of each group's attitudes and views.

Focus groups took place over lunchtime for 90 minutes in a shared work hub. This was a non-invasive way to integrate the sessions into the working day and provide stimulus for some of the more personally revealing reflections. Time was given at the end for participants to raise issues that concerned them. To protect participants' identity, quotes have been made anonymous, but apart from some elision their words are reproduced verbatim. The focus groups were digitally recorded and transcribed, along with the author's field notes – personal narratives using diary-style accounts and images that were analysed using qualitative techniques – and handwritten notes of observations.

Analysis

Building on Glaser and Strauss (1967), comparative analysis was used to identify and compare the actions and interpretations of participants in each group. The aim was to identify a set of themes to allow an account of work, diversity and discrimination in tech cities to be constructed, by noting the range and prevalence of practices participants experienced. Thematic analysis was used to compare the group discussions, including the observations made at the time. To ensure methodological rigour, initial interpretations were presented to several volunteers from among the participants (n=8). Any points considered not faithful to the intended meaning were corrected during this process.

Findings

Points of contact I: Awareness of diversity in professional and non-professional settings

At each case study site, gender equality initiatives had been implemented in response to negative work practices. Each tech city has a distinct vision of how women should fit into the tech economy, based on recent publications and evidence about the importance of diversity and skills development. The most common initiatives included marketing and networking events orientated around the 'women in tech' identity, a label discussed at length:

> *Ana:* [F]or a long time now the emphasis has been on how to deal with 'women in tech' [uses air quotations]. We've been discussing about the roles [specific job titles] for women and how and why they should be in that role compared with men. (36, digital business intelligence analyst)

> *Simone:* Yeah, no-one aspires to be like the 'women in tech', but you aspire to be the next CEO of a company like Facebook [laughs]. OK, maybe not Facebook, but to build something meaningful and be renowned for your work. (28, database developer)

> *Tricia:* When I was younger, I always thought all tech jobs are maths and science based. While many are (and getting girls in STEM is more important than ever) I would have really liked to learn about the tech jobs that are soft-skill or arts oriented. I'm a content strategist, I've worked as a community manager, and I have a background that's purely arts. (30, content strategist)

> *David:* My twelve-year old son was interested in the history of computing, so I've been introducing him to the early women inventors. Also telling him how women have *always* dominated computing software and programming until PCs were advertised to 'the boys' in the

early 1980s. That's something that isn't even on the curriculum at the moment. Tech is still about the boys and what we do and how much money we make. (46, data security)

<div align="right">London, SR</div>

A large part of the dialogue was about reforming how women in tech are viewed through involvement with initiatives to improve the teaching of technology to girls and their access to the sector. These findings highlight the focus on the subcultural context of tech culture that was associated with identifiable 'women's roles' in marketing, advertising, community management and content editing (Duffy and Schwartz, 2017). Moreover there is a link to Ness's (2012) research on occupational ideology concerning a masculinised hierarchy of labour – it is not that women are unable to do the work, or secure careers in tech cities, rather the often insecure conditions of employment and career trajectory favour masculine identities and ways of working. This echoes more traditional assumptions attached to working in tech (Corneliussen 2004; Henwood, 2000), and the way in which common gendered associations aligned with the 'women in tech' identity. Within tech cities, a major issue is that of roles concerning how these replicate gender segregation of jobs and are connected to visibility – or in this case the visible lack of diversity experienced by many participants. To give an example, the degree to which the 'women in tech' label was tied to non-professional roles had most impact. The US focus groups were more optimistic about how to reposition the language around diversity:

> *Matt:* I work with a lot of early-stage entrepreneurs who need help developing their business […] For a lot of my [female] clients we spend a lot of time talking about how they want to be, professionally speaking, and what kind of image they portray: is this a woman to emulate? What's her family background? What's the bigger picture here? (34, CEO)

> *James:* I think that's really interesting, because would we ask the same questions about a male entrepreneur? Not in my experience. I'm a dad of three running two startups and my family background isn't a context that I've ever been asked about or invited to talk about. (44, CEO)

> *Claire:* I mentor a lot of junior women and recently did an interview about women tech founders. Every single question was about *how I felt 'as a woman'* and there wasn't one question about my professional experience. So I'm not sure that being known as the 'women in tech' does anyone any favours when the media is using it, though I can agree if we own the label this improves our visibility to each other and other tech networks. (32, systems analyst, participant's emphasis)

<div align="right">New York, SA</div>

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Being known as 'women in tech' comes with risks: 'you only do marketing' (Clara, 20, intern), or 'you get asked about your family or marriage situation more than your business' (Amy, 47, CEO). Yet participants agreed that the label is markedly more positive when applied to meaningful activities such as mentoring, business coaching and (in some cases) networking. In this way, professional training is a key point of contact in determining the polarity of women's and men's roles in tech cities – and, as James's reply highlights, something experienced very differently by men. This finding is reflected in Watts's research (2009) about women civil engineers and how women are marginalised in professional contexts. For example, maintaining a respected professional identity had different implications for those women in the study whose identity was always defined in relation to motherhood, with the risk of putting one's career in jeopardy.

Attitudes about professional roles and experiences in tech cities were far from homogeneous. The survey highlighted considerable similarity in experiences of attitudes and access, and opinions about the future of diversity in tech cities, but also important differences (Table 1).

Table 1. Tech professionals' attitudes to work in tech cities (%)

	London, SR			California, SV			New York, SA		
	Female	Male	All	Female	Male	All	Female	Male	All
I feel that women are less visible in the tech sector	100	73	87	83	48	66	74	21	48
I feel secure working in tech	21	67	55	75	99	87	77	97	87
Working in a tech city is very important to my future	31	84	58	57	95	76	44	73	59

In practice, dialogues on contentious and sensitive subjects tend to result in segregation into recognisable groups and networks. One example is the 'Girls in Tech' network, of which many women in this study were members. Membership had allowed some to feel they could create a more constructive message about female tech professionals, but at the same time it emphasised their sense of precarity. Indeed, skills difference continue to act

as the pivot for this image (Vallas and Christin, 2018). Marginality features in this study in terms of the lack of diversity in roles – 'more often the boys create the code' (Sara, 52, game designer) – but also, for a few female participants, as a way to enable them to 'celebrate' what is distinct in their experience of working in a tech city: 'I get a real kick out of proving I am as good as the boys' (Erica, 20, intern). In a context where women professionals can 'do a bit of showing off' (Jane, 40, network manager), there is a counter-narrative emerging around empowerment and 'really changing the attitudes about women here' (Zoe, 32, web designer). This leads to the next point of contact: the way in which new identities are allowed to emerge in the space of tech cities.

Points of contact II: Changing tech identities, changing spaces

The focus on 'women in tech' stereotypes above shows how gender differences and lack of diversity in professional experience (particularly in senior roles) can be reproduced in tech cities. Such patterns are ever-present, but their repetition is not automatic or unchangeable; rather, it must be continually either enacted or reacted against. This implies that – particularly in moments when counter-narratives are introduced and even 'celebrated' – tech cities may also be viewed as spaces of change (Hardey, 2019). However, such change is likely to be contested and to cause tensions:

> *Rebecca:* I've just come from an interview for a more senior role where I asked about the salary. They wanted to know about my current salary range before any negotiation so I said that's the end of the interview. (28, user research analyst)

> *Iris:* That was a bold move! I hope they come back to you. (39, software engineer)

> *Rebecca:* I think not, and they didn't like that I wouldn't discuss my family responsibilities.

> *Iris:* That's a bad experience. I was hand-picked for a senior role. My interview went really well and then they also asked my salary expectations. A quick Google search to find a comparable rate for the job title, got a second (and third) opinion from others in the industry, and came up with a figure […] They came back with a 'really good offer' that was $20K less than mine – I'd have been spending three fewer days with my child, not being able to work on my own business, and taking home around $100/week for the privilege. So I said no. They gave the job to a college guy who was ten years younger than me, who has no history in the industry, and who will be happy to be exploited for 'experience'.

> *Jenna:* I just looked up a prospective boss on LinkedIn and was so turned off by the fact that he follows no women – ugh! I am looking for a new boss because my current boss is a total misogynist, openly professing to prefer hiring younger women. Gee, I wonder why? (32, engineer)
>
> New York, SA

These participants had proactively sought to enable positive change, such as negotiating on salary offers. However, such practices took place within difficult and stressful contexts: Rebecca feels violated and is asking for an open dialogue; Iris feels patronised and dismissed. In both instances there is frustration at new opportunities being closed off and reaction against an increasingly toxic culture (Massanari, 2017). Cockayne (2018) identifies similar boundaries in San Francisco's digital sector, noting the silent agreement by early-stage employees to fit with current work culture. This is just one example of Payne's (2018) observations about the continuation of masculine cultural expectations of competition and performance-driven compliance. While Rebecca, Iris and Jenna continue to work in tech cities, to do so necessitates constantly negotiating their professional status by identifying ways to establish a cohesive identity across professional spaces. Strategies for stepping outside of perceived roles involved, for some, entering new patterns of labour as part of digital projects that could be managed from home. But such strategies limit the potential for diversity in tech cities, with (mostly women) workers managing career and family at home (Polletta and Tufail, 2–16; Richardson, 2018). The next exchange concerns perceptions of the division of labour within tech cities:

> *Janet:* I'm at a senior level and I invest a lot in new businesses, turning them from failure to success. The biggest unrecognised efforts are the inclusion events that I volunteer for. These are seen as secondary work, even though my company relies on volunteers for a lot of inclusive efforts. All our volunteers are women. Right now I'm helping with a global girl-tech group and it's amazing! I've also helped create space for coding classes and a Bring Your Kids to Work day, set up the rooms so my local Women in Tech group can stream talks happening at Amazon HQ [… and] spent a lot of my emotional energy trying to get training for my organisation. These are all seen as 'perks' that I get to do with manager permission, not something that the company relies on for their diversity and inclusive efforts. (41, systems architect)
>
> *Arjun:* So something that we're doing is to draw a distinction between social or domestic tasks, which really if an organisation wants them done they need to assign to a person or make everyone responsible, and avoid the repetitive administrative tasks associated with a job function.

Otherwise you get women doing low-level things and the guys at the top making all the money. (48, risk director)

Miranda: The women on a majority male team who don't volunteer for these tasks will be disproportionately blamed for 'not being a team player' while men will be seen as pursuing enlightened self-interest and adding more value by pursuing their areas of expertise without distraction. For example one of the forever debates on software teams is who will get 'stuck with' routine maintenance and who 'merits' working in new development. It's almost invariably a status judgement and women are expected to choose other people's feelings over status. (44, solution architect)

California, SV

Much of this conversation was about being *allowed* to enter and occupy tech cities in ways that singled women out as 'different from boys in tech', with women's professional identities and occupation of space perceived differently to those of men. Duffy and Schwartz (2017) take this division one step further, thinking about the situational context of women's labour and its categorisation in job advertisements, with expectations that women will take on feminised roles. The above exchange reveals a distinction between women's and men's responsibilities, in Arjun's identification of women being associated with 'social and domestic tasks' and Miranda's observation of 'a status judgement'. What is noticeable is not a lack of competencies, but how these are viewed 'differently' when comparing women's and men's status (Hacker, 2017). Janet's comment about the emotional energy involved in creating space for opportunities highlights how steps towards inclusion rely on an affective element – echoing Hochschild's (2012 [1983]) 'emotional labour' – and reinforce the gendered, stratified effects of dominant male work culture (Polletta and Tufail, 2016), and possible resistance to change (Johansson et al., 2017). However, there are advantages to such affective effort, as the London group discussed regarding the social and professional benefits of tech networks in allowing space for diversity:

Ladan: I've been thinking about how privilege (both financial and knowledge-based) has differentiated our trajectories. I finally left my last job after the company started *forgetting* to pay me and am now working a one-year contract job as a security engineer at Facebook. Despite this I am struggling with my sense of self-worth and engineering capability. I don't feel that tech companies are supportive of much diversity and this isn't something I feel comfortable talking about in public. (30, security engineer)

Steve: I've benefited from free career counselling that might be offered in your area through non-profits or government groups. This is not something I would ever talk about with my [male] colleagues – not saying that we don't feel this way, but there isn't the support network [in tech] to begin to talk about negative things. (42, senior digital designer)

Martyn: I have two women working for me who were in tech, took a break to raise children, and came back after age 40, so there's no need to be out of place at all. (46, operations director)

London, SR

A positive aspect of gendered tech networks implied here is their support role, helping to establish and promote women into stronger positions. A similar effect was noted by Rosner and Fox (2016) in their study of a mother-operated hackerspace enabling culture and knowledge exchange. However, the exchange above underscores how tech cities are coded by perceived masculine ways of working to the extent that Ladan and Steve feel obliged to repress any public expression of negative feelings.

Points of contact III: Inscribing empowerment through narratives of success

This final point of contact was revealed in discussions setting empowerment alongside 'privilege', closely aligned to attributes associated with the youthful, white, masculine ideal. Such privilege allows men to act as the 'ideo-affective resonator' (Ngai, 2005: 75) and exclude the actions of women. Understanding how empowerment might overcome this was a significant discussion point in California:

Kate: In my opinion, yes, you are expecting too much, we all do. The stark reality is that there is a shortage of women. This starts from school: how many women are being coached into studying CS [computer science]? But also the lack of success stories around us. Why are X number of women in tech leaving the industry? No-one can fix it alone. Diversity programmes are a start, but it takes, me, you and everyone presently involved in tech to mentor young women, show them that technology is a decent career and also that they have options. (45, access technician)

Nikos: My company and I take part in mentorship programmes and we mentored a young lady this year. From my management role, I also participate in the interviews and try to look beyond the technical skills. This is something we can all get involved with by participating in the recruitment process and playing an active role in promoting positions to skilled women. (46, live game producer)

Ashley: Oh my god, no, you are *not* expecting too much! We can all do more. If diversity and inclusion is actually important, then first we can start hiring more junior women and then training them up. […] But if you don't see women around you, or higher up than you, then we're not going to be able to change anything. (24, marketing director)

Noah: How about a change of tack: look, it's not fair or right that women get to protest bias but that men can't. (47, CEO)

Ashley: I really think you're missing the point. Having to protest isn't a form of privilege. This just shows me that we are not at all thinking about how women are systematically not part of the culture as much. It's just disappointing how few men really try to make a difference on this issue and how powerless women are to give an alternative voice.

California, SV

There is a tension in how the group talked about women's place in tech, and the possibilities for a future change in this status. The group talked about *being allowed* to criticise the lack of diversity, noting negative reactions and being labelled as 'sensitive' to issues of discrimination. This contrasted with the belief, much supported in all focus groups, that women deserve equal opportunities in the sector. Discussions demonstrated an awareness of a culture around status and roles within tech cities that continues to strongly favour a certain masculine ideology. This theme was taken up by the London group, where concern was expressed about the representation of diversity at events and public-facing activities:

Miya: I've just been to the Applied AI and Machine Learning where the keynote raffled off two free tech products. […] After introducing one of the winners the conference Chair announced: 'Do you think she even knows about GPU [Graphics Processing Unit]?' I feel so betrayed by the [tech] community. This isn't the right message about women and it sends out totally the wrong signal about what we *can* do. (22, product analyst; participant's emphasis)

Rachel: You have to be brave to be confronting these kinds of issues. Imagine when he went home, he probably told his family he did a 'good thing today' giving away free tech to a girl. (29, web developer)

Marina: I've read something similar on a Subreddit. The Chair later said it was 'just a joke'. It's not a joke to the women facing ongoing challenges, made even more challenging when a Chair and CEO to a major tech company pulls this kind of shit. (35, AR developer)

Liz: Yeah, how as a woman you must 'overcome the weakness of your feminine condition', or 'absence of masculinity' […] When I launched our new product last month the press release headline was 'Ladies playoff', nothing about professional development or what the product actually does. (37, Python developer)

Joseph: Another expression I always hear: 'she doesn't know what she's doing, she doesn't belong here'. (25, software engineer)

Meghan: Women will continue to be displaced until there's a major step-change in this industry. Until then, we need to learn from each other and support our successes. (34, lead developer)

London, SR

This discussion demonstrates the distinction of women as 'lesser' in experience and expertise, compared with the privilege (and prejudice) demonstrated by the conference Chair. Such marginalisation links back to the first point of contact: participants' perceptions of being labelled as 'women in tech'. Alongside such labelling is concern about how we begin to tell a story about the roles women are allowed to emulate and to dismiss claims about their supposed lack of interest in tech careers (Cheryan et al., 2013; Ehrlinger et al., 2018). Taking this context one step further, the participants are saying that as long as the 'women in tech' label exists, it is mostly predictable and (relatively) 'easy' to navigate around. But more complex negotiations are needed within tech cities to reach beyond the label and 'properly speak to the issues' (Meghan) (Massanari, 2017). Some felt that their attempt to change the story around women in tech had itself became a point of conflict: 'I don't feel comfortable going to the events where its all male and pale who stare at your tits and don't listen or consider that you could be more competent than them' (Sally, 22, media sales); 'you fight to be heard. If you're talking about business you get past the "being a woman" apology as quickly as you can' (Ana, 42, CEO).

Such attitudes appears at odds with more optimistic visions on gender and technology, 'where neither gender nor technology is taken to be pre-existing, nor is the relationship between them immutable' (Wajcman, 2007: 287). Participants' perceptions were shaped by the masculine territories of tech cities, and their experiences of having to negotiate or explain their difference and seeking to produce and fix in place new narratives of success (regardless of gender) that were constantly overlooked. While participants agreed that gender was a focus of discrimination, they felt that the spaces within tech cities enabled further labour divisions that intersected with negative judgement about women's

professional roles. This distinction in labour reinforces a uniformity in the professional relations that are allowed to materialise in the spaces in and around tech cities to echo technology as a source of masculine power (Cockburn, 2009; Hacker, 2017). Far from being neutral places, tech cities consist of spaces where power relations (especially those shaped by gender) have a profound effect (Hardey, 2019, 2017). One of the most passionate discussions in the New York group was about establishing diversity in tech cities:

> *Judith:* What about hearing about women's stories of success? What are these stories of success [about], if not managing families or overcoming divorce or illness? Shouldn't these sensitive issues be allowed? (45, solution architect)

> *Tony:* Yes, they should be allowed, but it is precisely because of these topics that women get treated differently. (53, CEO)

> *Andrew:* When I think about the lack of diversity my initial solution is for pay equity and a transparent and clear process for both levelling and advancement. I think part of what the success story idea prevents is a serious discussion around how the employee experience needs to be designed to appeal to a diverse cross-section of women. (50, innovation specialist)

> *Vron:* In my experience 'women' is not further broken down into women of colour, queer, disabled or anything else. So there is never a push to thoroughly think through what is required to become successful. Please take an intersectional approach so that the process doesn't by default only focus on the gendered heterosexual white women. (49, software engineer)

> *Angie:* I was just explaining something similar to a colleague yesterday. You can't pick and choose 'diversity'. I've experienced my being a woman and black treated as a big 'tick', but my being a wife and mother was more of an 'eh, not ideal, but as long as it doesn't get in the way' and my age and amount of experience as an 'over-qualification'. (37, database developer)
>
> New York, SA

The need for women to represent themselves in ways other than as mother, wife or carer was discussed in all three sites. Participants recognised that personal contexts often prevented a focus on professional roles and activities. Moreover, because networking and professional events were located in tech cities, some of the dynamics of these personal contexts reflected the physical separation of women's and men's roles. Compared with male colleagues, female participants more often worked from home and were not interested in attending evening 'drink-about' networking events. Within this context, the

challenge is to enable women and men of different professional experience to establish more, and more meaningful, points of contact, recognising commonality in their experiences, which might break down preconceived stereotypes and identify new points of transition.

Conclusion

This paper has moved beyond current studies of masculine tech culture to identify key points of contact in the physical spaces of tech cities with the potential to enable professionals to break away from old stereotypes and produce new narratives about women's and men's place in tech. Compared with other masculine industry settings such as construction and engineering, tech cities are emerging spaces, acting as hubs for business and cultural exchange within which the professional networks encompass a diverse range of technical, computational and creative skills. The narrative captured in this study as we move through each of the points of contact is partly one of escalating demands for new counter-measures, to (i) raise awareness of diversity, (ii) allow for changing identities within tech spaces, and (iii) support empowerment. Each point of contact emphasises growing discontent among women and men in the tech industry about the lack of parity in job security, advancement and skills training. There is a question here of how much empowerment is really happening if the frame of reference continues to be one version of masculine culture. This study has shown that such a culture is difficult to shift; however, there is openness to new ways of working that support flexible hours and remote interactions, and to new pathways of advancement. The sense of achieving and retaining professional credibility echoes previous work on male-dominant work spaces such as construction and engineering, and the intractability of organisational work practices that serve male workers. As this study has shown, strategies for reducing role conflict and improving career advancement opportunities in tech cities are far from universal. Here the points of contact are effective in identifying shared experiences of the challenges faced and connections across more contentious topics, such as how the complexities of family and home life intersect with work life and career progression opportunities. This approach acknowledges that tech cities are not neutral spaces – their workers do not exist in a homogeneous cultural bubble with easily identified boundaries. Instead, as the points of contact highlight, there is a hybridity to these spaces and the ways that professionals occupy them. This complexity of socio-

techno spaces offers the potential for this study's participants to find similarity and connections across difference, despite the apparent boundaries of masculine cultural identifications.

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Table 1. Tech professionals' attitudes to work in tech cities (%)

	London, SR			California, SV			New York, SA		
	Female	Male	All	Female	Male	All	Female	Male	All
I feel that women are less visible in the tech sector	100	73	87	83	48	66	74	21	48
I feel secure working in tech	21	67	55	75	99	87	77	97	87
Working in a tech city is very important to my future	31	84	58	57	95	76	44	73	59

Table 1. Tech professionals' attitudes to work in tech cities (%)