Decentralizing the Gender-blind Meritocracy: A technofeminist discourse analysis of women's work in blockchain

by

Julie Frizzo-Barker

M.A., Goldsmiths University of London, 2005

B.A., Trinity Western University, 2002

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Declaration of Committee

Name:	**Julie Frizzo-Barker**
Degree:	**Doctor of Philosophy (Communication)**
Title:	***Decentralizing the Gender-Blind Meritocracy: A Technofeminist Discourse Analysis of Women's Work in Blockchain***
Committee:	**Chair: Ellen Balka** Professor, Communication
	Peter Chow-White Supervisor Associate Professor, Communication
	Richard Smith Committee Member Professor, Communication
	Alison Beale Committee Member Professor, Communication
	Edana Beauvais Examiner Assistant Professor, Political Science
	Lana Swartz External Examiner Assistant Professor, Media Studies University of Virginia

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Abstract

Blockchain is the emerging, decentralized technology best known for powering cryptocurrencies. It connotes powerful narratives about socio-economic progress, democracy, transparency, and inclusion. Yet like many technology spaces, blockchain has a gender problem. According to a recent study of 100 blockchain startups, 14% of employees were women, and among those 7% were in leadership roles. Stakeholders have highlighted how gender-diverse tech teams are more innovative, profitable, and just. Yet proactive inclusion efforts are often dismissed as irrelevant in dominant tech cultures built on assumptions of postfeminist meritocracy. This dissertation cross-fertilizes macro-level discourses of the network society, meso-level discourses of the social shaping of technology, and micro-level discourses of technofeminism to offer new insights on how gender and technology shape one another. How do discourses about gender and technology enable or constrain women who work in blockchain?

This study is based on a technofeminist discourse analysis of 30 interviews with women who work in the space, as well as 17 participant observations at blockchain meetups and conferences. It develops three discursive frames about gender and technology in blockchain into an analytical framework inspired by Hall's encoding/decoding model of communication. They include: (1) the dominant “gender-blind meritocracy,” (2) the negotiated, gender-conscious “lean into blockchain” frame and (3) the oppositional “intersectional inclusion” frame. Women perform the additional labour of ‘toggling’ between frames to navigate the material conditions of blockchain work. This study demonstrates how words do more than reflect reality. Words make worlds.

Participants were both enabled and constrained by each of the discourses, depending on social context. The data suggests that both top-down organizational initiatives and bottom-up grassroots initiatives are necessary, but insufficient on their own, to create meaningful improvements for women in the space. Gender equity in tech spaces can not accurately be measured by the politics of representation, but by the politics of inclusion. This study offers new insights about broader sociotechnical shifts occurring at present with the rise of the equitable tech movement.

Keywords: communication; technology; gender; blockchain; discourse; technofeminism

Dedication

For Lily and Sage.

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List of Acronyms

EDI	Equity diversity and inclusion
ICT	Information and communication technologies
SCOT	Social construction of technology
STS	Science and technology studies
SST	Social shaping of technology
WiB	Women in blockchain
WiT	Women in technology

Chapter 1. Introduction

> *With blockchain technology, for the first time, we're challenging the status quo. Of course it's inevitable that people with money and network will benefit a lot easier. But there is still so much more opportunity for average people to participate. After 20 years on Wall Street, this is unlike anything I've seen before. Power dynamics are absolutely shifting - not just threatened, but shifting. And that is why I am so adamant about this diversity thing, right?*
>
> *(Jessie, blockchain investment advisor, New York City)*

Blockchain is full of contradictory possibilities in its early stages of emergence. It is the decentralized technology best known for powering cryptocurrencies such as Bitcoin. Like other technologies before it - personal computing, the Internet, mobile, and social media - it invokes hopeful narratives of revolutionary social and economic change, democratic values, and meritocracy in action (Swan, 2015; Tapscott & Tapscott, 2016; Mougayar & Buterin, 2016; Vigna & Casey, 2018). Its grassroots anti-establishment ethos connotes a radical break from the status quo of intermediaries such as banks, governments, or lawyers (Nakamoto, 2009). Blockchain is a digital ledger that facilitates securely encrypted, peer-to-peer value transfers of all kinds, including digital money, land titles, fine art ownership, educational degrees, and personal health information, without intermediaries such as banks or legal firms. This has fostered blockchain's reputation as a 'convening technology' that marshals a diverse array of stakeholders, resources, and power (Baym, Swartz & Alarcon, 2019).

Yet in practice, blockchain has a gender problem. According to a recent study of 100 blockchain startups, only 14% of employees were women, seven per cent of whom were in leadership roles (Custer, 2018). In its short history, the male-dominated sphere has fueled stereotypes of wealthy 'Blockchain Bros' (Bowles, 2018), although women have innovated some of blockchain's most important advances (Cuen, 2018). In response to the stark gender inequities in the space at large, women have worked to flip the script in blockchain. They have rapidly grown their ranks through local meetups, mentorship programs, hackathons, and global conferences (Griffith, 2018; Moy, 2018; Miller, 2019), and become more visible at the helm of some of blockchain's most innovative and successful organizations (Peck, 2019). Over the past five years, women's representation as Bitcoin investors has increased from 1.76% to 14.23% on the same

real-time data chart (Ogundei, 2016; Coin Dance, 2021). As a participant of this study illustrates in the quote above, emerging technologies open up discursive spaces of instability where social contracts may be rewritten or re-entrenched. In this dissertation, I investigate the gendered sociotechnical relations that enable and constrain women in blockchain. I do this through a technofeminist discourse analysis (Gill, 2000; Wajcman, 2004) of 30 interviews with women who work in the space, as well as 17 participant observations at blockchain meetups and conferences. This study delineates three discursive frames about gender and technology in blockchain. It demonstrates how words do more than reflect reality. Words make worlds.

Blockchain technology is simple yet powerful - literally a chain of blocks of immutable, digital information, each verified by a distributed network of nodes. Its hallmarks include transparency, security, and privacy. It is a chameleon-like technology associated with a wide array of social, political, and economic goals based on its central discourse of decentralization (Coeckelbergh & Reijers, 2016; Schneider, 2019). Its pseudonymous creator Satoshi Nakamoto (2009) released a white paper, a manifesto of sorts, signaling the importance of blockchain's decentralization as a sociotechnical movement. As individuals mint and transfer new forms of digital currency in a peer-to-peer fashion, they solve fraud issues such as double-spending. Perhaps most importantly they challenge the existing socio-economic structures of centralized banks and the current global monetary system through a new system of value exchange. More than just a better, faster technology, blockchain represents a 'power to the people' movement tied to narratives about personal progress, social progress, gender equity, poverty eradication, and corporate transparency. Although these are worthy, complementary causes, the discourses associated with them can conflict with one another. Blockchain can advance radical or corporate agendas (Swartz, 2017).

While recent scholarship has examined important social and cultural aspects of blockchain and cryptocurrency (De Filippi & Loveluck, 2016; Dodd, 2018; Karlstrom, 2014; Swartz, 2018; Vidan & Lehdonvirta, 2019), less has been written about how gender and blockchain shape one another. As the quote at the top of this chapter illustrates, 'women in blockchain' advocates view the technology as a tangible way to challenge the status quo. It is framed as an opportunity for leveling the playing field for women, professionally and financially, with positive ripple effects for gender inequities in society at large. Preliminary studies that take gender into account have explored

blockchain as an accelerator for women and children's health (Thomason, 2017), a secure solution for recording identification and transferring money for women in humanitarian crises (Thylin & Duarte, 2019), and a new path to financial services for nearly one billion women worldwide who do not have a bank account (Thompson, 2021). As Sandra Ro, chief executive of the Global Blockchain Business Council, notes, “there is as much a human, culture shift element to what is going on as well as the technical evolution” (Bond, 2018). As such, this study examines blockchain culture as an emerging space where social, technological, and economic systems are in flux. In contrast to the studies mentioned above, this study focuses on how communication itself shapes gendered experiences in emerging tech spaces. It examines how the discursive tensions at stake in blockchain reveal moments of instability that open up the possibility for change in gendered sociotechnical relations. The assumptions and interests associated with discourses that shape the space can overlap at times, and cause friction at others. Discourses employed by gatekeepers and gated members (Nahon, 2011) in the blockchain community have material consequences. These roles are not fixed within individuals but shift dynamically among stakeholders based on social context. Communication represents a key mechanism in the social shaping of this new technology.

Investigating blockchain during its earliest stages offers the unique vantage point of tracing a sociotechnical phenomenon as it unfolds in real time. For example, as I explored the space in my research, I observed various t-shirts that people wear at industry events. I realized they represent a shorthand for each of the discursive frames I analyze in this study (see Fig. 1). A t-shirt you might see on someone who subscribes to the dominant discursive frame in blockchain, reads “Who is Satoshi Nakamoto?” Debating the answer to this question regarding blockchain's anonymous founder has become somewhat of a parlour game in blockchain, with the most popular guesses including white or Asian men. Other t-shirt slogans that circulate in the dominant frame are “I am Satoshi Nakamoto” or "We are Satoshi Nakamoto." This points to the popular discourse of personal autonomy and empowerment, which connotes the ethos of the blockchain revolution. Next, a t-shirt you might see on someone who subscribes to a negotiated, gender-conscious discursive frame in blockchain is “Satoshi is female.” This is a provocation in response to the original “Who is Satoshi Nakamoto?” question, just as the negotiated frame is a response to the dominant frame. Finally, another t-shirt you

might see on someone who subscribes to an oppositional, intersectional discursive frame in blockchain is “Satoshi is Black.” This serves as a provocation to both of the aforementioned discursive frames. Another telling factor about these t-shirts is that many of the “Satoshi is female” and “Satoshi is Black” shirts are fundraiser items for organizations that aim to welcome more women and people of colour into the space.

Figure 1. Satoshi T-shirts

Why research gender and blockchain?

Why is research required on gender and emerging technologies such as blockchain? Scholars have highlighted the importance of context-based, real-world analysis to understand how technology mediates and re-organizes gendered power, politics, and participation. Cultural studies scholar Merete Lie has called for “more attention to be directed at cases where women are active users and designers [of information and communication technologies, or ICTs]; even if these are not the ‘majority cases,’ they are important within a strategy for developing new perspectives on gender and ICT” (2006, p. 170). In addition, STS scholar Sally Wyatt (2005) has suggested a return to production and work as research sites, since research on gender and ICTs in recent years has often focused on consumption, identity, and representation. Feminist scholarship contributes to empirical research in communication, gender, and technology, as well as political change. For instance, Kelan (2020) argues that despite organizational efforts to make workplaces more equitable, progress towards gender equality has been limited at best. Both she and Wynn (2020) have attributed this problem to the widely accepted belief that gender inequality exists on a societal level while denying that it exists in the immediate work environment. Based on this assumption, organizational leaders neglect to make structural change in the workplace, leaving women with a sense of 'gender fatigue' (Kelan, 2009) as they are caught in between these discursive

frames. While disciplines including cultural studies and political science have investigated contemporary forms of feminism in the workplace, the fields of gender and organizational communication have given it less attention in recent years (Lewis et. al., 2019). As stakeholders in dominant spaces begin to embrace some feminist practices such as reflexivity, improvisation, and co-learning partnerships, this calls for an investigation of the complexities attached to them (Long et. al., 2020).

Why are improvements that support women's work in technology important? Beyond the well-documented problems to do with gender disparities globally (World Economic Forum, 2020), there is the simple fact that women's underrepresentation in science and technology negatively affects how the world is made. If everyday life is made possible through sociotechnical systems (Castells, 2000) and if very few women are in the control rooms of those systems, then it follows that useful innovations will be missed. The interests of half the global population are more likely to be overlooked and underserved. For example, the launch of Apple's robust health app in 2014 neglected to include a simple period tracker, which was later added (Perez, 2015). To shape the latest technology is to shape the future, and "feminists have long argued that the symbolic representation of technology is sharply gendered" (Wajcman, 2000, p. 454). This study examines current negotiations over how gender and blockchain influence one another.

In her book *Invisible Women: Data Bias in a World Designed for Men*, Caroline Criado Perez (2019) shows how everyday technologies and spaces, such as seat belts, voice recognition software, and public restrooms, are designed by men for men. These biases make the world less comfortable at best, and dangerous at worst, for women. Perez argues for greater representation of women in design for these very practical reasons. In this study I examine discourses that call for greater representation in blockchain. In *Hacking Diversity*, communication scholar Christina Dunbar-Hester (2020) considers an array of motivations and tactics for increased diversity in tech communities, noting that most fall short of calling for social justice. She argues that diversity initiatives with blurry motivations can backfire, reinforcing the status quo in terms of social and economic hierarchies. This study examines precisely the overlaps and clashes between different types of diversity discourses in the blockchain space. Finally, sociologist Shelley Correll (2017) notes that while the academy has amassed a large body of theoretical and empirical literature on how gender inequality is reproduced at work, there

is a need for more research on how to bring about effective, positive change. This dissertation helps to address this gap in the literature, by exploring both enabling and constraining factors for women in blockchain.

Over the past decade, both information and communication technologies (ICTs) as well as popular discourse on gender have rapidly evolved. Contemporary understandings of gender and technology evolve in deeply intertwined, mutually constitutive ways. Therefore our theoretical understanding of the relationship between them must continually be refined (Wyatt, 2008). For instance, the "#MeToo" movement facilitated by Twitter hashtags, sparked public conversation and media coverage of the harassment, misconduct, and unequal treatment of women in 2017 (Clark-Parsons, 2019; Garcia, 2017; Gibson et. al., 2019). Around the same time, the #TimesUp movement shed critical light on sexual harassment in organizations, sparking scholarly and corporate attention toward this pressing issue that had gone relatively dormant in previous decades (Chawla, Gabriel & Kelly, 2021). Communication scholar Lukasz Szulc (2020) has detailed how ICTs have played a crucial role in introducing new understandings of gender diversity that eschew rigid binaries, through the proliferation of new gender labels such as 'nonbinary,' 'agender,' or 'genderfluid.' The inclusion of gender pronouns in one's professional or social media profile is one recent gesture that people of all genders have begun to adopt, to dismantle the taken-for-grantedness of gender presentation. Digitally networked ICTs provide a sandbox in which to experiment, learn, and share about gender.

Feminist scholarship has historically explored projects such as: 1) 'woman worthies,' adding women's overlooked achievements to the canon, 2) 'women's contributions,' detailing women's work in recognized achievements, and 3) 'victimology,' documenting histories of women's ignored exploitation (Harding, 1986, p. 30). While each of these were valuable, their limitations led feminists to formulate gender as a theoretical category, as opposed to a personal attribute. This invites us to analyze the gendered divisions inherent in social experience and social structures. For example, in her critique of gendered experiences of the workplace, social scientist Dorothy Smith (1987) conceptualized the ‘problematics of everyday life’ as a way to destabilize gender power relations that remain stubbornly inequitable yet not directly observable. Smith notes that "where there is society, there is gender… gender relations are not tucked away in those zones called sexuality, the family, interpersonal relations and the like"

(1987, p. 4). Rather, gender organizes our activities in the lived world. One of the places we can see this clearly is in the context of work. In this study, I examine gender not as a rigid analytic category, but a fluid one whose meaning emerges in material, social contexts as it is created and recreated (Butler, 2004). I show how women navigate and deploy various discourses about gender and technology to be successful in blockchain.

Theoretical foundations

While anchored in communication, this study also draws upon theories from science and technology studies (STS), feminist technoscience, sociology-based Internet studies, and cultural studies. This approach exposes the embeddedness of networked technologies in our everyday lives, and their implications in mediating gendered social relations. Communication research has historically focused on how media and technology organizations affect consumers and society, but public trust in these social institutions, among other powerful intermediaries including banks, has faded in the recent past (Neff, 2018). Blockchain is important to the field of communication because, similarly to the rise of the Internet, it is framed as facilitating new patterns of social connection, value transfer, and meaning-making. New technologies' compelling promise of 'cutting out the middleman,' or disintermediation, has been studied by communication scholars in the past (Katz, 1988; Gellman, 1996). Even in the 1980s, David Chaum (1983) developed a digital payment system called Digicash. He forecasted that decentralized applications could bring about major global change, solving problems to do with surveillance and governance. But the technology was ahead of its time, and unable to expand its user base before e-commerce was fully integrated with the Internet. At present, a variety of technological, social, and economic factors make blockchain a more viable, relevant innovation that is gaining the attention of scholars, business leaders, and the public.

Theories of the information society (Bell, 1973; Burnett & Marshall, 2003; Castells, 2000; van Dijk, 2012; Wellman, 2001) provide a contextualizing backdrop for this study. They highlight how the practices and processes of contemporary life are made possible through constellations of connectivity, with key social structures organized around information networks. This dissertation illustrates how 'networked individualism' (Castells, 2001; Wellman, 2001), one of the key concepts from this literature, has developed from a prescient idea to the normalized infrastructure that

mediates work and everyday life for many at the present. Terranova (2000) argues that contemporary work has shifted from the factory to society, marked by continuous production of value. This is characteristic of the 'space of flows' in the network society (Castells, 2000), or the way ICTs facilitate simultaneity of social practices regardless of physical location. Macro-level perspectives about the information society tend to highlight what technologies can do, where meso and micro level perspectives highlight what people can do through technologies.

Scholars of communication and STS have shown that technological innovations consist of more than artefacts and algorithms (MacKenzie & Wajcman, 1999; Boczkowski & Lievrouw, 2008). They reflect continuities and disjunctures in social, political, and organizational arrangements. In this study, I use the term ‘political’ in the broad sense of the word as it relates to power relationships, and not necessarily to electoral politics or party affiliations (Hanisch, 2006). Emerging information and communication technologies (ICTs) can facilitate new social dynamics and can also entrench or reproduce existing conditions (Sassen, 2002; Wajcman, 2004). Canadian physicist Ursula Franklin defines technology as cultural practice characterized by "organization, procedures, symbols, new words, and most of all, a mindset” (1990, p. 3). Technology is not the icing on the cake, she reminds us, but the cake itself. From this cultural perspective, we can see that "new technologies will not simply redistribute power equitably within already established hierarchies of difference" (Sharma, 2020, p. 177). For blockchain enthusiasts, the compelling discourses associated with the technology itself spark 'sociotechnical imaginaries' (Jasanoff, 2004) about decentralized forms of power, which could facilitate greater financial equity, social equity, and transparency in business and government practices. The way tech workers co-produce these meanings can be observed most clearly during the stages of emergence, contestation, and stabilization of new technologies. This study takes advantage of examining the emergence and contestation of the meaning of blockchain to create new insights on this process.

In her theory of technofeminism, STS scholar Judy Wajcman (2004) echoes these sentiments above and elevates gender as an imperative aspect of social analysis. She draws on STS and feminist theory to challenge notions of technology as neutral and value-free. Technofeminism helps us to view gender and technology as mutually constitutive (Wajcman, 2004). It strikes a balance between technophilia and

technophobia, “to explore the complex ways in which women’s everyday lives and technological change interrelate in the age of digitization” (Wajcman, 2004, p. 6). Blockchain is steeped in the sociotechnical infrastructures (Star, 1999) of the finance and technology industries it purports to disrupt. Its earliest adopters primarily included male gamers, cypherpunks, and those on male-dominated forums such as Reddit and 4chan, where blockchain was discussed as it emerged (Lam, 2017). The tech industry at large has produced some of the worst high-profile cases of sexism, bullying, and discrimination over the past decade (Chang, 2019; Schwab, 2021). Similarly, the finance industry has a well-documented history of patrimonialism and gender inequality (Neely, 2018a). Researching the co-construction of gender and technology in the context of emerging technologies like blockchain brings the contours of this sociotechnical process more visibly into relief.

Personal background and motivations

In terms of my personal background and motivations in pursuing this study, a central line of inquiry I have followed over the past decade as a communication scholar is, *how do emerging technologies shape people's everyday lives, and how do people shape emerging technologies?* I have conducted research on women's negotiation of everyday life through smartphone apps in the context of networked individualism (Frizzo-Barker & Chow-White, 2012). Through this empirical study, I saw the potential to cross-fertilize concepts from the network society and technofeminism to analyze women's experiences and innovations through their use of emerging technologies. I have also investigated genomics as a form of big data in the contemporary context of networked privacy and precision medicine (Frizzo-Barker & Chow-White, 2014; Frizzo-Barker et. al., 2016). Genomics is a prime example of a sociotechnical 'space of convergence' (Chow-White & García-Sancho, 2012) in which two spaces, such as genetics and computing science in this case, come together to create a new field with new possibilities such as the open-source, digital landscape of genomics databases.

More recently, my lab colleagues and I have conducted various systematic reviews of emerging technologies, such as big data and blockchain, across the business literature (Frizzo-Barker, Chow-White, Mozafari & Ha, 2016; Frizzo-Barker et. al., 2019). As communication scholars, we were interested in how researchers were defining and

investigating these new technologies, as a study of the social shaping of technology. The field of business proved to be one the most prolific in terms of early scholarship on these topics. Our systematic review of blockchain as a disruptive technology for business (Frizzo-Barker et. al., 2019) addressed a gap in the literature, since early blockchain systematic reviews have tended to focus on its technical properties (Yli-Huumo et. al., 2016). In the paper, we argue that understanding the social, ethical, and organizational elements is essential to its development. For example, in a study focused on barriers to blockchain adoption in business, Mori (2016) found that only 20 percent were technology-based, while 80 percent were attributable to organizational and communication-based practices. This demonstrates the central role of culture, discourse, and practice in developing and diffusing any new technology. My lab colleagues and I also began attending local blockchain meetups in Vancouver, BC, examining the gendered social relations at play, and published a book chapter based on our participant observations (Adams et. al., 2019). The extreme gender disparity in blockchain, and the way this was talked about or avoided at gatherings, compelled me to investigate further.

About this study

The first and most obvious problem I began to track was the lack of gender diversity in blockchain, as noted in the bleak statistics at the start of this chapter. But as a communication scholar, I noticed a second problem that intrigued me even more: the role of discourse in various attempts to address blockchain’s gender gap. The gendered social shaping of this new technology is thorny terrain. I observed that the various initiatives designed to solve blockchain's gender problem, and women's various responses to those initiatives, were rooted in different sets of interlocking discourses and practices. Some of these discourses overlap seamlessly, while others collide with friction between them. I observed women in the space toggling between these discourses, based on which was most advantageous personally and professionally in a given social context. Karen Hao (2018) captured this sentiment in her journalistic coverage with a Fight Club metaphor: 'the first rule of being a woman in crypto, is you do not talk about being a woman in crypto.' The phrase 'women in blockchain' is fraught with discursive tension. It may be experienced as a warm welcome to the space in one social context, and a demeaning categorization in another, by the same person. These discourses both reflect and create material differences in experience for women involved in blockchain.

STS research often frames co-construction analyses in terms of problems and solutions. But a key aspect of the co-construction of gender and technology happens through conversation, debate, and discussion in the public sphere, which requires analysis of its own. Lana Rakow articulates this cycle of co-construction: "communication creates genders who create communication" (1986, p. 23). The things interviewees do (practices), and the ways they talk about those things (discourses), create new spaces for defining both gender and blockchain in the earliest stages of this emerging technology. Discourses attached to new technologies can "mediate emerging distributions of power often too nascent, too slippery or too disconcerting to directly acknowledge" (Thomas, Nafus & Sherman, 2018, p. 1). In their recent study of algorithms, Thomas, Nafus, and Sherman (2018) show how the fetishization of technologies imbues material objects with capabilities that are not inherently properties of the object itself. This is precisely the case for blockchain. I argue that as blockchain takes shape, in its early state of emergence, discourses of social, political, and economic change open up spaces for possibility, hope and change. Not the technology itself, but the discourses and practices in the space that create it and critique it.

With these preliminary observations in mind, I conducted a technofeminist discourse analysis (Gill, 2000; Wajcman, 2004) based on 30 semi-structured interviews with a stratified sample of women who work in blockchain, located in Vancouver, Seattle, Toronto, Ottawa, New York, Washington DC, Berlin, and Dubai, as well as participant observation at 17 blockchain meetups and conferences in Vancouver, BC. Methodologically, I followed a qualitative approach inspired by multi-sited ethnography (Marcus, 1995). The primary goal of this study is not to answer questions such as, “why aren’t there more women in blockchain?” or “how can we attract more women into blockchain?” – although these important issues are addressed in detail. More specifically, this exploratory study investigates a communication-focused research question: “how do discourses about gender and technology enable or constrain women who work in blockchain?” I argue that the findings related to this particular research question offer key insights that help to answer the seemingly more obvious questions listed above it. This is because words make worlds.

Analyzing both discourse and practice is key to research in communication. Discourses do not work on their own to shape material reality. They require people and practices. I extend the theory of technofeminism (Wajcman, 2004, 2007) into this

emerging space by analyzing the participants' engagement with blockchain as a site of personal, professional, and social advancement. I examine blockchain's gendered sociotechnical relations as exemplified at industry events and workplaces. I analyze women's experiences and negotiations in the space focusing mainly on place-based spaces, while acknowledging the ways these spaces are heavily mediated through digital networks. In doing so, I demonstrate a diversity of ways women shape, and are shaped by, new technologies. Who is seen and heard as an expert in blockchain? Whose knowledge counts? And what are the consequences? The multiple framings of who participates in blockchain, how, and why, are worth studying in their own right. In this study, I use the term 'women' inclusively, including all those who have been socialized as women or identify as women.

This study employs a discursive analytical framework inspired by Hall (1980), consisting of three key discourses about gender and technology that emerged from the data. Based on preliminary observations, I expected to explore the implications of discourses that conveyed "gender is irrelevant to blockchain" versus "gender is important to blockchain." But I did not anticipate that these binaries would be broken up by a third discourse that emerged to add greater nuance to all three. The discursive frames include: (1) the dominant "gender-blind meritocracy," based on meritocracy, libertarian values, and postfeminism; (2) the negotiated "lean into blockchain" frame, associated with liberal, popular, and cyberfeminisms; and (3) the oppositional "intersectional inclusion" frame, associated with third wave feminism and technofeminism. I used this framework to analyze my data and make sense of how discourses about gender and technology both enable and constrain women in blockchain. This process rises and falls on communication.

I observed how dominant discourses, which dismiss gender as irrelevant to technology, do just as much 'gender work' as negotiated or oppositional discourses, which validate gender as an important factor in shaping technology and society. Where those in the dominant discourse would say 'gender has nothing to do with the technology,' those in the negotiated and oppositional frames would respond, 'gender is inescapably part of how we make technology, so to dismiss it is to dismiss those who are different than you.' Put another way, the discursive frames may be characterized as such: (1) the dominant frame suggests that technology can solve social problems and everyone is currently welcome to participate; (2) the negotiated frame suggests that

technology can solve social problems, but we need to support more women to join the space in order to improve both the workplace and the technology; and (3) the oppositional frame suggests that social solutions are required to solve social problems. It also suggests that technology is an important space to increase social equities that can enact more equitable technical solutions. This is important to understand based on the increasing influence of ICTs in mediating everyday life.

One of the most accessible and informative spaces to analyze how discursive frames shape gender and technology is work. Communication scholars have investigated organizations as discursive constructions, demonstrating the interconnectivity of language and social interaction at work (Fairhurst & Putnam, 2004). In this study I examine women's experiences and negotiations in blockchain, across various formal and informal workspaces both online and place-based. At the most basic level, careers give form and meaning to paid and relevant unpaid work (Buzzanell & Lucas, 2006). On a conceptual level, cultural historian Thomas Streeter (2010) has shown how work in technology is intricately tied to identity, agency, and the hope of self-transformation, within the social relations surrounding networked computing. This study examines the meaning-making processes of early adopters (Rogers, 2003), as observed through discourse and practice, more than the value, efficacy, or characteristics of the technology itself. Technologies are sociotechnical products patterned by the discursive and material conditions of their creation and use (Wajcman, 2006). STS scholarship underscores how technologies can be redesigned to empower workers. This study analyzes how power flows through discourse to sustain or interrupt hierarchically gendered social orders. This is particularly pertinent at the present, in contemporary postfeminist meritocratic contexts such as the dominant blockchain space.

While it is generally accepted that gender power asymmetries between women and men remain persistent in late modern societies, the nature of these asymmetries has become more subtle in some contexts and re-emerged with new fervency in others (Lazar, 2007). Although my data was collected and analyzed prior to the COVID-19 pandemic, I observed the renewed urgency in studying gender and work in 2020 while writing this dissertation. Scholars and journalists showed how the global crisis and its related shutdowns dramatically increased women's unpaid care work (Power, 2020), and decreased their opportunities for paid work and academic research (Aldossari & Chaudhry, 2020; Bennett, 2021; Collins, 2020). For instance, Smith et. al. (2021)

conducted a feminist political economic analysis of COVID-19, showing that women incur comparatively more risk on the front lines of the pandemic with less economic and personal security. Although I was fortunate to be able to work from home and stay healthy, the additional mental load of homeschooling my two children and parenting without our usual social support during the pandemic certainly affected my stress levels and productivity. This was another good reminder of the importance of studying women's work in the overall context of their everyday lives, as technofeminism emphasizes.

Contributions to knowledge

This study aims to make several important contributions to knowledge. First, on an empirical level, it examines blockchain as an emerging technology and a new domain to be explored in scholarship, expanding the literature in communication, STS, and feminist technoscience. Second, on a theoretical level, it cross-fertilizes several fields of literature that are not often in conversation with one another to offer new insights on how discourses of gender and technology enable and constrain women's work in blockchain. Connecting the macro-level discourses of the network society (Castells, 2000), meso-level discourses of social shaping of technology theories (McKenzie & Wajcman, 1999; Pinch & Bijker, 1987) and micro-level discourses of technofeminism (Wajcman, 2004) offers a unique analysis of the issues at stake. It also extends and clarifies each of the theories used, as outlined in the conclusion. Third, on a methodological level, it offers a discursive analytical framework designed to examine gendered sociotechnical relations in tech work. I was inspired by Hall's (1980) encoding/decoding model of communication from cultural studies, which I re-envisioned and translated to apply in my study. Hall's approach, focused on television as a case study, examines the various ways media messages are produced, disseminated, and interpreted by audience members who may subscribe to dominant, negotiated, or oppositional readings. This model elevates the fact that meaning-making is a discursive process that happens within social, economic, and political structures, and that people have agency to interpret messages, and even change them through collective action (Hall, 1982). In my own version of this framework, I focus on tech workspaces in emerging technology as the domain of inquiry. In another contrast from the original model, the participants I studied both encoded and decoded discourses through their work in blockchain. This led to a more nuanced application of the encoding/decoding model, and more complex findings. Specifically, I identify the

concept of ‘toggling’ discursive frames, as a technique that participants tacitly perform as they navigate various work environments.

In one sense, this research is the latest contribution to a long trajectory of work that seeks to understand the relationship between gender, technology, and communication. From this perspective, blockchain is simply an emerging empirical site to explore the new opportunities for social progress, and the wicked problems tied up in this complex relationship. Yet in another sense, this study offers theoretical insights that could only have been produced through this investigation into blockchain. For example, in comparison to other tech spaces, blockchain culture is imbued with stronger and more varied ideologies to do with social transformation. And in addition, venture labour in blockchain involves an increased level of speculation and risk. Workers are expected to make significant investments of time, in the form of paid and unpaid labour, and money in the form of cryptocurrency. Gendered social relations influence how each of these dynamics are experienced and navigated.

Outline of the dissertation

The overarching question of this dissertation is *how do discourses about gender and technology enable or constrain women who work in blockchain?* Below, I outline the foundational literature, methodological approach, and discursive analytical framework I used to investigate the way women navigate their work in blockchain. I also outline how I operationalized this framework in two findings chapters, one on informal workspaces such as meetups, conferences and hackathons, and more formal spaces of employment. Examining both social contexts was important for understanding this emerging space. For instance, some participants were heavily involved in blockchain through community organizing without formal, paid employment in the space.

Chapter 2 is a literature review that engages interdisciplinary theoretical concepts from the fields of communication, cultural studies, science and technology studies (STS), and feminist technoscience. This study examines sociotechnical relations, which refers to the idea that all social, political, and cultural power dynamics should be seen as both technical and social (Bijker & Law, 1992). I concur with Judy Wajcman (2007) that each of these dynamics should also be seen as gendered. In this chapter, I argue that an

understanding of the network society (Castells, 2000), the social shaping of technology (Mackenzie & Wajcman, 1999), and technofeminism (Wajcman, 2004) are important scholarly foundations for analyzing gendered power, in terms of both structure and agency, for women in blockchain. The underlying mechanism that makes each of these social systems possible is communication. Macro level theories about the Internet, meso level theories about sociotechnical systems, and micro level feminist theories of technology are diverse schools of thought that are not often in conversation with one another (Wyatt, 2008). This study aims to combine the most salient aspects of each. They inform both my research design and data analysis. In addition, the findings of this study provide recent insights that contribute to the literature in each of the fields I used as guides to explore this new empirical site.

Chapter 3 details the methodology behind this study. I followed a social constructivist approach inspired by multi-sited ethnography (Marcus, 1995), and guided by Haraway's (1988) feminist concept of 'situated knowledges.' As communication scholar James Carey put it, qualitative communication research is “a process of making large claims from small matters,” by studying particular rituals and conversations and “gingerly reaching out to the full relations within a culture” (1975, p. 190). My empirical data is based on semi-structured interviews with women who work in blockchain, and participant observations at blockchain meetups and conferences. This allowed me to observe connections between discourse and practice in both group settings and individual interactions. I analyzed the data by coding for emerging themes using NVivo qualitative data analysis software (Saldana, 2015). The epistemological and methodological theories outlined in Chapters 2 and 3 deductively informed my interview questionnaire and coding protocols. And the discourses from the data that emerged inductively informed the analytical framework outlined in the following chapter.

Chapter 4 presents the discursive framework I used to examine the data and answer my research questions. The discursive frames include: (1) the dominant ‘gender-blind meritocracy,’ based on meritocracy, libertarian values, and postfeminism; (2) the negotiated ‘lean into blockchain’ frame, associated with liberal, popular, and cyberfeminisms; and (3) the oppositional ‘intersectional inclusion’ frame, associated with third and fourth wave feminisms and technofeminism. While some participants viewed the space and their experience in it primarily through one frame, many toggled between these discursive frames based on social context. The following chapters operationalize

this framework to analyze how the interviewees experience and negotiate the space in different settings. Their experiences reveal the structural elements of what the space does to and for them. And their negotiations reveal the agentic, strategic elements of how they shape the space.

Chapter 5 examines gendered sociotechnical relations at industry events such as meetups, conferences, and hackathons. I show that social context is key in determining whether blockchain groups and gatherings are enabling or constraining for the participants. Who designed the event, and who is it primarily intended to serve? For example, while 'women in blockchain' panels at male-dominated blockchain conferences may be designed to heighten the visibility of women in the space, they were typically experienced by participants as hollow, performative gestures of diversity, because they highlight panelists' gender over their blockchain expertise. In contrast, 'women in blockchain' events and networks designed ‘by women, for women’ often served as important spaces of resistance and infrastructures of support (Ahmed, 2017) for those curious about entering the field as well as experienced practitioners. The thorny discursive label of 'women in blockchain' raises both awareness and backlash. It is a bridge that can lead to potential progress for some but remains insufficient to improve the overall conditions for women in the space.

Chapter 6 pivots to more formal workspaces which remain relatively non-institutionalized in comparison to other well-known tech spaces. Participants were compelled by the 'openness,' freedom and flexibility, and brilliant, collaborative people doing fast-paced, innovative work in the blockchain space at large. One significant contrast I found among participants' experience was based on their professional role. The few women in technical roles that I interviewed cited dealing with far more hostility than the majority of participants in business, communication, or other professional roles. A similarity cited by most participants was the tendency for men in the space to presume their incompetence about blockchain until proven capable. Other salient themes in this chapter include the prominence of self-employment and women-founded companies, and the valorization of leadership and communication styles traditionally coded as feminine. Common constraints in these workspaces included 'stay in your lane' limits to success, increased instability and precarious work, and the lack of critical mass required to increase genuine gender equity in blockchain.

Chapter 7 concludes the dissertation with a discussion of how the results of this study relate to larger themes of gendered social relations in tech, and gendered power imbalances in society at large. I suggest avenues for future research that will continue to deepen our understanding of the most salient themes of this study to address gender inequities in emerging tech spaces, as small wins with positive ripple effects (Correll, 2017). The narratives of women in blockchain exemplify some of the broader sociotechnical shifts occurring with the rise of the equitable tech movement. Technofeminist research highlights the fact that such movements hold significant influence beyond tech circles. If gender and technology are mutually constitutive, and emerging technologies like blockchain increasingly mediate everyday life, gender equity in such spaces has the potential to increase social equities in society at large.

Chapter 2. Literature Review

Introduction

Blockchain dreams of peer-to-peer decentralization echo the cybernetic tradition of signal processing or the spiritualist tradition of telepathy in the age-old pursuit of the "dream of direct communication" without the hassles of imperfect human mediation (Swartz, 2017, p. 90). But as scholars of communication, and science and technology studies (STS) have argued, technological innovations consist of more than algorithms and artefacts. They are also made up of continuities and disjunctures in social and organizational arrangements (MacKenzie & Wajcman, 1999; Boczkowski & Lievrouw, 2008). This dissertation examines the gendered social relations around emerging technologies through a multi-sited ethnography (Marcus, 1995) focused on women in blockchain. This chapter presents a discussion of several theoretical domains which, layered together with insights from the empirical data, helped to formulate a productive discursive framework for this study's analysis. These include the theories of the network society (Castells, 2000), the social shaping of technology (Mackenzie & Wajcman, 1999), and technofeminism (Wajcman, 2004).

I draw upon diverse theoretical foundations from communication and science and technology studies (STS) that consider macro, meso, and micro-level discourses of sociotechnical relations. This study considers macro-level, grandiose discourses that organize the social world, meso-level discourses such as meanings, orientations, and practices, and micro-level discourses such as the social texts produced in interviews and everyday life observations (Alvesson & Karreman, 2000). By sociotechnical relations, I mean that all social, political, and cultural power dynamics should be seen as both technical and social (Bijker & Law, 1992). Communication scholars have analyzed the socio-cultural implications of mass media since the 1940s, networked computing since the 1970s, and information and communications technologies (ICTs) since the 1990s (Lazarsfeld, 1941; Innis, 1949; McLuhan, 1964; Williams, 1975; Castells, 2000). Meanwhile STS scholars have illuminated how design, practice, and politics are intertwined, with a focus on engineering, knowledge production, transportation, biomedicine, and ecological interventions (Latour, 1990; Winner, 1980; Pinch & Bijker, 1987; Woolgar, 1991; Jasanoff, 2004). Technofeminist scholars build on the

contributions of social constructivist studies of technology, foregrounding a critique of gender, and striking a balance between technophilia and technophobia (Cockburn & Ormrod, 1993; Wajcman, 1991, 2004; Faulkner, 2001; Wyatt, 2008). I begin this chapter by briefly placing this study within the field of communication. Next, I discuss each of these three theories, including an overview, key concepts, critiques, and examples of emerging blockchain scholarship using this lens, for each. Finally, I conclude the chapter by outlining the research questions of this study, which pertain to the co-construction of gender and technology in the context of emerging technologies such as blockchain.

As a brief caveat, I should note that while I do highlight some of the limited, early scholarship on blockchain in this chapter and throughout this dissertation, this literature review is not primarily focused on all that has been written to date about blockchain. This is because my object of inquiry is the discourses of gendered sociotechnical relations around blockchain, and not a critical analysis of the technology itself. In addition, blockchain remains in its earliest stages of development and diffusion, and has not been thoroughly or adequately theorized, especially from a communication or STS perspective, which ask the types of research questions I find most useful for understanding the implications of emerging technologies. To illustrate the dearth of blockchain literature at the present, my lab colleagues and I conducted a systematic review of blockchain literature across the fields of business and communication, focused on the social, cultural, and ethical aspects of blockchain (Frizzo-Barker et. al., 2019), to complement previous systematic reviews that have focused on technical aspects (Yli-Huumo et al., 2016). We ended up revising our study to focus solely on the 155 business studies we identified, since we found only six communication studies using the same search protocol. However, communication scholarship brings a vital, critical perspective to understanding the social, cultural, and economic significance of blockchain, and this dissertation serves to continue addressing that gap in the literature.

Communication has been theorized through metaphors of transportation (Innis, 1949), extensions of human capacities (McLuhan, 1964), and ritual (Carey, 1992). In this study, I take a cultural, social constructivist approach to communication, which examines it as “a symbolic process whereby reality is produced, maintained, repaired, and transformed” (Carey, 1992, p. 23). This type of communication research demonstrates how words make worlds. At the heart of communication scholarship is a tension between critical and pragmatic considerations. From a critical perspective, George Gerbner

argues that communication scholars should be “women and men prepared and free to critically scrutinize the ends as well as the means of any project” (1983, p. 356). At the same time, Robert Craig conceptualizes communication as a practical discipline that offers value to social, institutional, and industry stakeholders outside of academia, by “cultivating phronesis (practical wisdom) as well as techne (productive skill) in a culture’s communicative praxis” (2018, p. 289). This dissertation aims to make contributions in each of these categories. As its main focus, this study makes an original contribution to communication literature, and to gender and technology scholarship in particular. It does this by examining original empirical data in the emerging field of blockchain through a novel discursive analytical framework, which applies and extends several of the theoretical ideas presented below. As a technofeminist discourse analysis, this study also challenges traditional work in the field of communication, which like many other disciplines has historically been predominantly Western, white, and male-dominated, with a lack of interest in women’s voices, experiences, and agency (Robinson, 1998; Rakow & Wackwitz, 2004). A secondary and more pragmatic focus of this study can be found in the conclusion of this dissertation, which outlines my plans to share the insights from this study with the interviewees in a way that might support them in their work.

Communication scholars Jack Qiu and Christian Fuchs (2018) analyzed the research published over the past few decades in one of the top journals in the field, the Journal of Communication, which revealed several key areas of focus: communication on a global scale, the critical and materialist turn, praxis communication, and communication in the context of digital media environments. My research contributes to the final category of communication scholarship, which analyzes how people make sense of ICTs, and how ICTs mediate contemporary life. A central debate in the field of communication has been that of characterizing the relationship between technology and society - the causality, process, and consequences of sociotechnical change (Boczkowski & Lievrouw, 2008). I draw upon three theoretical lenses that offer distinct views on the deeply intertwined relationship between technology and society. Each offers a productive lens from a unique vantage point to interpret my findings. The theory of the network society (Castells, 2000), for instance, is characterized by its broad theoretical scope and empirical range, representing a macro level, global view. It is marked by discourses of ‘revolutionary’ change and the rapid pace of change in contemporary society facilitated by digital technologies. In contrast, the constructivist

theory of the social shaping of technology (Pinch & Bijker, 1987; Mackenzie & Wajcman, 1999) asserts more a 'continuity' stance, which views the social consequences of technological change as incremental and compounding over time, due to their contexts embedded within established technologies and associated practices. Finally, since neither of these theories seriously considers the pervasive role of gender, I draw on Judy Wajcman's (2004) theory of technofeminism, a mutual-shaping perspective that shows how gender and technology co-evolve in a seamless web of technical artifacts, social relations, and cultural meanings. In short, if the network society depicts the freedom to connect through global digital networks, the social shaping of technology highlights the social, political, and cultural dynamics at play in doing so, and technofeminism points to women's often overlooked role in cultivating and maintaining those technologies and communities.

In this study, I classify blockchain as one the latest developments in the family of information and communication technologies (ICTs). Swan (2015) places blockchain within the lineage of previous major, global computing paradigms and 'disruptive technologies' (Christensen et. al. 2015), following the mainframe, personal computing, the Internet, social networking and mobile phones. Through the lens of communication and STS, we can view ICTs as both material systems and their social contexts, including *artifacts* used to communicate information, *practices* people engage in to communicate information, and *social arrangements* that develop around them (Lievrouw & Livingstone, 2006). The common thread running through each of these elements of ICTs, at the heart of communication, is mediation. Our everyday lives rely on mediation as a "transformative process in which the meaningfulness and value of things are constructed" (Silverstone 2002, p. 761). Mediation is dialectical, in that it involves the structuring element of ICTs and the engagement of users, whose power to work with or against the dominant meanings embedded within certain technologies (Hall, 1980) is unevenly distributed across and within societies. I analyze the gendered discourses and practices around blockchain to expose the interplay between the technology's structuring influences and interviewees' agency. In the following sections of this chapter, I introduce the theoretical lenses I use to do so.

The Network Society

Overview & background

According to the theory of the network society (Castells, 2000; Wellman, 2001; Burnett & Marshall, 2003; Van Dijk, 2012), the practices and processes of contemporary life are made possible through a constellation of digital connectivity, with key social structures organized around electronically processed information networks. The network society is a useful backdrop against which to present my findings, offering a macro-level view of social, political, and economic change facilitated by the emergence of networked, digital ICTs over the past several decades. Although networks, in both social and technical sense, are nothing 'new' per se, Castells (2000) argues that networked digital technologies have transformed contemporary society by altering the very nature of productivity, experience, and power. Contemporary scholarship continues to build on this influential thesis. In their book *Networked*, Rainie and Wellman (2012) argue that "the triple revolution" of social networks, the Internet, and mobile technologies work in tandem to form the distinctly new social operating system we live in today.

The intellectual origins of the network society can be traced back to social theorists such as Georg Simmel (1950) who investigated the influence of modernization and industrial capitalism on patterns of organization, production, and experience. Just as Leo Marx (2010) identified the machines of the Industrial Revolution as ushering in a new technological era in the 1800s, many of the macro-level theories of the information society treat new technologies as transformational agents of social development. For instance, Karl Marx (1887) identified the steam-mills and modern machinery of the Industrial Revolution as the definitive tools of capitalist domination. Almost a century later, Canadian scholars attributed the increasing pace, scale, and interconnectivity of global communication and markets to emerging technologies, theorizing them as empire-building (Innis, 1949) or 'the extensions of man' (McLuhan, 1964). Both McLuhan and his intellectual predecessor Innis argued that the true message of any medium was not its content but its space or time-binding properties. In the 1970s, Bell (1973) identified the centrality of technical knowledge in the post-industrial society, characterized by information-driven and service-based work made possible by the emergence of computers. He was perhaps the first sociologist to write about the social impact of algorithms, miniature electronic circuits, and the impending integration of

computer processing and telecommunications. Similarly, in her study on the computerization of the workplace, Zuboff (1988) investigated the 'smart machine's' power to *informate* versus simply to *automate*. While earlier technologies automated tasks, reducing human skill and labour, computer technologies simultaneously produced both information and meta-information, informating when, where, and by whom a task was completed. Zuboff's (2019) most recent work, The Age of Surveillance Capitalism, brings a similar macro-level analysis to the socio-political consequences of Silicon Valley's pervasive big tech conglomerates.

Key concepts pertaining to this study

Castells' (2000) network society builds upon the work of these post-industrial information society scholars outlined above. He argues that the historical and social development of the network society is rooted in a new, global socio-economic structure of 'informational capitalism' (Castells, 2000). To understand this structure, we must focus on both its capitalist mode of production and its informational mode of development or technological system. Castells operationalizes the mechanisms of the network society through flexible concepts such as the "space of flows" and "timeless time" (2000, p. 406). Other pertinent concepts include ‘'real virtuality" and "networked individualism" (Castells, 2001), which I argue in this dissertation, have developed from prescient ideas in the early 2000s, to the invisible, normalized infrastructure that largely mediates our everyday lives at the present. Below is a brief discussion of each of these concepts.

The 'space of flows' (Castells, 2000) refers to the way ICTs allow for simultaneity of social practices regardless of physical location. The traditional, embodied 'space of places' loses some of its dominance in the network society. However, it is the interface between these different types of spaces where tensions between "uniformity and autonomy, of domination and resistance, and of instrumentality and experience" are negotiated (Castells, 1999, p. 294). Beyond space, time is also reconstructed in the network society. As discourses and practices become instantaneous and simultaneous, time also becomes compressed, elastic, or in some cases entirely collapsed. In contrast to clock time, 'timeless time' is characterized by immediacy, yet void of socially meaningful ordered sequence and subject to random interruption. The 'space of flows' and 'timeless time' operate through the new cultural-communication complex of 'real virtuality,' where according to Castells, digital screens not only mediate experience, they

become it. He inverts the concept of 'virtual reality,' arguing that "when our symbolic environment is, by and large, structured in this inclusive, flexible, diversified hypertext in which we navigate every day, the virtuality of this text is in fact our reality, the symbols from which we live and communicate" (1996, p. 403).

Each of these dynamics contributes to the final concept: 'networked individualism' (Castells, 2001; Wellman, 2001; Wellman et. al., 2003) is theorized as the emblematic way of negotiating power and experiencing time and space in everyday life. In the network society, where the practices and processes of contemporary life are made possible through a constellation of digital, mobile connectivity, these 'me-centred networks' represent the privatization of sociability. The rise of social media, in which each person is a switchboard between ties and networks, is a prime manifestation of this. Internet-based social networks represent an individual's 'network capital,' which impacts how people connect, interact, and share resources. The lens of networked individualism shifts the object of analysis from the social group, organization, or institution to the individual as the basic unit of connectivity (Wellman et. al., 2003). However, this change occurs not only "at the interpersonal level but at the organizational, interorganizational and even the world-systems levels. It is the move from densely-knit and tightly-bounded groups to sparsely-knit and loosely-bounded networks" (Wellman et. al, 2003). More recently, in relation to the work context, Canadian communication scholars Enda Brophy, Nicole Cohen and Greig De Peuter have suggested 'networked solidarity' as a term that reclaims ICT infrastructure for the "recomposition of a disconnected, flexible, yet altogether digitally adept labor force" (2015, p. 321). This concept draws attention to how individuals connect and work with one another in the context of dispersed, global, participatory technologies.

Contrasts & critiques

In contrast to these discourses of revolutionary change, scholars of communication, culture, and technology have contextualized the information society and network society theories within a broader historical shift, highlighting the role of bureaucratic control and new modes of production, distribution, and consumption as key factors in the development of new ICTs. For instance, cultural theorists such as Raymond Williams (1975) and Stuart Hall (1980) critiqued the underlying technological determinism in prevailing theories of the information society. They questioned, if the

medium really is the message, what is left for us to say or do? They argue, on the contrary, that individuals have agency to disturb, disrupt, or distract existing logics of technology and society, as they are embedded within social, economic, and political structures. Further, new technologies may offer momentary opportunities outside of established systems to develop new forms of identity and political expression. In another contrast, communication scholar James Beniger (1986) developed a broader definition of technologies as something material (such as a bike) or social (such as voting), intentionally created to influence or control natural processes. And McGuigan (1999) critically assessed claims about the 'postmodernization' of culture and society, explicating some of the key ideas of the network society, such as the nature of time within real virtuality, and the concept of building 'resistant identities.' Finally, Robins & Webster (2004) aimed to dispel the hubris at the heart of so many technologically deterministic claims at the heart of information society theories, analyzing ICTs from a cultural, political perspective. They challenge the very assumptions behind the claims of the information revolution, specifically the promises of "technological progress, economic growth, and human betterment" (2004, p. 63).

The theory of the network society has been critiqued as technologically deterministic for elevating technology as the chief agent of change in society (Garnham, 2000; Fuchs, 2013). For instance, political economy scholars have argued that while technological development and diffusion plays a central role in contemporary society, socio-economic structures and inequities persist (Garnham, 2000; Terranova, 2000; Webster, 2006). In his own conception of the network society, Van Dijk (1999) commends Castells' achievement in demonstrating how formal network structures float to the surface but refutes the claim that these structures are the central drivers of societal change. Van Dijk views the digital and embodied realms more complexly intertwined, noting that even a network society "where all relations are fully realized by, and substantiated in, media networks, where social and media networks equal each other, would still be based on bodies, minds, rules and resources of all kinds" (1999, p. 272). Castells aims to collapse this critique as a false dichotomy, stating "technology is society, and society cannot be understood or represented without its technological tools" (2009, p. 5). Media and communication scholars Pablo Boczkowski and Leah Lievrouw (2008) also argue against the false distinction between technology and society, presenting a dialectical perspective that acknowledges the ebbs and flows of

determination and contingency inherent in sociotechnical change. These scholars take a 'continuity' perspective which views socio-technical change as gradual, incremental, and embedded in broader sociocultural contexts rather than as isolated, dramatic events. I will examine this perspective in more detail below, after outlining blockchain scholarship that aligns with the network society theory.

Emerging blockchain scholarship through this lens

The 'revolutionary' discourse associated with blockchain has been evident from its first description in the Nakamoto (2009) white paper. It proposes to solve problems of fraudulent double-spending through a "system for electronic transactions without relying on trust" (Nakamoto, 2009, p. 8). As journalists began to take cryptocurrency seriously, they often framed Bitcoin in a polarized way as either 'evil' (Krugman, 2013) or 'transformative' (Economist, 2015) for society at large. Popular trade titles analyzed blockchain from a similarly grandiose, macro-level perspective. In *Blockchain: Blueprint for a New Economy*, Swan (2015) conceptualizes blockchain development in three stages: blockchain 1.0 is cryptocurrency; blockchain 2.0 is smart contracts, which are computer protocols that facilitate, verify, and execute the terms of a legal agreement; and blockchain 3.0 is social applications such as intellectual property, voting, medical records, and degree verification. In *Blockchain Revolution: How the Technology Behind Bitcoin is Changing Money, Business and the World*, Tapscott and Tapscott (2016) exude futurist enthusiasm about blockchain as a solution for the increased centralization and unequal data ownership of the current digital landscape, with improvements for human rights, transparency, and prosperity. Other popular trade titles focus on blockchain's potential to transform business (Mougayar & Buterin, 2016), law (Werbach, 2018), and the global economic order (Vigna & Casey, 2016). These early perspectives often include definitions and metaphors to bridge technical and non-technical concepts in the early stages of blockchain's development (Drescher, 2017).

Blockchain literature that builds on the network society perspective investigates questions such as "what is this new technology?", "what can we do with it?", and "what are the benefits, challenges, and risks to particular sectors and society at large?" Castells' addresses blockchain in his latest edited volume, *Another Economy is Possible* (2017), as one of the latest socio-economic experiments in the wake of the 2008 financial crisis. In the book, communication scholar Lana Swartz (2017) identifies an

ideological spectrum including ‘radical’ blockchain initiatives oriented toward revolutionary socio-economic change, and ‘incorporative’ ones that seek to incorporate decentralized technologies into existing systems like banks for greater efficiencies. Blockchain projects can slide from one side of the spectrum toward the other. Some altruistic visions of ‘sharing economy’ platforms based on peer-to-peer commerce have developed into exploitative digital platforms for on-demand task work such as Task Rabbit and Uber.

Over the past several decades, scholars of communication and the information society have documented how new technologies offer individuals and organizations the promise of ‘cutting out the middle man,’ or disintermediation (Katz, 1988; Gellman, 1996), which is also one of main benefits cited by blockchain enthusiasts. Early studies have centred these qualities in their discussion of blockchain’s potential to transform a given sphere. For example, Kamilaris et. al. (2019) examine the rise of blockchain in agriculture and food supply chains. They discuss blockchains like Hyperledger Sawtooth which can trace the seafood supply chain, and AgriLedger that facilitates local food economies in Africa. Scholars have also investigated blockchain’s potential for making the insurance industry more transparent (Disparte, 2017), helping to fulfill the United Nation’s sustainable development goals (Kewell, Adams & Parry, 2017), breaking the chain of third world poverty (Kshetri, 2017), and supporting safe vaccine supply (Yong et. al., 2019). In these approaches, blockchain works as a solutionist discourse (Morozov, 2014), which is emblematic of the network society philosophy, as it ascribes sociopolitical power to the technology itself.

Early blockchain studies represent both enthusiasm and skepticism, as exhibited in the title *Building the blockchain world: Technological commonwealth or just more of the same?* (Manski, 2017). Similarly, in *Trusting Records: is blockchain technology the answer?* Lemieux (2016) assesses blockchain’s efficacy in administering a land registry system in a developing country, raising concerns about the reliability of data entered into the system, which would limit the technology as an effective long-term solution. The theory of the network society contextualizes this type of early blockchain literature. It provides a backdrop for analyzing the rapid pace of change and taken-for-granted nature of digital, networked logics at the present. In the next section we turn to explore the strengths of constructivist, interpretive approaches for analyzing the social shaping of blockchain.

The Social Shaping of Technology

Overview & background

Communication research on ICTs has often been characterized by praise or critique of technologies and their associated discourses and practices, at two ends of the spectrum (Jenkins, 2006; Fuchs, 2013). Constructivist, interpretive scholarship opens a path between these, to explore the cultural mediation of technology in a less polarized way (Dunbar-Hester, 2014). This research approach comes alongside individuals to understand their everyday practices, and analyze how socio-cultural values are inscribed into technologies, avoiding excessive idealism or pessimism. The field of science and technology studies (STS), and the concept of the social shaping of technology that emerged from it, have supported communication scholars in this pursuit (Pinch & Bijker, 1987; MacKenzie & Wajcman, 1999; Boczkowski & Lievrouw, 2008). In the 1980s and 1990s, STS emerged as a critique of positivism and technological determinism, or the belief that technology 'does' things to us and to our society (Smith & Marx, 1994). Rooted in Marxism, STS offered a more nuanced debate about the relationship between technology and society, through a critical analysis of the status of science, knowledge, and ideology. While the origins of the field carry political implications, STS has historically focused on developing empirical methods and case histories, that feature more of a latent political critique (Feenberg, 2017). This school of thought highlights the fact that technologies, such as the electric light or digital networks, are never merely technical - their everyday functions are deeply intertwined with economic, organizational, political, and socio-cultural factors (Hughes, 1993). Communication scholar Carolyn Marvin (1988) offers a complementary cultural perspective in her history of electronic communication at the end of the 19th century, showing how the telephone and electric light disrupted the customary boundaries between public and private life. She shows how professionals in the electronics field tried to influence these new technologies, which is an aim of this study as well.

An important idea stemming from the field of STS is the social construction of technology (SCOT) or social shaping of technology (SST). This theory marked a departure from older views of media and technology users as passive consumers,

highlighting the social contexts and human agency involved in technological development. Technologies both reflect and reinforce a society's values and power dynamics. STS attracted scholars from sociology, history, and philosophy of technology. They were united by the common goal of opening technology's black-boxes to expose the socio-cultural, economic, and political factors influencing their development and use (Bowker & Star, 2000). This analysis begins at the foundational rhetorical level, through analysis of the ideological work performed by the very word 'technology' (Marx, 2010). Such work highlights how human bias, whether intentional or unintentional, influences the design, trajectory, and social worth of an innovation. For example, in their well-known study of the development of the bicycle, Pinch and Bijker focus mainly on debates among 'relevant social groups,' only briefly mentioning 'less obvious social groups' including women and anti-cyclists as part of the shaping process (1987, p. 31). These scholars trace the ways social groups define, develop, and make sense of an artifact – that is, construct the social meaning of a new technology. Different social groups attach different ideas to artifacts, based on how they define relevant problems and solutions. However, one aspect of the social shaping process STS scholars do not clearly explain is how these 'problems and solutions' are negotiated through discourse. This study in communication serves to highlight that process.

In the essay *Do Artifacts Have Politics?* STS scholar Winner (1980) challenges the notion that technologies are neutral, arguing instead that they are inherently political. His study of the geo-political contexts of suburban development in New Jersey documents how architects designed bridges that prevented busses from working class and predominantly black neighbourhoods from accessing beaches located in predominantly white middle class areas. This demonstrates that technologies can be designed, consciously or unconsciously, to benefit particular demographics more than others. New technologies often help certain social groups consolidate power while diminishing the power of others. A small number of STS scholars pay particular attention to these 'others' beyond 'relevant social groups,' who are marginalized, excluded, or invisible from a network or from the history books. For instance, Ruth Schwartz Cowan contrasts the extensive documentation of the steam engine with the lack of a single reference to the innovation of the baby bottle: "Here is a simple implement… which has transformed a fundamental human experience for vast numbers of infants and mothers, and been one of the more controversial exports of Western technology to

underdeveloped countries - yet it finds no place in our histories of technology" (1979, p. 52).

At the turn of the 21st century, the rise of digital technologies forced the field of communication to broach the gap between interpersonal and mediated communication, either by adapting older communication theories, or by looking outside of communication. As the internet rapidly diffused into mainstream use, scholarship began to shift away from utopic claims of cyberspace (Turkle, 1995), the new global village (Rheingold, 1999), and dystopic threats of the digital divide (Compaine, 2001), to focus on more complex social implications for both users and non-users (DiMaggio, Hargittai, Neuman & Robinson, 2001; Oudshoorn and Pinch, 2003). Communication scholars turned to STS, computer-mediated communication, and contextual studies of everyday life to make sense of large quantitative studies, such as the work of Castells (Lievrouw, 2009). Just as sociologists like Castells became interested in ICTs around the turn of the century, so too did scholars of STS, building on the field's foundational strengths in complex technologies and knowledge systems (Bowker & Star, 2000).

Boczkowski & Lievrouw (2008) map out key themes bridging STS and communication: a) ideas about causality in technology-society relationships, or the directional flow of influence between these forces; b) the process of technology development, in terms of privileging production or consumption as the focus of analysis; and c) the social consequences of technological change, or the framing of ICTs as either revolutionary or evolutionary. Based on this, the authors identify three dialectic relationships bridging communication and STS: determination and contingency, production and consumption, and continuity and discontinuity. Each field offered something useful to the other. Communication gave STS a body of social science research, and critical inquiry about mediated content, individual behavior, socio-cultural processes, and meanings. In turn, STS gave communication a sophisticated conceptual language and grounded methods for articulating the distinctive socio-technical character of ICTs as culturally and socially situated artifacts within systems. Where communication had historically focused on technologies' technical features and effects for users, STS had historically focused on technologies' origins, meanings, and producers.

For communication scholars using social shaping theory, it is important to highlight what is unique about information and communication technologies, in contrast

to the broad range of technologies beyond them. What remains distinctive about ICTs is that “they are at once cultural material and material culture” (Boczkowski & Lievrouw, 2008, p. 955). In other words, the material and the symbolic elements of ICTs undergo a more intimate and complex process of mutual shaping than the bicycles, bridges, or missiles historically studied in STS. Between the poles of determinism and constructivism, scholarship at the intersection of communication and STS is well-suited to theorize social relations around emerging technologies through a co-construction dynamic encompassing moments of determination and contingency. This fluid perspective “captures both the social shaping of technology development and the emergence of broad, persistent societal effects” (Boczkowski & Lievrouw, 2008, p. 956). The following section highlights several key concepts that work to operationalize this type of analysis.

Key concepts pertaining to this study

STS scholarship investigates how innovations develop, diffuse, solidify in meaning, and fade into the background of everyday use. Susan Leigh Star’s concepts of ‘infrastructures’ (1999) and ‘boundary objects’ (Star & Griesemer, 1989) highlight the socio-technical processes at work in achieving this. Infrastructures, for example, shape human organization in powerful yet invisible ways that only become noticeable when they break down – when the power goes out, or the wifi goes down, for instance. Star argues that we view and label things differently under different infrastructural regimes. She defines infrastructures as: (1) ‘embedded’ into other structures, social arrangements, or technologies, (2) ‘transparent,’ not reinvented or assembled for each new task, and (3) built upon an ‘installed base,’ inheriting previous technologies’ strengths and weaknesses (Star, 1999, p. 381). In *Sorting Things Out: Classification and Its Consequences*, Bowker & Star (2000) argue that infrastructure is learned as part of membership in a community of practice, through the taken-for-grantedness of artifacts and organizational arrangements. Within these invisible infrastructures are more visible ‘boundary objects,’ which are abstract or concrete things which are “both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites” (Star & Griesemer, 1989, p. 393). Boundary objects are weakly structured in common use and become more strongly structured in individual-site use. In other words, their structure is common and cohesive

enough to translate across various social spheres, but within each of those spheres they take on particular meanings. Part of this process relies on interpretive flexibility, to which we turn next.

The process by which a technology solidifies from its early-stage, malleable, or opaque state has been explored from the 1980s to the present by STS scholars. Through their study of the bicycle, Pinch & Bijker (1987) outline ‘interpretive flexibility’ as a social shaping process by which technologies progress from new innovation to widely accepted technology with a commonly understood meaning. The concept is rooted in the empirical program of relativism (Collins, 1975). The first stage of analysis acknowledges the rhetorical openness of the object in question: “it can be shown that different social groups have radically different interpretations of one technological artifact” (Pinch & Bijker, 1987, p. 41). The second stage involves surveying the variety of ‘closure mechanisms,’ or social processes whereby interpretive flexibility is curtailed, as influenced by ‘relevant social groups.’ Finally, as a technology ‘stabilizes,’ interpretive flexibility vanishes, and a predominant meaning and use diffuses into mainstream society. Many SCOT studies focused on early-stage technologies - how bicycles, fluorescent lighting and Bakelite moved from interpretive flexibility to stability, for example (Bijker, 1995). Bijker (1995) went on to make the connection between designers and users more explicit within the concept of a ‘technological frame,’ as a social phenomenon that structures the interactions among the actors of a relevant social group.

Although technologies remain somewhat ‘plastic’ throughout cycles of production and use, the fluidity of this co-construction process is heightened in the early stages of its emergence (Wajcman, 2004). The options for what a technology may be understood and used as, are not infinitely flexible - they become routine and established as time goes on. Consider for example, our definitions of 'the internet' or 'social media' in comparison to 'blockchain.' The meanings and uses of more established ICTs have become more solidified and taken for granted over time, and this has consequences for social reality. Harvard STS scholar Sheila Jasanoff (2004) developed the related concept of ‘sociotechnical imaginaries,’ which can be observed in moments of co-production including stages of emergence, contestation, and stabilization. Jasanoff & Kim (2015) show how such visions of technological progress are infused with ideas about public purposes, collective futures, and the common good. Each of these key

concepts show how STS scholarship is attuned to the disjunctures and overlaps that occur when different kinds of knowledges bump up against one another, and how meaning is decided at the local level (Law, 1990). STS brings the 'social' into focus, and then shows how the social and technological are deeply intertwined and inherently interdependent.

Contrasts & critiques

Latour's (2005) actor-network theory (ANT), another sub-field of STS, challenged the social constructivist argument by suggesting that both technological artifacts and humans have equal agency in the development of contemporary society, as indistinguishable nodes in a heterogeneous, mutually-constituted network. As Latour (1990) succinctly put it, "technology is society made durable." He suggested that a clearer picture of the durability of social domination and power could be seen by reconstructing networks. And he adopted the term 'technoscience' to emphasize the entanglement of contemporary processes in technologies, sciences and societies. ANT scholars draw attention to the collective process, or ensemble of actors, as a new technology unfolds. MacKenzie and Wajcman concur that "technologies (especially radically new technologies) typically emerge, or fail to emerge, from processes in which no one set of human actors plays a dominant role, and in which the role of a recalcitrant material world cannot be ignored" (1999, p. 28). This is especially pertinent to blockchain, in which various transactions are not only automated, but immutable.

Fellow STS scholar Winner (1993) offers a philosophical critique of social constructivism in his essay "Upon Opening the Black Box and Finding It Empty: Social Constructivism and the Philosophy of Technology." He outlines several limitations of this position, including the need to look beyond how technologies arise to examine their consequences in broader contexts, include social groups and interests who have no voice in the social shaping process which can lead to conservative and elitist technologies, and go beyond immediate needs, problems, and solutions toward deeper cultural and economic origins of social choices. Feenberg's (1991) critical theory of technology sought to incorporate aspects of social constructivism into the philosophy of technology, blending Marxist perspectives and insights from empirical STS case studies to re-politicize the study of technology as a more actionable theory. He makes a case for

broader democratic participation in technological choices. Finally, Klein & Kleinman (2002) challenged SCOT by presenting supplementary concepts from organizational sociology and political economy that would better illuminate the structural influences inherent in shaping technologies.

Each of these challenges to social shaping theory reflects different ways of conceptualizing technology and society as more deeply intertwined, dynamic, and non-linear. These critiques spurred the field forward. For instance, STS scholars examined "How Users and Non-Users Matter" (Oudshoorn & Pinch, 2003), and "The Construction of Users & Non-Users of the Internet" (Wyatt, 2003). And in the second edition of *The Social Shaping of Technology*, MacKenzie & Wajcman (1999) updated and clarified their stance on the relationship between technology and society. They acknowledged that the first edition in the mid-1980s focused mainly on the influence of social relations upon artifacts, but that "it is mistaken to think about technology and society as separate spheres influencing each other: technology and society are mutually constitutive" (1999, p. 41). In this revision of social shaping theory, scholars began to collapse the age-old technology/society dichotomy, and examine their complex, co-constructed interrelations. Similarly to the network society (Castells, 2010), this expanded the notion that society is made possible through technologies. A recent co-construction theory developed by Chow-White and Garcia-Sancho (2012) is 'spaces of convergence.' They conceptualized DNA databases as 'spaces of convergence for computing and biology,' that have evolved in both form and function over the past 50 years, setting the stage for today's genomic research in which "the biological and computational are currently indivisible" (p. 128). The convergence between biology and computing transformed genomics from wet lab science into a big data project.

To expand on one of Winner's critiques, another limitation of social shaping is that it has historically focused on immediately relevant local considerations, such as the reward structures of engineers' membership in professional communities (Kranakis, 2004), with less consideration for broader social axes of class, gender, or race. According to social shaping theory, technologies would simply 'work' when they become accepted by 'relevant,' or rather dominant, social groups (Bijker, 1995, p. 270). MacKenzie & Wajcman themselves acknowledge this problem:

> It clearly would be most foolish to assume that gender is irrelevant to the development of a technology just because no women were directly involved and the masculinity of the men involved was never mentioned explicitly in the discussion of it; and analogous points hold for class, and especially, ethnicity. The point is a difficult one - we would not claim to have a formula for how to analyse the effects on technological development of structural exclusion - but needs always to be kept in mind. (1999, p. 40).

Wajcman (2004, 2007, 2010) went on to theorize gender and technology in depth, which I discuss in the final section of this chapter.

Over the past decade, communication and STS scholars have conducted exemplary social shaping research focused on raced and gendered social relations and ICTs. Ensmenger (2012) traces the rise of 'the computer boys' of the mid-twentieth century computer revolution as an intentional, contentious, human process of building up power, identity, and expertise in American society. In another historical account, Hicks (2017) documents a similar process to show how Britain discarded women technologists and lost its edge in computing in *Programmed Inequality*. Computing is well known as a male-dominated field, and Hicks shows how it came to be that way through structural gender discrimination. Turning to considerations of race and technology, scholars have shown how search engine algorithms reinforce racism (Noble, 2018), high-tech tools profile, police and punish the poor (Eubanks, 2018), and computer code encodes inequity by ignoring and thereby replicating racial bias (Benjamin, 2019). As one final example that further contextualizes each of the studies mentioned above, artificial intelligence scholar and data journalist Meredith Broussard (2018) articulates the inner workings and outer limits of technology, exposing how technochauvinism, or technology-based solutionism, has fueled poorly designed technologies. She problematizes the way we have come to view computers as objective, efficient, superior information processors, and the people who use them as inferior to their logics. Each of these studies highlights the fact that seemingly neutral approaches to technology design are developed with socially embedded assumptions and blind spots.

Emerging blockchain scholarship through this lens

Scholars of communication and STS have analyzed cryptocurrency and blockchain through social shaping perspectives. Instead of asking 'what can it do?' or 'how can we harness the potential of this technology?', these studies focus on the fact

that blockchain emerges from within existing socio-political contexts, with the potential to influence them. For example, Maurer, Nelms & Swartz (2013) investigated the semiotics of Bitcoin as a form of 'practical materialism' that replays age-old debates about privacy, labour and value. Reijers and Coeckelburgh have theorized both cryptocurrencies (2016) in particular, and blockchain (2018) more broadly, as 'narrative technologies' that configure our social reality in their philosophical investigation. They suggest that these technologies organize characters and events in various plots, by replacing human interactions with automated code, for example. Similarly, Maxwell, Speed and Pschetz (2017) use the language of 'narrative' and 'story blocks' to show how blockchain is changing the nature of transactions and exchange, through a participatory experiment that demonstrates the implications of digital, collaborative, linear and non-linear processes. Each of these studies focuses on different elements of communication as integral to blockchain's influence.

Several other recent blockchain studies reflect the interests of the social shaping perspective. De Fillipi and Loveluck's (2016) analyze the 'invisible politics' governing Bitcoin. On one hand, Bitcoin is a self-governing, self-sustaining network based on social trust and coordination. On the other, its development and maintenance relies on a small core of influential developers. In a study on 'the social life of Bitcoin,' Nigel Dodd arrives at the paradoxical conclusion that "if Bitcoin succeeds in its own terms as an ideology, it will fail in practical terms as a form of money" (2018, p. 35). Reinforcing the core message of social construction, Dodd critiques the techno-utopic image of Bitcoin as a system operating over and above social life. Rather, he argues, the currency is intricately bound up in social organization, political power, and asymmetries of wealth, not unlike other financial intermediaries such as banks. Lana Swartz (2019) extends this argument in *New Money: How Payment Became Social Media*, by examining digital payment as a form of communication. She shows how everyday transactions produce communities and identities, and inclusions and exclusions, across a range of social possibilities and limitations. In another study, she and her colleagues explore blockchain as a 'convening technology,' which "helps to build publics or re-order old ones [and] marshals resources and institutions and other forms of power," through their case study of the music industry (Baym, Swartz & Alarcon, 2019, p. 403). Finally, Woodall & Ringel (2019) illustrate the interpretive flexibility of blockchain, as discourses of trust and financial security are extended to other professional sectors such as digital preservation

and archival work. The authors show how blockchain's association with concepts such as decentralization and cryptography instills confidence in new applications, and lends legitimacy to traditional institutions integrating the technology.

The social shaping of technology theory offers a productive language for investigating emerging technologies in critical yet hopeful ways, rooted in the perspective that their trajectories are anything but inevitable. As feminist STS scholar Donna Haraway said, 'the lively, unfixed, and unfixing' practices of science and technology produces 'surprises [which] just might be good ones" (1997, p. 280). Her words are a fitting introduction to the following section, which explores technofeminism (Wajcman, 2004) as the third theoretical lens for this dissertation.

Technofeminism

Overview & background

Gender and technology share a dynamic, recursive relationship with one another. Building on social shaping theory, feminist scholars argue that the "social sphere in which the shaping occurs, often interpreted as class relations, is also a matter of gender relations" (Cockburn & Ormrod, 1993, p. 7). Feminist technoscience emerged out of second-wave feminism as a politically oriented critique of science and technology spaces, with the goal of dismantling hierarchies of knowledge production and patriarchal power structures (Adrian, Skewes & Schwennesen, 2018). A particular stream of feminist technoscience is Judy Wajcman's (2004) technofeminism, which challenges notions of technology as neutral and value-free. She urges us to see technologies as gendered, and gendering. Her 'co-construction' approach focuses on "the mutual shaping of gender and technology, where neither gender nor technology is taken to be pre-existing" (2007, p. 287). As an STS scholar who helped to establish the mutually constitutive nature of technology and society, Wajcman addresses a gap in the literature by arguing the same of technology and gender in particular. Similarly, Wendy Faulkner (2001) argues that the crucial question of how technology is gendered can be understood through a social constructivist lens. Shade and Crow (2004) highlight the foundational work of Canadian feminist scholars Gertrude Robinson (1998), Maggie Benston (1989) and Ursula Franklin (1999) in articulating the idea that technology itself is a gendered space historically associated with masculinity and power. As Franklin

notes, “when certain technologies are predominantly used by men, then maleness becomes part of the definition of those technologies” (1999, p.8). Indeed, historical research on manufacturing and engineering highlights women’s exclusion from technology as a consequence of the male domination of skilled trades that developed during the industrial revolution (Bradley, 1989; Cockburn, 1983; Milkman, 1987).

A key concern for feminist scholars, from the start of second wave feminism to the present, has been the limitations on women’s experiences and contributions in scientific and technical work. In early scholarship on gender and technology, Joan Rothschild argued, “technology as a liberating factor for women cuts two ways”—while it aids capitalism in reinforcing the patriarchal division of labor, it also provides a precondition for women’s emancipation (1983, p. 79). Liberal feminists in the 1970s and 1980s critiqued structural barriers, discrimination, and the biased socialization of girls, arguing for equal access, education, and employment (Keller, 1985; Rossiter, 1982). Technology itself was viewed as open, neutral, and unbiased. But some feminist scholars sought to flip this script. Instead of asking how to get more women into science, Harding (1986) interrogated ‘the science question in feminism’ and Faulkner (2001) later added ‘the technology question in feminism.’ Landmark studies from this time include Ruth Schwartz Cowan’s (1985) *More Work for Mother*, which questioned whether the mechanization of the home had decreased women’s workload and concluded otherwise. Social scientist Dorothy Smith (1987) analyzed the ‘problematics of everyday life’ in the workplace, as a way to destabilize gender power relations that remain stubbornly inequitable yet not directly observable. At the same time, radical feminists identified and critiqued the unequal, divisive ways gender is embedded in technologies themselves and their surrounding cultures, with a focus on women’s bodies and bio-technologies (Wajcman, 2007). Where liberal feminists gave too much power to technology in a deterministic way, radical feminists painted women with a broad, uniform stroke as victims of patriarchal oppression in a gender essentialist way.

By the 1990s, feminist views on technology shifted toward the emancipatory potential of information and communication technologies to close the gap of gender inequalities. Haraway’s (1990) *Simians, Cyborgs and Women*, Turkle’s (1995) *Life on the Screen*, and Plant’s (1997) *Zeroes + Ones: Digital Women and the New Technoculture* celebrated the power of digital technologies that blurred the boundaries between human and machine, male and female, paving the way for a new era of social

relations. The future-focused optimism and language of possibility used in these works show their connections to theories of the network society. Haraway (1991), who trained as a scientist before turning to philosophy of science, sparked the feminist imagination with her 'cyborg manifesto,' envisioning both gender and technology as changing and changeable. Her ideas on how ICTs link people globally into new chains of affiliation, exploitation, and solidarity were prescient. But cyberfeminism's utopian enthusiasm cooled in the context of persistent gender inequality in the material realm. Wajcman critiques cyberfeminist accounts of gender and technology as 'perversely post-feminist' (2004, p. 73). She notes that the theorists mentioned above did not seriously consider women's actual experiences within tech work or cultures. This is key to technofeminist research, and to this project.

By the early 2000s, scholars began a fruitful exchange between gender theory and STS, viewing technologies as socio-material or sociotechnical practice. As part of this, Wajcman's (2004) technofeminism took insights from cyberfeminism and social shaping theory of technology, to conceptualize "a mutually shaping relationship between gender and technology, in which technology is both a source and a consequence of gender relations" (2004, p. 7). Wajcman sought to create a path between technophobia and technophilia, to "explore the complex ways in which women's everyday lives and technological change interrelate in the age of digitalization" (2004, p. 6). Similarly, Berg and Lie (1995) echo Winner's (1980) foundational STS question 'do artifacts have politics?' in their essay on feminism and constructivism, *Do Artifacts have Gender?* Like Wajcman, they argued that research must move beyond women's lack of access to technology, to examine the dynamics of their active, competent use of existing technologies in context. For example, Wendy Faulkner (2009) has examined the 'in/visibility paradox' in her research on gender in engineering workplace cultures, whereby women engineers are highly visible as women yet invisible as engineers.

A wide variety of everyday uses of technology provide ideal empirical sites to expand the theoretical insights of technofeminism. Studies that have explicitly used this framework include Chan's (2018) study of women's use of dating apps in urban China. He shows the complexity of dating apps as both a liberating feminist tool, and a disciplining mechanism of structural gender inequality that reinforces marriage expectations and state policies. In addition, England and Cannella (2018) explore technology camps that empower tween girls as technofeminists who challenge sexist

media portrayals of girlhood by constructing their own digital identities. Other technofeminist projects include Frost and Haas's (2017) study of decolonizing the body through a reframing of fetal ultrasound technology. And Blair (2018) documents women's lived experiences of technology from historical figures such as Ada Lovelace up to women working in the tech industry today. Finally, in previous work, my supervisor and I have published an empirical study of women's diverse use of smartphone apps, theorized through a technofeminist lens (Frizzo-Barker & Chow-White, 2012). We found that women were both empowered and restricted, sometimes simultaneously, by their use of smartphone apps, due to their potential to foster 'always on' forms of sociability across both public and private spheres.

Information and communication technologies, and the discourses that flow through them, are an important space where issues of gender and feminism are negotiated. For example, the #MeToo movement facilitated by social media re-opened debates between second- and third-wave feminists over the nature of sexism and feminism itself (Donegan, 2018). Similar to scholars of technological change, feminist scholars have debated whether the distinct 'waves' of the women's movement represent a radical break from one another (Heywood, 2006), or a 'fluid' movement with 'carry-overs and carry-ons' (Gusfield, 1981). The second wave, which peaked in the 1960's with the release of *The Feminine Mystique*, stirred debate over women's roles as wives and mothers, and generated activism on issues such as birth control, abortion, sexuality, rape, domestic violence, divorce, and workplace equality (Fermaglich & Fine, 2013; Rosen, 2000). The third wave rose in the 1990s as an inclusive, pluralistic, non-judgmental movement in defense of individual 'choice' about how women present and conduct themselves (Snyder-Hall, 2010). It fostered new currents including sex positivity, ecofeminism, transfeminism, postmodern feminism, and intersectionality (Heywood & Drake, 1997; Crenshaw, 1990). If the emblematic media of second wave feminists was *Ms. Magazine*, third-wavers used the Internet to spread a diversity of feminist ideas (Finneman & Volz, 2020). Contemporary feminisms are indivisible from ICTs. As media and gender scholar Lisa Nakamura reflects, "I think for the younger feminists, there is no feminism without technology because they cannot imagine how they would possibly articulate it. How they would network around it, how they would archive it, how they would understand it in dialogue with other people?" (Nakamura in DeVoss, 2019).

Nakamura notes that the term technofeminism carries an inherent activism, since studying technology as a feminist was a radical act in previous decades.

Beyond academic debates around feminism, public discourse about gender and technology are unfolding within a sociocultural context that is predominantly postfeminist (Gill, 2007; McRobbie, 2008). Postfeminism is a contested term, but I use it here to describe "the ways social institutions and mainstream culture have recognized liberal feminism as 'common sense,'" which renders sexism as no longer a problem (Rossie, 2019, p. 1079). But feminist scholars including Rosalind Gill have identified enduring patterns of gender inequalities that are apt to remain hidden and even flourish amidst postfeminism's "emphasis upon self-surveillance, monitoring, self-discipline, [and] preoccupation with discourses of individualism, choice, and empowerment" (2011, p. 64). A good example of this is Schwartz & Neff's (2019) study of sex-for-rent schemes in online rental sites. They conceptualize 'gendered affordances' to show how technology users are "afforded different actions based on cultural repertoires and social institutional factors" (Schwartz & Neff, 2019, p. 2407). New technologies, and the social structure of gender itself, are reproduced through gendered affordances.

Both experimental and discursive research have found that challenging sexism is risky for most women (Ahmed, 2015; Worth, Augoustinos, & Hastie, 2015). As Gill puts it, "the potency of sexism lies in its very unspeakability" (2011, p. 63). Paradoxically, within this postfeminist context, there is a rising public awareness of the need for diversity and inclusion initiatives, among corporate and open technology cultures as well as conferences (Bourke & Espedido, 2019; Eswaran, 2019; Tulshyan, 2019). In *Hacking Diversity*, Christina Dunbar-Hester (2020) investigates local initiatives to include more women and people of colour in hacker communities. She concludes that their laudable efforts have nevertheless fallen short of securing substantive equity. These discourses in tension, as seen in gender-equity initiatives within postfeminist contexts, are explored in this study.

Key concepts pertaining to this study

The first concepts from this body of work most pertinent to this study are foundational and definitional. They are the very ideas of 'gender' as a noun and 'gendered' as a verb. Feminist scholarship shows how such labels matter in the real world: being seen as male or female creates presences and absences, access and exclusion, spaces for voices to be heard and others to be silent (Robinson, 1998). Contemporary scholars view gender as fluid, contextually defined, and socially performed in relation to everyday practices, in contrast to the traditional view of gender as binary, sex-based, and invariant (West & Zimmerman, 1987; Butler, 1990; Wajcman, 2004). Sandra Harding (1986) delineates three notable aspects of gender: gender *structure*, or the sexual division of labour, gender *symbolism*, a category to which meaning and value are assigned, and gender *identity* or individual gender. While Wajcman does not cite Harding's particular terminology, she draws upon these interrelated elements of gender in technofeminism: "The construction of gender identities, like that of technologies, is a moving relational process achieved in daily social interactions" (2004, p. 54).

We can trace the transition of terminology in the literature, from thinking about 'women and technology' to 'gendered technologies,' or the ways gender is embedded in technologies themselves (Wajcman, 2007). According to Cockburn & Ormrod, "Technology is gendered. We collectively gender it, of course; but in turn it individually genders us" (1993, p.159). This discursive reframing disrupts the concept of gender, dismantling the naturalist view of static gender roles. Feminist communication scholars have developed a body of research that examines how communication technologies have been gendered, both through design and social uses, whether intentional or unintentional, in masculine or feminine ways. For instance, Leslie Regan Shade documented how the telephone, the radio, and the television have been heavily studied in terms of women's "use of these technologies to both forge new communities and nurture existing place-based communities" (2004, p. 57). Wajcman's technofeminist approach underscores that "treating technology as a culture has enabled us to see the way in which technology is expressive of masculinity" (1991, p. 149). Understanding how technologies are gendered requires a social shaping, cultural approach.

Another important concept pertaining to this study is Donna Haraway's (1988) 'situated knowledges.' Flyvbjerg (2001) argues for the value of social science based on the Aristotelian concept of phronesis, or practical wisdom, which goes beyond analytical, scientific knowledge (*episteme*) to the realm of invisible, tacit knowledge and intuition (gendered experience, for instance). Haraway (1988) puts feminist language to this in her influential text on situated knowledges. The concept, developed in conversation with scholar Nancy Hartsock, concerns how truth is made. Haraway appeals to the metaphor of vision to argue that people *make* truth through concrete practices from particular vantage points:

> I would like a doctrine of embodied objectivity that accommodates paradoxical and critical feminist science projects… The moral is simple: only partial perspective promises objectivity. Feminist objectivity is about limited location and situation knowledge, not about transcendence and splitting of subject and object. It allows us to become answerable for what we learn how to see (1988, pp. 581, 583).

This postmodern perspective, favoured in STS and feminist technoscience among others, maintains that even scientists in a laboratory do not simply 'observe the truth' as they conduct experiments on a cell, for instance. Rather they co-create what a cell is, by seeing, measuring, naming, and manipulating the data. Feminist materialists such as Karen Barad stress this point: "knowing, thinking, measuring, theorizing, and observing are material practices of intra-acting within and as part of the world" (2007, p. 90). This illustrates the deep linkages between discourse and practice. Put another way, 'theorizing is worlding' (Thiele, 2015). Thinking is an action. Whose thoughts matter? This is an important concept for examining the gendered social shaping of technology which can not be directly observed.

In light of these definitions of gender and situated knowledges above, technofeminism stresses that we cannot uncritically assume a unitary motivation or experience among women in their interactions with technology. A technofeminist stance presumes difference among women's lived experiences. We examine women's particular relationships with ICTs, in certain social contexts, to assess how they accommodate, shift, or reproduce gendered power relations.

Contrasts & critiques

Contrasts and critiques to do with gendered technoscience include calls for queering feminist technology studies, intersectional technofeminism, and for research on more ways to bring about effective social change. First, Catharina Landström (2007) argues that the habitual reproduction of heteronormativity in the cultures and technologies studied prevents technofeminism from achieving its full potential. In technofeminist empirical studies, technologies are often viewed as malleable, whereas gender is treated as relatively stable (Oudshoorn et. al., 2004). Similarly, Gil-Juárez, Feliu & Vitores (2018) qualify the technofeminist approach, showing how 'mutable technology' and 'immutable gender' are negotiated in discourses around video games. They found that the reification of these terms happened asymmetrically. As the meaning of technology was explored, it became more flexible, while the meaning of gender became more essentialized and static in contrast. In efforts to address this, the notion of 'assemblages' is useful – it reconfigures subjectivity by approaching individuals as dynamically constituted in relation to technologies, placing the relationship between them as the crucial mechanism, instead of gender identity (Deleuze & Guattari, 1987; Currier, 2003, Landström, 2007). Viewing gender and technology as equally flexible and constructed is an important clarification to strengthen technofeminist analysis, which I have aimed to carry forward in this dissertation.

Next, scholars have argued that beyond its focus on gender and technology, technofeminism should pay more attention to intersectionality (Crenshaw, 1990). It should more meaningfully engage with other interlocking social axes such as race, ethnicity, class, sexual orientation, and ability (Garcia & Scott, 2016). Intersectional technofeminism serves to dismantle the language of objectivity deeply embedded in technological artifacts, by revealing how various identity categories shape technologies, and by extension, participation in technological initiatives. Garcia & Scott (2016) demonstrate how this approach to technology education can challenge stereotypes of girls of color as passive victims of technology and provide a counter-narrative that empowers girls of color to form generative relationships with technology. Scholars have also used intersectional technofeminist frameworks to examine community-driven technology innovation (Shivers-McNair et. al., 2019), and bodies of scholarly literature, such as computers and composition (De Hertogh et. al., 2019). Similarly, Tressie McMillan Cottom (2017) calls for 'black cyberfeminism' as a way forward for

intersectionality in technology research. This approach looks beyond lived experience, to focus on the "dimension of power as the mobilization of capital and politics to the benefit of some at the expense of others" (Cottom, 2017, p. 211). She argues sites of cultural production involve hierarchies of groups and resources, with power flowing between them. Although I did not initially design this study from an overtly intersectional perspective, which foregrounds the connections between these social axes to theorize identity and oppression (Nash, 2008; Cho, Crenshaw & McCall, 2013), my data collection and analysis compelled me to incorporate this crucial perspective into the discussion of women in blockchain, and into my recommendations for future research.

Finally, sociologist Shelley Correll (2017) notes that while the academy has amassed a large body of theoretical and empirical literature on how gender inequality is reproduced, which technofeminism has helped to expose, we have far less research on how to bring about positive change. At a recent event, Correll was quoted as framing the issue in a structural sense: "Gender equality is public good, like water and roads. It enriches and better companies and communities" (Neely, 2018b). In other words, this is not a zero-sum game of men versus women. Gender equality is a social good, like clean air, that benefits us all. This is a more expansive view in which people across a diversity of genders can bring more of their genuine selves and talents to work. She argues for a 'small wins' model to bring about gender equality at work: achievable acts of education, bias prevention, tool development, and interventions with the potential to spiral into larger changes down the road through a contagion effect. Public talks by Correll and other scholars associated with the Clayman Institute for Gender Research at Stanford University have highlighted concepts such as 'micro-inclusions' as concrete steps to combat gendered or racist 'micro-aggressions' (McDowell, 2016). This terminology shaped my interview protocol and facilitated many of the interesting findings in this study.

Emerging blockchain scholarship through this lens

There remains a dearth of scholarship on blockchain and gender. I conducted searches in various scholarly databases yielding only two results, which highlights the need for more studies such as this dissertation. From a global development perspective, Thylin & Duarte (2019) examine the opportunities and risks of leveraging blockchain in humanitarian aid for women and girls. Their research is based on the UN Women's

blockchain pilot projects targeting Syrian refugee women, and its cash-for-work program in Jordan. In a study published in *Australian Feminist Studies*, Allon (2018) examines the gendered, racialized and sexualised discursive practices that attend representations of gold, in the context of the 'new libertarianism.' Finally, my lab colleagues and I have published a book chapter entitled "Meetups: Making Space for Women on the Blockchain" (Adams et. al. 2019), based on early participant observations from this study, in the edited volume *Blockchain and Web 3.0: Social, Economic, and Technological Challenges*. We attended local gatherings designed for general audiences and for women in particular and observed gendered dynamics and discourses at each of them. We found that 'women in blockchain' meetups functioned to resist the hyper-masculine blockchain space, and to foster supportive networks for women in the space.

Research Questions and Conclusion

In this chapter, I have outlined three theoretical lenses which, taken together, provide an effective intellectual framework for this interdisciplinary study in communication. My object of inquiry is the gendered social relations around blockchain. An engaged and relevant study of this type requires an anti-essentialist understanding of both gender and technology, that takes seriously digital networks, structures of power, and lived experience. I have demonstrated how key theoretical concepts from the network society (Castells, 2000), the social shaping of technology (Pinch & Bijker, 1987; Mackenzie & Wajcman, 1999), and technofeminism (Wajcman, 2004), each offer useful analytical tools for chiseling a clear, compelling picture of gendered discourses and practices in blockchain. The network society thesis provides a useful backdrop for understanding the global, digital flows and connectivity we have come to take for granted at the present. The social shaping of technology highlights the social, political, and cultural contexts these networks emerge from. And technofeminism underscores the diversity of ways gender and technology shape one another. They are not often in conversation with one another, but I argue their cross-fertilization is important for my analysis in this study.

These schools of thought conceptualize the relationship between technology and society differently. This continually evolving process depends on communication. Macro-level discourses of the network society highlight blockchain's potential for sweeping, transformational change. Meso-level discourses inspired by STS help us to understand

meaning-making, orientations, and practices in the space. And micro-level technofeminist discourses based on talk about work in blockchain show how each these discourses come together to enable and constrain women's participation in the space. These diverse theoretical lenses sensitize us to the possibilities associated with new technologies: they may facilitate dramatic or incremental social change, or further entrench the status quo, depending on the social context. One important thing they all bring into view, in different ways, is the very idea of technological change as a political opportunity that heralds both positive and negative possibilities. This shifts our focus from the properties of emerging technologies themselves, to the discursive spaces of negotiation people create around them.

Throughout these frameworks, we see that the pace and direction of socio-technical change takes places in terms of ebbs and flows, through continuities and disjunctures in social and organizational arrangements (Boczkowski & Lievrouw, 2008). Of these theories, the most influential to my study of communication is technofeminism. This mutual-shaping perspective shows how gender and technology co-evolve in a seamless web of technical artifacts, social relations, and cultural meanings (Wajcman, 2004). The technofeminist approach emphasizes "that the gender–technology relationship is fluid and flexible, and that feminist politics and not technology per se is the key to gender equality" (Wajcman 2007).

The central research question of this study is:

- How do discourses about gender and technology enable or constrain women who work in blockchain?'

In order to answer this, I considered several related questions including:

- What are the most salient discourses about gender and technology currently shaping the blockchain space?'
- How do women working in blockchain navigate discourses that are in tension with one another?
- Whose voice is heard, in what social contexts?
- Whose knowledge counts?'

Each of these inquiries furthers our understanding of how blockchain shapes gender, and how gender shapes blockchain.

Before delving into this analysis, I devote the next chapter to explaining this study's methodology. To conduct this study, I followed an approach inspired by multi-sited ethnography (Marcus, 1995; Falzon, 2009; Hulme, 2017). This constructivist methodology supported my goal of tracing gendered social relations by following people, technologies, and narratives, both in-person and online. It provided a useful way to observe discourses and practices across blockchain's global 'space of flows' (Castells, 2000). I situate myself as an insider/outsider researcher conducting this interpretive study. I also detail my methods of recruitment, data collection, coding, and analysis, before addressing the limitations and challenges associated with these methodological choices and the overall study.

Chapter 3. Methodology: A Technofeminist Discourse Analysis

Introduction

This empirical study is based primarily on 30 semi-structured interviews with women who work in blockchain, located in Vancouver, Seattle, Toronto, Ottawa, New York, Washington DC, Berlin, and Dubai. I also conducted participant observation at 17 blockchain meetups and conferences in Vancouver, BC. As a researcher, I take a constructivist view on the nature of reality as socially constructed through ongoing interaction among individuals and groups. Methodologically, I followed an approach inspired by multi-sited ethnography (Marcus, 1995, 2011). This approach allowed me to observe connections between practices and discourses, through my own participant observations at events, and the interviewees' situated knowledges (Haraway, 1988). This combination of qualitative research methods "allows the researcher to understand the meanings everyday activities hold for people" (Marshall & Rossman, 2006, p. 102). This methodology complemented the theoretical foundations of my study, presented in the previous chapter, since multi-sited ethnographies are designed to connect and contrast the local and global spheres, and personal agency and social structure.

In the chapter below, I explain how I conducted this multi-method approach to analyze the gendered sociotechnical discourses in blockchain. Participant observations and interviews are both pragmatic, interpretive methods, grounded in lived experience. I also situate myself as the researcher conducting this interpretive study. I then outline my methods of recruitment, data collection, and coding using NVivo qualitative data analysis software (Saldana, 2015). I examined the emerging themes through a technofeminist discourse analysis (Gill, 2000; Wajcman, 2004). Finally, I address some of the limitations and challenges associated with these methodological choices and the overall study.

Methodological Overview

A qualitative communication study

If the goal of all scientific inquiry is to investigate questions about the evolution of phenomenon via observation, the goal of social science is "to discover new or different ways of understanding the changing nature of lived social realities" (Jackson, Drummond & Camara, 2007, p. 21). In doing so, social sciences contribute a systematic analysis of the values and interests that shape the political, economic, and cultural development of society. Qualitative social science focuses on communication-based data, including textual, discursive, and narrative analyses. This type of research takes the ontological stance that reality is subjective, and the epistemological stance that reality can be described in terms of meanings people attach to social objects and human experience (Denzin & Lincoln, 2005; Du Plooy, 2001). In contrast to quantitative studies focused on testing reproducible, generalizable theories in controlled environments, qualitative studies are designed to explore and understand the meanings people ascribe to human problems (Cresswell, 2009).

Qualitative communication research produces critical, analytical, in-depth insights that illuminate situated, reflexive social action (Deetz & Putnam, 2001; Lindlof & Taylor, 2017). Communication scholar James Carey describes it as "a process of making large claims from small matters," by studying particular rituals and conversations and "gingerly reaching out to the full relations within a culture" (1975, p. 190). Through this lens, what interviewees do (practices), and how they talk about those things (discourses) exposes the material/symbolic relationship at play in the early-stage development of blockchain (Boczkowski & Lievrouw, 2008). This approach produces important insights for this study, which elucidates gendered sociotechnical relations in an emerging tech space.

Feminist communication research aims to show how people infuse their actions with meaning, in ways that acknowledge women's activities, experiences and influence in a variety of social contexts including work (Brooks & Hesse-Biber, 2007; Buzzanell, 1994; Rakow & Wackwitz, 2004). Elisabeth Kelan (2009), scholar of gender and business, notes that despite many organizational efforts toward gender equity, the lack of tangible progress is often based on the struggle to recognize the gendered inequalities of everyday interactions and practices at work. In other words, it is widely

accepted that gender discrimination exists 'out there,' but gendered hierarchies within so-called gender-neutral workplaces are often left unexamined. This recalls 'the third-person effect in communication' (Davison, 1983) which shows how people exposed to persuasive communication are prone to view mediated messages as having a greater effect on others than themselves. The third-person effect phenomenon characterized many of the conversations I had with interviewees about sexism in the workplace. A techofeminist discourse analysis approach helped to identify precisely these discursive patterns. Interviewees were far more able to report challenges that had occurred for other women in the space than themselves, which offered a more accurate picture of the space at large. I sought out women's situated knowledges (Haraway, 1988), as minoritized stakeholders in blockchain, to understand how discourses in the space shape their experience and the technology. Their identities and experiences were diverse, yet their positionality as members of a highly underrepresented group offered them a unique vantage point in common, from which to comment on an emerging space as it takes shape.

Multi-sited ethnography

If research methods refer to how data is collected, methodology refers to the identification and use of the best approach for addressing a theoretical or practical problem (Kaplan, 1964). To conduct this study, I followed the general approach of multi-sited ethnography (Marcus, 1995; Falzon, 2009; Hulme, 2017). Marcus (1995) lists ideal topics to analyze through this methodology including the circulation of objects and techniques, and relationships among dispersed communities and networks in the global flow of capital and expertise. It served as a fitting strategy to trace discourses and practices across blockchain's global 'space of flows' (Castells, 2000), by following people, technologies, and narratives. It cross-cuts the deeply intertwined digital and place-based dynamics of the blockchain space. Multi-sited ethnography offers a language of movement and spaciality, which aligned with my goals of tracing a fragmented sociotechnical phenomenon in an interpretive way. In contrast to a traditional ethnography, where a sociologist or anthropologist enters and exits a clearly bounded single site for fieldwork, multi-sited ethnography is designed to acknowledge dichotomies from the local to the global, and from lived experience to social structures. When the "thing traced is within the realm of discourses and modes of thought, then the circulation

of signs, symbols, and metaphors guides the design" of the research (Marcus 1995, p. 108). This approach allowed me to understand the gendered discourses in tension within blockchain, which guided the next steps of my research design as I transferred them onto the discursive framework outlined in the following chapter.

Multi-sited ethnographies are well-suited to trace the social shaping of technologies, through pre-planned or opportunistic movement within different settings around a complex cultural phenomenon (Marcus, 1995). Studies often begin with an initial baseline concept that turns out to be contingent and malleable as one traces it. Prominent STS scholars including Latour (1987, 1993) and Haraway (1991) have used this mode of inquiry to construct their objects of study, tracing social correlations and associations in language, print, or visual media. Haraway's (1991) cyborg in particular has been influential in stimulating researchers to think more progressively about the juxtaposed sites that constitute their objects of study. The value of this approach became increasingly visible and important throughout the data collection phase. I started out conducting interviews in-person in Vancouver and planned to complete my data collection this way. But I started to realize that even within Vancouver, the nature of blockchain was multi-sited and global. Interviewees suggested I spoke to certain people located in other cities. And even among my Vancouver-based interviewees, some had come to their current blockchain roles from the United States, India, China, and Israel. I decided to pursue these diverging currents in blockchain's 'space of flows' (Castells, 2001). This led to interviewing participants located in Seattle, Toronto, Ottawa, Montreal, New York, Washington DC, Germany, and Dubai, via video chat on Zoom. If I had kept my study exclusively Vancouver-based, I would have missed out on many of the insightful interviews and vantage points that make this study so rich.

Gender as analytic category for observation

In designing this study, I followed the theoretical perspectives of sociologist Judy Wajcman (2004), best known for her analysis of the gendered nature of technology, and Donna Haraway (1988) whose 'situated knowledges' explicitly avoids essentialist ideas of a universal women's perspective. Both scholars critique mainstream, or 'malestream,' social science for treating gender and race as static categories, deployed in functionalist ways. Any analytical framework that treats gender as an isolated or universal factor is flawed, and masks white heteronormative privilege. In contrast, Wajcman and Haraway

conceive of gender as fluid, dynamic, and relational. Through this lens, feminist sensibilities are political and social mindsets available to people of any gender. Social identities are created in relation with technologies, as “racial formation, gender-in-the-making, the forging of class, and the discursive production of sexuality through the constitutive practices of technoscience production themselves” (Haraway, 1997, p. 35). Where a postfeminist perspective would critique the very idea of studying gender in tech work, Wajcman notes that “indeed, the enormous variability in gendering by place, nationality, class, race, ethnicity, sexuality, and generation makes a nuanced exploration of the similarities and differences between and across women’s and men’s experience of technoscience all the more necessary” (2004, p. 8). In this way, technofeminism conceptualizes gender as an umbrella covering diverse but connected subjectivities. Likewise, this study brings into focus the varied contours of gendered sociotechnical relations in blockchain from an array of women’s experiences, as opposed to uncovering a central phenomenon of experience from the interviewees.

Scholars have argued for the use of a sophisticated understanding of gender as a productive analytic category. As outlined in the previous chapter, contemporary scholars view gender as contextually defined, socially performed in relation to everyday life practices, and repeatedly reconstructed, whether through ethnomethodological (West & Zimmerman, 1987) or discursive approaches (Butler, 1990, 1993, 2004). Scott notes that gender is a key constitutive element of social relationships, and “a primary way of signifying relationships of power” (1986, p. 1067). Analyzing gendered experience provides a way of decoding meaning and understanding complex connections across discursive patterns. Harding (1986) argues that critical investigation of gender symbolism, gender structure, and individual gender, works to dispel essentialized identities, opening space for solidarities across race, class, age, ethnicity, and sexual orientation. Following Harding, I think of gender as one analytic lens through which the interviewees think about and organize their lives and work, as opposed to a natural difference or social variable assigned to them based on culture.

In this study, I deliberately chose to centre the experiences of women in blockchain, without the need to compare, contrast, or legitimize them by interviewing men as well. Since “the marginalization of women is accomplished through text, talk and social practices, it is necessary for discursive work to continue to be at the forefront” of communication research, in order to amplify women’s experiences, expose problematic

practices, and envision progressive paths forward (Nartey, 2020, p. 1). With that said, investigations of gender at work are not women's issues. Contemporary, evolving conceptions of masculinities, though not the primary focus of this study, are just as important to this conversation. This study takes a non-binary approach to gender, highlighting women's positive experiences of working with men as allies who promote gender-inclusive attitudes and practices in blockchain. Heightened awareness of the need for equity, diversion and inclusion in work contexts has sparked public discussion about gender itself. It is encouraging to see efforts designed to humanize people of all genders in the workplace, through initiatives like Vancouver's "We for She" conference, advocacy groups like "Next Gen Men," and emerging research on healthy masculinities (Chu, 2014; O'Neil, 2015). Hashtag-signified movements like #HeForShe and #MenAsAllies are just as significant as #MeToo and #TimesUp in moving the dial for gender equality. In my data analysis, I coded for stories of men as allies, some of which are reflected in chapters five and six. In this study, decentralized, gendered power is explored as a force that benefits not only women but everyone. People of all genders can proliferate it and benefit in the process.

My study follows in the footsteps of recent studies that focus on women's practices and discourses in relation to technologies. To name just a few, Heather Ford and Judy Wajcman (2018) examine the gendering of Wikipedia in "'Anyone can edit', not everyone does: Wikipedia's infrastructure and the gender gap." They show how Wikipedia's open infrastructure counterintuitively introduces new and less visible sources of gender disparity, which this study does as well. Sarah Banet-Weiser's (2018) *Empowered: Popular Feminism and Popular Misogyny* investigates how popular feminism and popular misogyny backlash are co-constituted across advertising and digital platforms. Like I do in this study, Banet-Weiser shows that 'empowering' feminist initiatives such as Black Girls Code do not exist in a gender-neutral environment. They are often met with backlash, harassment, or neglect, as seen in GamerGate and other instantiations of toxic geek masculinity. And Christina Dunbar-Hester's (2020) *Hacking Diversity: The Politics of Inclusion in Open Technology Cultures* explores efforts to improve gender diversity in software and hackerspace communities. Similar to this study, she examines the underlying assumptions associated with STEM-oriented communities to show how tech enthusiasts 'hack' their cultures to ameliorate some of the social 'bugs.' She concludes that these methods typically fall short of transforming

socio-economic systems. These studies have provided useful frameworks for thinking about the mutual shaping of gender and technology, as I hope this study might for other scholars.

Conducting the study

Situating myself as researcher

All researchers interpret and translate their data from a certain positionality. Researchers of interpretive qualitative studies, in particular, take a highly active role in making sense of data. This highlights the researcher's role as co-producer of meaning with participants (Johnson & Rowlands, 2012). Reflexivity involves paying attention to the context of knowledge construction, and the role of the researcher, at each step of the research process. A researcher's background and position "will affect what they choose to investigate, the angle of investigation, the methods judged most adequate for this purpose, the findings considered most appropriate, and the framing and communication of conclusions" (Malterud, 2001, p. 483-484). It is therefore important to address my own background and positionality in relation to this project (Saldana, 2015).

In terms of personal subjectivities, I am a straight, white, cisgender woman. I'm married, and a mother to two young girls. In terms of educational and vocational background, I am a communication scholar who favours a technofeminist lens for understanding the construction of gender and technology. Between my degrees in communication, I have worked as a corporate communications writer, magazine editor, and project manager at a digital agency, coordinating web-based projects involving technical staff, graphic designers and clients. So I could relate to some of my interviewees' experiences in industry. In terms of research vantage points, the lived experience of an 'insider' can help researchers develop more appropriate interview questions and help them see complex meanings in the data (Rubin & Rubin, 2005). In contrast, an 'outsider' researcher is more prone to notice things that may be familiar or unremarkable to an insider with fresh eyes, offering the chance to make explicit forms of taken for granted knowledge. Regardless, researchers typically have characteristics that set them apart from those they research.

Within multi-sited ethnographies, the researcher takes the stance of a reflexive "circumstantial activist" as they trace a "cultural formation across and within multiple sites of activity" (Marcus, 1995, pp. 95-96). That role resonates with my experience of data collection, and even up to the present in some regards. At times I felt like an honourary member of the 'women in blockchain' community, especially through attending a monthly drinks night meetup. Other times, I felt like a supportive outsider helping to build the insider network, by introducing participants to one another whenever relevant opportunities arose or when a participant contacted me with a request. For instance, I noticed on LinkedIn that one of the participants had taken a new job with a food-related blockchain company. I had interviewed someone in that sector, so I asked each of them if they would like an introduction to one another. Several participants have contacted me with job opportunities they were hiring for and asked me to circulate it to my network of interviewees. This is a small but useful role I was able to play in giving back to the community, since it remains relatively fragmented in its early stage of development. As one of the participants added at the end of our interview, "maybe you'll be the glue to bring us all together."

Participant observation

In participant observation, the researcher herself is an instrument of data collection, as both a participant and an observer in a natural setting pertaining to the study (Babbie & Benaquisto, 2009; Marshall & Rossman, 2006). After receiving approval to conduct this research from the university's Research Ethics Board, my first step of data collection was to conduct participant observations at various blockchain meetups and conferences in Vancouver. I did this from March 2018 to July 2019, before and during interviewing. The act of hanging around place-based gatherings to do with a research topic offers a chance to get to know the unwritten rules and backstage culture of the space. It dovetails with the emergent, negotiated nature of qualitative research (Anderson, 1997). Participant observation involves three phases: listening and watching in careful attention, interpreting the significance of these sights and sounds for those present, and developing an extended record of what happened (Kawulich, 2005). My participation level as a researcher ranged from "one-time visitor" to "semi-regular member." I bumped into interviewees at various events and entered the flow of the local blockchain scene as I was added to email listservs. Through these events, I made

observations about the multiple framings of blockchain, discourses around gender and technology, demographics in attendance, communication dynamics among the attendees, and types of questions raised. These insights provided a useful foundation for developing my interview protocol. I included key topics and questions from these events for more in-depth discussion during my interviews, including a set of questions about the role and value of meetups and conferences.

Participation observations at blockchain events were important to this study, because gender is defined through relationships between women and men, among women, and among men in social groups. Gender is not a rigid "analytic category imposed on human experience, but a fluid one whose meaning emerges in specific social contexts as it is created and recreated through human actions" (Gerson & Peiss, 1985, p. 317). The social shaping of technology happens in part through conversation, debate, and discussion in the public sphere, as exemplified by meetups. Vancouver is home to a burgeoning blockchain community including companies like Etherparty which specializes in smart contracts, Vanbex, a blockchain consulting firm, and Dapper Labs, the studio that created the first blockchain-based game, Cryptokitties. Meetups and conferences go hand in hand with this blockchain 'scene.' Blockchain meetups attract people with different levels of technological experience, backgrounds, and motivations. There are gathering designed for entrepreneurs, tech workers, decentralized tech advocates, and newcomers who are curious about cryptocurrency or potential work in the space. I identified a variety of public blockchain events happening in Vancouver through social media, Meetup.com, and Eventbrite.com. Some of the events I attended were aimed at women audiences, and others had no particular gender focus (and were generally male-dominated). On a discursive level, meetups present an ideal site of observation for both the development and the gendering of blockchain. Blockchain meetups where 'anyone is welcome' tend to be male-dominated. In other cases, the gendering of meetups is clear. For example, at the outset of this project, a simple web-based search for local blockchain meetups yielded a list of gatherings, including "Bitcoin Gentlemen's Club" and "Crypto Witch Futurist Brunch." In overt and subtle ways, individuals are hailed toward or repelled away from participating in certain tech spaces.

The relationship between participant observation and interviewing methods has been central to qualitative methodologies for the past fifty years (Holstein & Gubrium, 2003). One of the historical claims that has been made for this combination is

triangulation, or the idea that researchers may draw on these methods' strengths while offsetting their weaknesses (Denzin, 2009). Contemporary social science, however, has deemed it unnecessary to separate and juxtapose talk and events as if they constitute different types of meaning. Social life is simultaneously performed and narrated in all of these scenarios (Holstein & Gubrium, 2003). With that said, participant observation is limited to the researcher's perspective, while interviews afford the chance to gain a deeper understanding of the meaning of these scenarios from women's situated knowledges, as part of their overall experience in blockchain space. The social shaping of technology happens in part through conversation, debate, and discussion in the public sphere, as exemplified through meetups and conferences. My findings on this topic are the focus of chapter five.

Recruitment

One of the main challenges of interviewing is gaining access and trust among the participants one wishes to study (Anderson, 1987). I used a series of recruitment methods in order to identify and interview 30 participants who represent a stratified sample for this study. These included phases of self-selection sampling, snowball sampling, and purposive sampling (Sharma, 2017). These choices were guided by several factors including ethics requirements, the technofeminist framing of the study, and the challenge of identifying often-hidden candidates in an emerging field. Gray advises to select a sample that allows for a subject to be viewed from all relevant perspectives, and to "keep increasing the sample size, or sub-samples that represent different perspectives, until no new viewpoints are emerging from the data" (2014, p. 389).

In the first phase, attending blockchain events proved to be an ideal location to invite self-selecting candidates to approach me freely. This was one of the benefits of conducting participant observation. For instance, I attended a blockchain panel at a 'women in tech' conference. During the discussion time at the end, I raised my hand and introduced myself as a researcher interviewing women who worked in blockchain. As the session concluded, a handful of women approached me to volunteer for the study. One of them, my first interviewee, also invited me to a private monthly drinks night she had started for local women who work in blockchain. In another case, I attended a cryptocurrency mining conference. There may have been five or six women in a hotel

ballroom with about 100 attendees. I met one of the other women in attendance in the restroom. We each mentioned our lines of work and interests in attending the conference, and she volunteered to be interviewed. These initial interviewees were helpful in recommending others for my study, in a snowball sampling fashion. This led to many outstanding recommendations of participants I would not have been able to identify otherwise. For example, many of their LinkedIn profiles do not mention blockchain, only their role and company name. Professional groups and organizations for women in blockchain have proliferated in popularity since the start of this study, but I was not aware of any at the time of recruitment.

Rowley (2012) suggests best practices for ensuring external validity in interviewing can be achieved by conducting 12 interviews of 30 minutes in length and adding a second round of interviews for a more extended study. For this study, I interviewed 30 participants, with conversations ranging from 40 minutes to nearly two hours, averaging around an hour. Arksey & Knight (1999) offer practical principles for making the case for being able to generalize from interview findings: selecting a sample that allows the subject to be viewed from multiple relevant perspectives and increasing the sample size until no new viewpoints emerge from the data. I wanted to speak with a diverse group of participants in terms of age, race, sexuality, professional role, vocational background, and level of caring responsibilities outside of work. So the process eventually shifted from snowball sampling to purposive sampling. Many of the recommendations I received were, unsurprisingly, for white women in business or communication roles, with no children. Race, class, the role of parenthood, and various other social factors affect women's work lives (Wajcman, 2004). Therefore I began amending my recruitment efforts with more specific requests for women in technical roles, women who were parents, and women of colour.

In this final stage of purposive sampling, the interviewees were helpful again. One of them advertised the opportunity to be interviewed through her women in blockchain WhatsApp chat group. As willing candidates replied, she connected us via email. In some cases, this style of recruitment worked out well and I ended up interviewing the person. In others, there was miscommunication or confusion, since I could not control how the request was communicated. For instance, I was connected online to a cryptographer who was a mother and a woman of colour based in the US, who was willing to speak with me. We had a positive exchange, and I sent her more

information about the study including the consent form. When she realized it was not just an informal chat on the phone but a recorded interview, she opted not to participate. I was interested to speak with her, but I also respected the fact that there are many valid reasons people might not want to participate in a formal study.

I gave each participant an information and consent form to sign, which stated that their identities would be kept confidential, so that they would feel safe to share any sentiments that arose. In keeping with the ethics approval, I assigned the participants pseudonyms to represent their quotes (Saunders et. al., 2015). I gave each of them an information sheet outlining a plain-language explanation of the study and their rights as participants. This included the option to skip any questions they were uncomfortable with, ask questions, or withdraw participation at any time. This promoted their agency and comfort level during the interview. For instance, in one instance while discussing micro-aggressions in the workplace, an interviewee said about her boss, “Some of the stuff he’s said is so bad, I won’t even repeat it.” This statement was telling enough on its own, and she shared whatever she was comfortable with, so we simply moved on to the next question. I tried to keep these principles in mind to mitigate social desirability bias, where informants may feel pressure to withhold or embellish details to influence a favourable perception with the interviewer (Fielding, 1994).

Interviews

I conducted 30 semi-structured interviews between February and July 2019. Interviews are well-suited for exploratory research. Participants can express and process their thoughts, however complicated or contradictory, more freely than they would in a survey, for instance. Each of us approaches the life world with a stock of knowledge composed of ‘common sense’ constructs and categories that are social in nature, and language is the central medium for conveying the meanings we make of them (Holstein & Gubrium, 1994, p. 263). In interviewing, my aim was not to reveal causal explanations of behavior. Rather I paid close attention to the various sociotechnical discourses in tension, as the participants recognized, described, and accounted for their everyday experiences and practices in their work in blockchain. As Silverman explains, “interview data display cultural realities which are neither biased nor accurate, but simply ‘real’” (1985, p.157). In this sense, interviews do not simply represent an individual’s opinion of social reality. Rather this sense of realism implies that interview data itself re-articulates

and reproduces cultural particulars of social norms. As Nietzsche put it, “the problems of politics, of social organization, and of education have been falsified through and through… because one learned to despise ‘little’ things, which means the basic concerns of life” (1969, p. 256). In this sense, the details from a large collection of source material represent a powerful tool for understanding social processes and possibly solve social problems.

I began by interviewing in-person in Vancouver. I offered to meet participants anywhere convenient to them and relatively quiet to record the conversation with a digital audio recorder for transcription. Interviews typically took place at the participant’s office, or a study room at the SFU campus located in downtown Vancouver if they preferred. Interviewing in-person was useful for building rapport with interviewees. In some cases, I invited interviewees along to the monthly women in blockchain drinks event I began attending, so I would schedule the interview just before the meetup, and then we would walk over to the restaurant where it took place. In-person interviews were also useful for refining my interview protocol. I amended the wording of a couple of questions participants asked me to repeat. As mentioned above, part-way through the interview data collection, I broadened the scope of recruitment to include participants in other locations, including Seattle, Toronto, Ottawa, New York, Washington DC, Berlin, and Dubai via video-chat on Zoom. These discussions reflected perspectives that contextualized the blockchain space in differently sized cities and cultures. Blockchain’s space of flows (Castells, 2001) is global, but gendered cultural contexts are local. This multi-sited approach introduced both nuance and limitations, which I discuss in more detail below. In total, I interviewed 16 participants in person and 14 via video chat (see Appendix A).

Interviews are not neutral. They take place in fields of power between interviewer, interviewee, and society (Fontana & Frey, 2005). Therefore the discursive co-production of the interview itself can be viewed as a political act. This is especially true of feminist research, where the personal is political. A successful research-based interview is not a tool for extracting information from a participant, but a social experience with moments of interaction between ideas, emotions, and cultural frames (Wuthnow, 2011). In this sense, politically engaged researchers frame an interview as a moment to advocate for the interests of the group, like a traveler who joins the interview subject on part of a journey (Kvale, 2007). This resonated for me in many moments

throughout the interview process. The interactions felt mutually meaningful. At the end of several interviews, when the 'interviewee' and 'interviewer' hats came off, participants would ask, "So tell me more about why you're doing this study? I'd really like to see the results." This signaled the meaningfulness of both the research topic, as well as the interview process itself. It showed that there are important real-world needs to be addressed for the interviewees through this type of research, in addition to the scholarly contributions it makes to the literature.

Validity and reliability are important factors in designing and conducting credible interviews. Validity means that the research instrument measures what it is intended to measure, and reliability means it does so consistently (Gray, 2014). These standards are commonly associated with quantitative research since they frame research more deductively than inductively. However, qualitative research design can benefit from its own versions of these standards. For instance, in the case of my interviews, validity was demonstrated through well-designed questions, arranged in a logical sequence, and conducted in a similar style each time. Validity was also strengthened by building rapport and trust so that informants could express themselves freely, prompting for more detail on initial responses when appropriate, allowing sufficient time for topics to be explored, and designing protocols with concepts and questions from the literature (Arksey & Knight, 1999). I used concepts and phrasing from Wajcman's (2004) technofeminism and from recent talks at Stanford's Clayman Institute for Gender Research, which I viewed online, to shape the interview protocol. For instance, I was familiar with the concept of micro-aggressions, but I learned about the concept of micro-inclusions through one of the Stanford talks. I asked the participants questions about both, starting with a definition of each, which I detail further in Chapter 6. This yielded not only interesting responses, but significant discursive patterns that showed how gender works in professional spaces. I asked participants a series of questions about their personal and work backgrounds, how they came to work in blockchain, their thoughts on the technology itself, their experiences at work in the blockchain space with prompts on micro-aggressions and micro-inclusions, and their reflections on meetups and conferences.

Reliability sets the standard for consistency and bias reduction. I aimed to do this through reading the questions exactly as they are written in sequence, posing follow-up probes in a non-directive manner, and accepting a respondent's refusal to answer a

question without irritation (Oppenheim, 2000). For example, one interviewee replied that she could give not give her opinions on any cryptocurrencies as it would be a conflict of interest with her work for a crypto exchange. The challenge of semi-structured interviewing is to constantly hold flexibility and consistency in balance. It is just as important to facilitate a conversation that flows naturally, as it is to maintain the same structure across all interviews in order to develop a reliable dataset. Prus (1994) notes that interviewing requires sympathetic engagement and yet calculated distance. A "helpful" interviewer who tries to assist or summarize can compromise a participant's account. This is something we naturally tend to do as a courtesy in casual conversation. So it took a conscious effort to curb that tendency, which I still caught myself doing at times, while transcribing and coding the interviews. This uniformly structured data set became especially useful during the coding and analysis phase, to identify emerging themes and sentiments across 30 interviews.

A final aspect of credible interviewing and data analysis involves member-checking as a feedback mechanism. This draws on the reflexive approach of a "hermeneutic fusion of horizons" between researcher and participants (Flyberg, 2001, p. 132). In practical terms, this means getting close enough to some respondents, sharing some of the findings and analysis with them, and allowing them to test and evaluate the research. This aspect of data collection and analysis is a key aspect of learning for both the researcher and the participants. In the case of this study, I have kept in touch with several participants with whom I made especially good connections. Through follow-up calls, emails or texts, we discuss my research in-progress, as well as their work and any relevant blockchain news semi-regularly. I have also discussed my findings with fellow blockchain scholars and practitioners beyond the data collection phase to hear their questions and feedback on my findings.

The data I collected was incredibly rich, and I am so grateful for my interviewees' time and thoughtful contribution to this study (see Appendix A). As for a brief introduction to the participants, I spoke to 30 women ranging in age from 25 to 56 (see Figure 2)

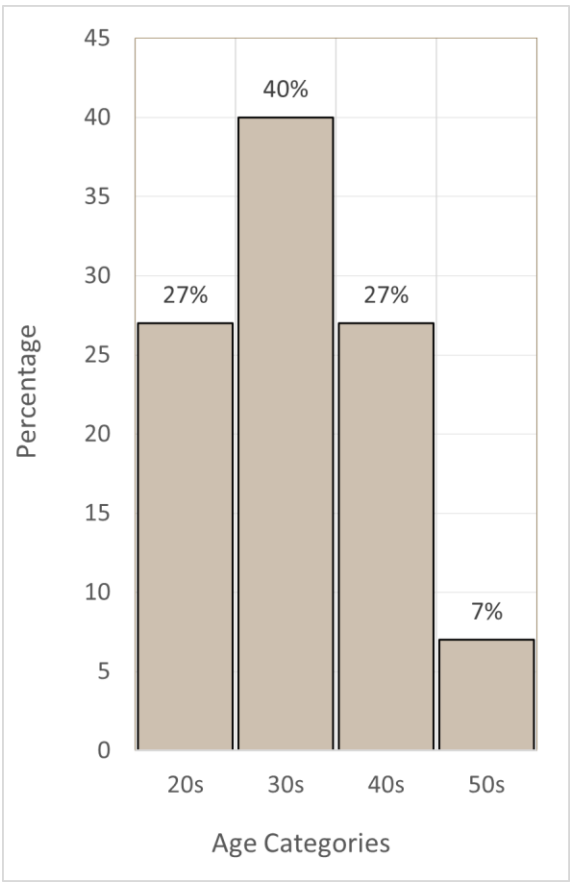

Figure 2. Age of Interviewees

I categorized the different types of blockchain stakeholders I interviewed based on the main focus of their work related to blockchain. They represented expertise in business and sales, communications, technical roles, advocacy, research, and law, governance, and security (see Figure 3). Of the four working in blockchain advocacy for women and youth, three of them also held other paid positions in business, finance, and government, in addition to the long hours they put into their non-profit work (one spent 40 hours a week on each). Some interviewees founded or worked for blockchain-focused companies specializing in cryptocurrency and crypto mining, gaming and app development, real estate, marketing, event planning, and food provenance. Others worked for universities, non-profits, consultancies, and professional services firms in roles directly focused on blockchain.

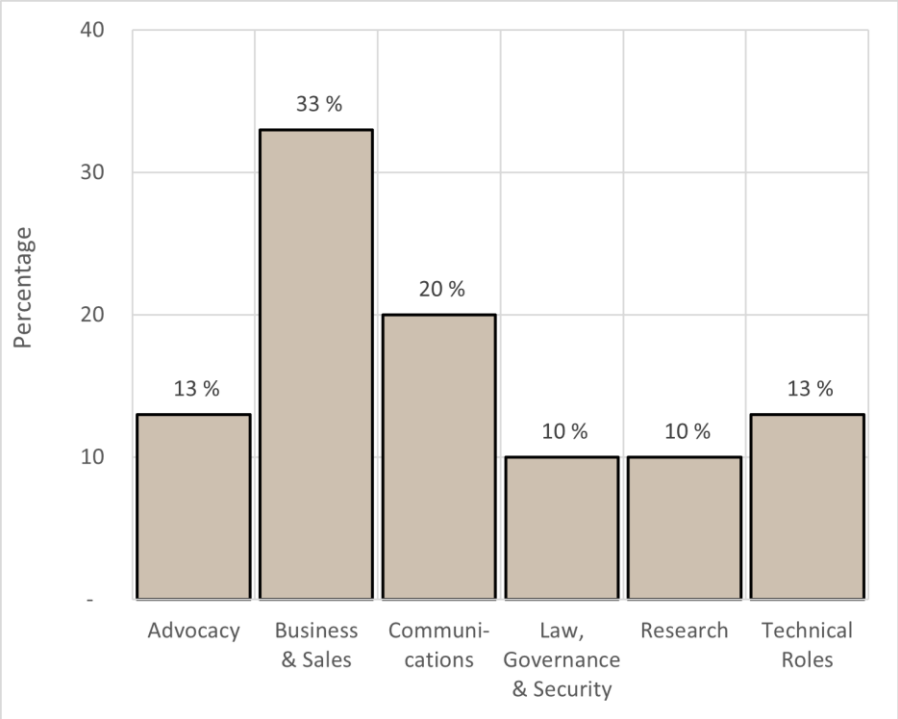

Figure 3. Professional Role of Interviewees

Finally, the participants came to blockchain with a range of educational qualifications, ranging from self-taught coding skills following a high school education, through to PhDs in materials engineering and public health (see Figure 4). As I reviewed this aspect of the participants' profiles once I was done interviewing, I found that, on average, that this was quite a highly educated group of early adopters. Yet it should also be stated that each of the interviewees were middle class. None of these early adopters were crypto-rich or wealthy, as per our conversations about compensation.

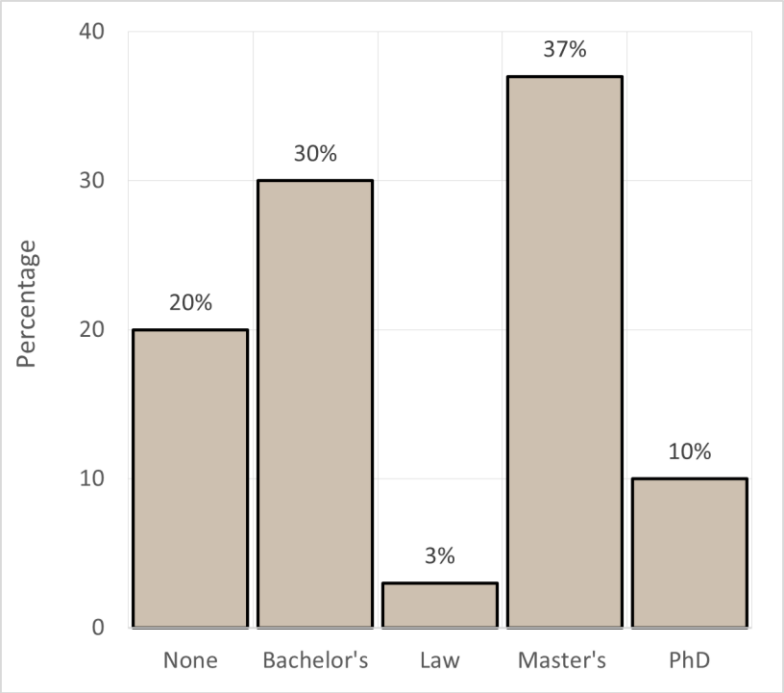

Figure 4. Educational Background of Interviewees

Coding and data analysis

Discourse is important data to be analyzed in its own right (Wetherell, Taylor & Yates, 2001). I conducted a technofeminist discourse analysis to make sense of the data (Gill, 2000, 2018; Wajcman, 2004). These lenses capture both the theoretical and methodological stance of this study. I took a technofeminist approach, which involves explicit attention to situated practices and lived experience, as opposed to focusing on gendered identity or social structure alone (Wajcman, 2004). Feminist scholars have explored new approaches to the sub-field of discourse analysis, including 'feminist stylistics' (Mills, 1995), 'feminist pragmatics' (Christie, 2000), 'feminist conversation analysis' (Kitzinger, 2000), and 'feminist critical discourse analysis' (Lazar, 2007). In this study I follow feminist scholar Rosalind Gill's approach to discourse analysis, which she developed as an instrument for media and communication research. She combines aspects of several traditions of discourse analysis, including social semiotics, critical discourse analysis, ethnomethodology, and poststructuralism (Gill, 2018). Discourse analysis highlights the central role of language as a social practice that not only reflects but constructs social reality (Schultze & Orlikowski, 2001). Put another way, discourse analysis recognizes that people use words to do things, and these words construct

worlds (Gill, 2018). A technofeminist discourse analysis examines how people are both 'doing' and 'undoing' gender in the context of tech work, as they toggle discursive frames along a spectrum of ideologies relating to both (Butler, 2004; Kelan, 2010; Wajcman, 2004).

The first step of my data analysis was to transcribe the interviews accurately and completely. I transcribed each of the 30 interviews myself, which was a painstaking but valuable process in my data analysis. The interviews averaged around one hour in length. An hour-long interview typically took four to five hours to transcribe accurately. Kvale (2007) notes that transcribing one's own interviews can recreate some of the social and emotional parts of the interview and jumpstart the process of meaning-making. While transcribing and reviewing each interview, I was able to engage in the narratives with full presence and attention to detail. During the actual interviews, I was mentally multi-tasking by watching the time, preparing the next question, and trying to keep my responses brief and neutral. In contrast, while transcribing, I found myself laughing at funny moments, or even shedding a tear over a traumatic story or inspirational sentiment. I felt another wave of gratitude for each of the interviewees and their willingness to share as I transcribed their stories.

I coded the data using NVivo software, which was useful for organizing, retrieving, and linking the data in an efficient manner. A 'code' is a researcher-generator construct, usually a word or short phrase, that symbolically assigns a salient, summative, or evocative attribute to a portion of language-based or visual data (Saldana, 2015). Data are representations and interpretations of culture (Chow-White & García-Sancho, 2012; Kitchin, 2014). Coding methods from grounded theory in the 1960s have generally prevailed, even within qualitative data analysis (QDA) platforms. To update these methods, Deterding and Waters (2018) outline best practices for flexible, rigorous, transparent coding using QDA platforms like NVivo. Instead of starting with laborious line-by-line coding, they recommend linking attributes to documents (i.e., personal characteristics of interviewees attached to transcripts), followed by applying index codes to larger chunks of text, and then analytic codes one research question at a time (Deterding & Waters, 2018). Following this recommendation, my coding protocol closely mirrored my interview protocol. In NVivo, I deductively created 'nodes' guided by my interview protocol, and then inductively coded the 30 answers to each question, categorizing the answers as commonalities emerged. The first few nodes captured

simple descriptive data such as “age” or “job title.” The subsequent nodes, related to longer-format answers, involved various sub-nodes that emerged from the data, reflecting different groupings of responses. The code labels were developed through a combination of my own observations, the participants’ words verbatim, and the guiding theory’s constructs.

I coded for emerging discursive themes to understand how the interviewees felt, behaved, and positioned themselves in the blockchain space. Thematic analysis refers to codifying patterns found in information, at observable or underlying levels, that describe, organize, or interpret the phenomenon at hand (Boyatzis, 1998). To give an example of how I might code a response, one of the questions I asked interviewees about their work was, “what are you most proud of?” One response was, “I can’t really take full credit for this, because I work with a great team, but I was really proud when our company went public on the London Stock Exchange.” In this case, I coded both the thematic content of achievement, as well as the discursive pattern of hedging, as sub-nodes. As I coded the 30 responses to each question, I came up with various sub-nodes representing the different types of responses. In my second round of coding, I linked, collapsed, and combined sub-nodes to better see the contours of the discourses at play. This type of ‘axial coding’ is a way to construct data linkages to identify central phenomenon in the data (Saldana, 2015). Along with continued data-gathering and analysis, it is designed to ensure saturation has been achieved. Saturation refers to the data analysis stage “when no new information seems to emerge during coding, that is, when no new properties, dimensions, conditions, actions/interactions, or consequences are seen in the data” (Strauss & Corbin, 1998, p. 136). Once I had analyzed my coding, I realized the participants were speaking about the space through at least three different discursive lenses. And in keeping with the paradoxical nature of discourse, they were toggling between these frames to convey different aspects of their experience. I re-imagined Hall’s (1980) encoding/decoding model of communication to show how this operates in the space, which is the focus of the next chapter.

Challenges & Limitations

Multi-sited ethnography, through participant observation and interviews, proved to be the most useful approach for conducting this study. But every methodology comes with its own set of challenges and limitations. In practical terms of methodological

challenges, this exploratory approach requires time, flexibility, and social skills to step into unfamiliar territory with a curious mindset. It was stressful and exhausting at times, to assess the terrain and decide on next steps and directions during data collection. Multi-sited ethnography is inherently made up of overlapping, interconnected sites of analysis, both digital and place-based in this case. In addition, interviews can be incredibly time-consuming, difficult to access, and can produce idiosyncratic data (Babbie & Benaquisto, 2009). I struggled with each of these aspects at times. I remained politely persistent in my attempts to coordinate interviews with several busy people. During video-chat interviews, I dealt with various technical glitches and scheduling issues across time zones. Once complete, the interviews and observations produced an overwhelming amount of data - more than I could ever analyze in a single project. The transcripts averaged around 25 single-spaced pages each, and up to 59 pages for the longest conversation. The process of identifying and developing the key findings was a messy, non-linear process involving multiple rounds of axial coding.

In terms of critiques, traditional ethnographers have argued that the movement and multiplication of data collection sites associated with multi-sited ethnography creates less boundedness and thus less intensity (Marcus, 2011). Indeed, this approach disrupts classic ethnography's prized trope of 'being there' in a singular location of fieldwork. It adapts the individualistic view into more of a collaborative exercise. Fischer (2007) refers to this as the forging of third spaces, or reflexive domains within scenes of social action in which global assemblages and ways of living are considered. This provided a suitable way to look at discourses in blockchain. Another criticism of the methodology is that it produces anecdotal or subjective findings. This positivist critique typically comes from those who expect research to test or generate theory, based on generalizable, replicable data. As noted above, qualitative research is a rich, scientific method of exploring and understanding human behaviour. In comparison, it is far less common to critique large-scale quantitative studies for neglecting nuance, which reflects a knowledge hierarchy of value in academia. Empirical, qualitative studies like this one are not designed to develop generalizable data, but *transferable* insights that might help to illuminate various sites of investigation for fellow scholars. For example, the discursive framework outlined in the following chapter may be applied or adapted to analyze a particular aspect of sociotechnical relations in a different workspace, inside or even outside of technology.

One limitation related to my dataset is that although I aimed to recruit a diverse pool of interviewees in terms of age, race, and professional role, my participant population was mostly white. In terms of racial diversity, eight of the 30 interviewees were visible minorities. In terms of cultural diversity, five white interviewees were Canadian immigrants, or living in Canada on work visas, from Israel, Poland, Russia, Columbia, and the Czech Republic. In addition, only four of the participants worked in technical roles. Among the interviews, I found one of the biggest contrasts to be that participants in technical roles experienced more hostility and discrimination while doing their jobs, compared to many of the other participants. Ideally, I would have interviewed more women in technical roles in order to make better comparisons between these sub-groups. With that said, each of these limitations to do with my population were reflective of the space overall. For instance, several participants who have worked in various tech spaces, noted that while more women are entering blockchain, they are typically in business, communications, legal, or administrative roles, while the small ratio of women in technical roles remains around the same.

Related to this, another limitation is that study represents primarily Western perspectives. Gendered sociotechnical relations can differ greatly across cultural and geographical contexts. Blockchain is a global phenomenon with diverse social contexts shaping its use and applications from the West to the Global South. Several Vancouver-based interviewees originally from India, China, and Eastern Europe, contrasted discursive frames to do with gender and technology across cultural contexts. I coded for these interesting comparisons as they arose, but it was not the main focus of this project. However, research on blockchain's significance in the global south is vital and growing (Thomason et. al., 2018). As one example of this important scholarship, my lab colleague Betty Ackah is currently completing her dissertation research on gender and blockchain in Ghana. Our interview protocols have many similarities, and we plan to compare and contrast our findings in order to collaborate on future publications.

Conclusion

In this chapter, I have described how multi-sited ethnography (Marcus, 1995), involving participation observations and semi-structured interviews, informed my research process. This approach complemented the way I think as a researcher. I felt a commitment and connection to those who participated, and I valued the co-production of

knowledge in the data collection phase of this project. I enjoy researching collaboratively, and this was the most collaborative phase of an otherwise solitary project. This methodological approach also complemented the theoretical foundations of the study. I drew elements of these foundations into the data analysis as well, by applying a technofeminist discourse analysis (Gill, 2018; Wajcman, 2004). This analysis produced the insights presented in the next few chapters.

Chapter 4 presents an analytical framework that I fashioned after Hall's (1980) encoding/decoding model of communication. I used this to tease out the different lenses to do with gender and technology in blockchain. Hall's model underscores meaning-making as a discursive process based on a set of codes in communication. But in the present context where networked individualism (Castells, 2010) structures everyday life, women in blockchain are doing something more complex than simply decoding mediated messages about blockchain as agentic audience members. They encode and decode different discourses, as advocates, analysists, and applicators of the technology. Beyond this, they strategically toggle discursive lenses based on social context. The following chapter describes this framework and process. Chapters 5 and 6 demonstrate how the framework can be applied to analyze formal and informal workspaces in blockchain.

Chapter 4. Discourses in Tension: Toggling Frames in Blockchain

Introduction

As an emerging technology, blockchain's definition, development, and diffusion remain in flux (Frizzo-Barker et. al., 2019). Social shaping scholars have highlighted the role of human agency in the meaning-making process of new technologies (Pinch & Bijker, 1987; MacKenzie & Wajcman, 1999). At the same time, this approach acknowledges the co-construction process of how technologies influence human behaviour and identity. For instance, technologies are "resources that provide people with opportunities to cultivate their agency as tools that allow them to act" (Lievrouw & Livingstone, 2006, p. 8). As technofeminist scholar Judy Wajcman puts it, "to be in command of the very latest technology signifies a greater involvement in, if not power over, the future" (2004, p. 12). At the heart of this technological development process is the relationship between discourse and materiality. In the social architecture of blockchain, a variety of discourses to do with gender and technology frame the rules, goals, and purpose of the technology, as well as who holds the power to influence these things. These discourses overlap and bump up against one another more visibly as new technologies progress through the early stages of emergence and contestation, before reaching stabilization as part of the technological infrastructure of everyday life (Star, 1999). These moments of instability open a space for negotiating the meaning of technology and gender in everyday life. By comparing and contrasting discursive frames, this study explores blockchain as a sandbox where the material implications of gender and technology are worked out in various contexts of tech work.

Blockchain's defining feature of 'decentralization' is not only a technical term, but "a rhetorical strategy that directs attention toward some aspects of a proposed social order and away from others" (Schneider, 2019, p. 265). It is somewhat of a chameleon type of technology at the intersection of diverse socio-cultural contexts: grassroots/corporate, emancipatory/surveillance-oriented, libertarian/capitalist, feminist/patriarchal, Global South/Western. Like other tech spaces, a meritocratic, postfeminist discourse prominently frames the dominant blockchain space. Through this lens, anyone has an equal opportunity to participate in blockchain, regardless of gender,

race, class. Yet on the material level, like other technology spaces, blockchain has stark gender inequities. According to a recent study of 100 blockchain startups, only 14% of employees were women, and among those just 7% were in leadership roles (Custer, 2018). As the technology continues to emerge into public awareness, its meaning and significance remain malleable, yet heavily influenced by legacy tech cultures that support its development. From its libertarian grassroots, blockchain has evolved in different directions through the installed base and infrastructures of the male-dominated tech and financial industries (Star, 1999; Ensmenger, 2012; Neely, 2018a). Blockchain is actively shaped through the interplay between discursive frames and material conditions, as conveyed by the interviewees in this study. This is why social shaping and social consequences ought to be studied together as an ensemble (Lievrouw & Livingstone, 2006).

To understand this process, and interpret my data, this chapter presents three discursive frames for analyzing the interviewees' meaning-making in their work in blockchain. I analyze the relationship between discourse and materiality to clarify the co-construction process between gender and technology. In this study of gendered sociotechnical relations in blockchain, I argue that the women I interviewed skillfully toggle between discursive frameworks, actively encoding and decoding various discourses based on social context, in blockchain's fragmented, fast-paced, global 'space of flows' (Castells, 2010). The interviewees' narratives reflected three discursive frames of significant salience, which formed my analytical framework. The dominant discourse is associated with meritocracy, postfeminism, and libertarian values. The negotiated discourse is associated with liberal, popular, and cyberfeminist values. And the oppositional discourse is associated with intersectional, technofeminist values. I argue that discourses, as instantiations of 'sociotechnical imaginaries' (Jasanoff & Kim, 2015; Ferrari, 2020) go hand in hand with a multiplicity of social, political, material consequences that conflict with one another at times. In addition, various elements within each of these discursive frames can enable or constrain women's identities and experiences, sometimes simultaneously. Discourses do not work on their own, but are deeply intertwined with materiality, social context, and lived experience.

The goals of this chapter are twofold. First, I describe the relationship between discourse and materiality to ground our understanding of the technofeminist co-construction of gender and technology. Second, I examine how communication operates

on the status of gender in blockchain through three discursive frames that emerged from the data. We can view discourses as technologies, in that they are constitutive of, and mechanisms for, the way we do things and why we do them. In this chapter, I present three discursive frames to make sense of the interviewee's encoding and decoding of dominant, oppositional, and negotiated discourses. Based on this framework, the following chapters take a closer look at how these discourses shape the materiality of the blockchain space in place-based social networking sites such as meetups and conferences contexts (Chapter 5), and work contexts (Chapter 6).

Discourse as inherent to language, society, and gender

The concept of 'discourse' has been taken up by scholars of cultural and critical theory, feminist theory and communication, to explore connections between the linguistic and performative function of words in society (Mills, 2004). Structuralist scholars cultivated the work of linguists and semioticians such as Saussure, who sought to develop a "science which studies the role of signs as part of social life" (1983, p.15). Structuralism investigated the underlying structures in cultural products such as texts, with a focus on binary pairs of related words often arranged in a hierarchy, such as male/female, speech/text, rational/emotional, signified/signifier, and so on. Structuralist and poststructuralist scholars applied these ideas to various media and modalities of communication, pointing to the social uses and implications of signs as discursive sequences. For instance, Baudrillard (1994) analyzed contemporary culture and technological communication through the concepts of simulation and hyperreality. Barthes' (1967) *Elements of Semiology* developed the concept of 'metalanguage' to show how meaning points beyond the constraints of traditional language. For Barthes, objects always 'say something' about their users. And Derrida (1967) advanced the poststructuralist critique of structuralist binaries, arguing that to understand a text or discourse, it is imperative to study both the object itself and the systems of knowledge that produced it.

As a theoretical concept for communication scholars, discourse directs attention to the social contexts and consequences of communication. For instance, poststructuralist scholar Foucault (1972) developed the idea of discourse as related to power, knowledge, subjectivity, and resistance in the broader social context. He used the term in several ways: "treating it sometimes as the general domain of all statements,

sometimes as an individualizable group of statements, and sometimes as a regulated practice that accounts for a number of statements" (1972, p. 80). According to Foucault, discourses can enable or constrain the production of knowledge, dissent, difference and the development of 'new' knowledges. He was also interested in how each discourse is maintained by specific technologies, especially those that facilitate surveillance of individuals. In this context, power is constituted through accepted, dominant forms of knowledge, which come to be known as 'truth,' based on multiple forms of constraint. Therefore, the Foucauldian model emphasizes how power flows through the material-discursive relationship.

Discourse plays a pivotal role in directing our attention, framing our questions, and motivating our actions. This has consequences for our conceptions of gender. Evelyn Keller (1996, 2017) problematizes the language of "competition and cooperation, which, at least in English, is conspicuously gendered" (2017, p. 425). She argues, for example, that encoding competition as male and cooperation as female has become so deeply ingrained that it is taken for granted as 'common sense,' and this belief can pervade 'objective' processes such as how biologists view interactions in nature. Without focusing explicitly on discourse, Wajcman (2004) echoes these ideas in her theory of technofeminism, which demonstrates how conceptions of masculinity and technology in the West have become deeply intertwined in an ongoing process of social-technical co-construction.

When we study discourse, we acknowledge the central role of language as a social practice that not only reflects but constructs social reality (Schultze & Orlikowski, 2001). How people talk about their work, lives, and experiences within a technological space, is key to the social construction of both technologies and our gendered subject positions (Kelan, 2010). Discourses make different social positions available, and how people negotiate these positions is explored through discourse analysis (Potter & Wetherell, 1987). Discursive patterns are paradoxical, functional, and rhetorically organized (Gill, 2000). This makes for a challenging yet fascinating object of inquiry, as I found in this study. From a critical, feminist orientation, Rosalind Gill (2009) elaborates a discursive analytic model based on four tenets: (1) discourse as significant in itself and not as a means to unveiling the truth, (2) language as constructive in terms of how we move through the world, (3) discourse as an action-oriented social practice, and (4)

discourse as rhetorically organized to make itself persuasive. To study communication, is to study the bridge between discourse and materiality.

The discursive-material connection

The 'material turn' emerged as a response to 'the discursive turn' in the social sciences, renewing focus on the role of embodiment and materiality (Brophy, 2010; Baer, 2015; Mislan & Dache-Gerbino, 2018). Rather than viewing the world primarily as a socio-linguistic construction, 'new materialist' approaches focus on vibrant matter, affective things, and agentic assemblages (Barad, 2007; Bennett, 2010; Coole & Frost, 2010). The Deleuzian concept of 'assemblages' invokes a useful anti-structural image of ephemeral and concrete elements, and provides scholars a way to speak of emergence, heterogeneity, and decentred phenomenon in contemporary social life (Marcus & Saka, 2006). This line of thought foregrounds the materiality of media and the physicality of culture at the heart of contemporary discourses, as seen in the work of Friedrich Kittler, Rosi Braidotti, and others. New materialist scholarship focuses beyond 'things' to study their agentic qualities.

This echoes Latour's (2005) actor-network theory in STS, which depicts a network of human and non-human entities continuously co-creating one another. As an example of this approach, Asenbaum explores the relationship between discourse and materialist corporealities in his study of "the participatory potentials of new communication technologies" (2019, p. 1). This strand of new materialist thought grounds earlier visions of cyberspace (Poster, 1995), virtual communities (Rheingold, 1993), and life on the screen (Turkle, 1995) in the embodied world. As Coole and Frost argue, "it is ideological naïveté to believe that significant social change can be engendered solely by reconstructing subjectivities, discourses, and identities—that is, without also altering their socioeconomic conditions or tracing crucial aspects of their reproduction to the economic interests they unwittingly serve" (2010, p.28). Feminist scholars have highlighted the importance of studying the connections between the discursive and material realms to address gender inequities.

Liesbet van Zoonen (2002, 2008) notes that the relationship between gender, communication, and technology is often characterized as a cultural one, focused on negotiations of meaning and values, seen in 'gender as identity' or 'gender as social

structure' frameworks. However, she argues, these perspectives can produce gender-essentialist or technological-determinist tendencies, ignoring embodied everyday interactions and struggles in the material realm. Echoing this important connection, Wajcman's (2004) mutual shaping approach outlined in technofeminism, takes both discourse and materiality into account, by focusing on situated practices and the lived experiences of women in relation to technology. Paying attention to the discursive-material dynamic, means acknowledging that discourses about gender and technology have material consequences. Durham (2011) reminds us that beneath 'technoscapes' (Appadurai, 1996) and 'real virtuality' in the network society (Castells, 2010), gendered bodies and lived experiences matter. Gendered power hierarchies continue to undermine the physical conditions of women's lives, in terms of economics, social power, and opportunity. New materialism is "interested in exposing the movement, vitality, morphogenesis, and becoming of the material world, its dynamic processes, as opposed to discovering immutable truths… Such a world is not determined; rather it is constantly in the process of its making" (Pitts-Taylor, 2016, p.4). Since masculinity has historically been associated with the enlightened, rational subject in the public sphere, and femininity with the embodied, irrational object in the private sphere, analyses that attempt to overcome such dualisms can be seen as inherently feminist in ontology (Pitts-Taylor, 2016).

In terms of scholars of technology and society who sought to bridge the discursive/material divide, both Castells' network society theory (2010), and the cultural materialism of British cultural studies scholars (Williams, 1975; Hall, 1980) offer useful lines of thinking to augment some of the posthuman, reductive tendencies in new materialism. First, Castells (2012) highlights the role of human intention, arguing against 'actor networks' and for 'human networks of actors.' We can think of these networks as assemblages encompassing bodies, language, communication networks, cultural forms, and social infrastructure. Castells argues that although the link between neural, social, and technological networks is vital, the capacity to interpret messages and make meaning out of them, is still the real source of power. According to Castells, "power is primarily exercised by the construction of meaning in the human mind through processes of communication enacted in global / local multimedia networks of mass communication" (2010, p. 416). In other words, information and communication technologies create a 'space of flows' for power but are not the source of power itself.

From British media and cultural studies, Silverstone describes the heart of cultural materialism as the “fundamental belief in the effectiveness of human agency: our capacity to disturb, disrupt, and distract the otherwise cold logic of history and the one-dimensionality of technology" (2003, p. xi). Raymond Williams (1975) explores the relationship between 'the technology and the society' in *Television and Cultural Form*, arguing against the inaccurate, bourgeois understandings of 'technological determinism' and 'symptomatic technology.' Cultural materialism represents the latest wave of materialism, involving the tools of class, race, and gender consciousness, through Williams' (1975) dialectical distinctions between 'dominant,' 'emergent,' and 'residual' class positions. Similarly, Stuart Hall's (1980) encoding/decoding model of communication shows how meaning-making is a discursive process that operates within a language system, which he called 'a set of codes,' all of which are loaded with signification. He outlines several ways that agentic audience members may 'decode' the discourse: in the 'dominant' code as intended by the producers, in a 'negotiated' code which accepts some of the preferred meanings but opposes others, or in an oppositional code that represents disagreement (1980: 137-8). As Hall explains, "Meaning is a social production, a practice. The world has to be made to mean. Language and symbolization is the means by which meaning is produced" (1982: 67). This model resonates with the social shaping of technology perspective: “It can be shown that different social groups have radically different interpretations of one technological artifact” (Pinch & Bijker, 1987, p. 41). Judy Wajcman (2004) takes this understanding one step further, noting that the same the technology can have contradictory effects based on the gendered social contexts they are developed and used within.

One of the places we can see discourse and materiality influence one another in everyday life is at work. The nature, accessibility, and meaningfulness of work are embedded within material, gendered contexts, and stakeholders mediate these issues through communication (Kisselburgh, Berkelaar & Buzzanell, 2009). Examining work through discursive frames helps to uncover the meanings and motivations behind participants' practices in the contemporary context of blockchain. This encompasses 'micro and meso level' as well as 'grand and mega-level' discourses in organizational contexts, including everyday talk, media framing, linguistic choices surrounding work scenarios, and standardized ways of referring to certain phenomenon within an industry (Alvesson & Kressman, 2000). It is vital to remain aware of each of these levels of

discourse to accurately assess progress toward gender equity in organizations. In her recent study of a Silicon Valley tech company, Alison Wynn (2020) has shown that executives tend to favour individual (micro level) and societal (macro level) explanations of gender inequities, often overlooking ways to enact structure change in the organization (meso level). An awareness of each of these levels of discourse can help guide our interpretations of experiences, people, and institutions. People use discourses to manage a multiplicity of organizational allegiances across local and distant networks (Kuhn & Nelson, 2002). Now that I have briefly described some of the ways discourse and materiality depend upon one another, and the work contexts where we can observe them, I turn to explain three discursive frames about gender and technology in blockchain, that emerged from the data in this study.

Three discursive frames

One of the research questions guiding this dissertation includes, '*what are the most salient discourses about gender and technology currently shaping the blockchain space?*' Three discursive frames emerged most clearly. Below, I present an analytical framework inspired by Hall's (1980) encoding/decoding model, for understanding these discourses as social interchanges that shape the interviewees' practices and experiences in work settings, and the blockchain space at large (see Table 1). They include: (1) a dominant discourse of meritocracy and postfeminism, rooted in libertarian values; (2) a negotiated discourse associated with cyberfeminism, popular feminism, and liberal feminist values; (3) and an oppositional discourse associated with intersectional third wave feminism and technofeminism. This framework re-envisions Hall's model of meaning-making as a discursive process based on a set of codes in communication, in the current context of 'networked individualism' (Castells, 2010). Hall's theory of encoding/decoding focused on media audience reception and interpretation, whereas this model revised for the blockchain space focuses on how stakeholders actively encode and decode discourses in an even more dynamic way. They are producers, not just consumers of the technology. This adds layers of complexity to this revised encoding/decoding process. Once I began to see distinct discourses about gender and technology emerging from the data, I developed these frames as I sought to answer the question: how do the interviewees develop, interpret, and negotiate these different discourses in blockchain to further their personal and professional goals through the

space? How do each of these discourses enable or constrain their experiences and practices in the space? These processes illustrate how discourses work to reproduce or oppose existing gendered social relations in this emerging tech space, at times simultaneously. I observed how the interviewees engage in a process of toggling discursive frames to do with gender and technology to effectively navigate the blockchain space.

Table 1. Three Discursive Frames to Analyze Gender & Technology in Blockchain

Discursive Frame:	**Frame 1: Dominant** **'Gender-blind Meritocracy'**	**Frame 2: Negotiated** **'Lean into Blockchain'**	**Frame 3: Oppositional** **'Intersectional Inclusion'**
Type of feminism it reflects:	Post-feminism	Liberal, popular, and cyberfeminisms	Technofeminism, third wave feminism
Stance on technology:	Neutral, objective, revolutionary. Separate from the social, cultural and political.	Neutral, objective, revolutionary. But presents a unique opportunity to benefit women.	Socially shaped. Potential to be revolutionary. Therefore gender equity is important, both for representation in design and justice in general.
Stance on gender:	Irrelevant. 'Divisive' if mentioned.	Matters. More women can and should join. Let's build their confidence, skill, and networks.	Matters. Based on social justice and intersectional politics, more than economic or technological imperatives.
Stance on blockchain space + women:	The space is good as it is. Anyone is welcome. If there are less women than men, that's based on their own choice.	The space is good. And it would be even better with more women in it. This will benefit both women and the tech.	The space is not good as it is. It is lacking in diversity on many social axes, and genuine inclusivity. Transforming the space will improve the tech as a byproduct of equity.
Problems & Solutions:	Technologies can solve social problems.	Technologies can solve social problems more effectively with greater representation of different types of people.	Social problems require social solutions, and tech equity is an important instantiation of these solutions.

Motivations:	Develop & diffuse the tech (technological and economic imperatives).	Develop & diffuse the tech (technological and economic imperatives plus 'interest convergence' for women).	Social equity at large. Blockchain is just one possible path to promote this broader vision.
Guiding Ethos:	Meritocracy	Representation	Inclusion
Discursive focus:	Macro-level discourses	Micro-level discourses	Meso-level discourses

I favour the term ‘toggle’ because of its technological and cultural sensibilities. On one hand it refers to switching views on a computer screen with a single, quick action on the keyboard. On the other hand, it reminded me of Ursula Franklin’s definition of technologies as a cultural practice made up of "organization, procedures, symbols, new words, and most of all, a mindset” (1999, p. 3). The metaphor of toggling illustrates the material/discursive elements of switching discursive lenses. It aptly characterizes one of the key communicative mechanisms I observed the interviewees perform as they talked about their work in blockchain. As I analyzed the data, I struggled to make sense of the paradoxical nature of the stories conveyed. I finally realized it was most productive to identify the different discursive frames the participants engage at different moments, as opposed to categorizing the interviewees themselves. People are prone to think and speak through particular lenses in particular social contexts. Human communication is much more complex than simple categorization can reflect.

In my discourse analysis, I noted how the interviewees reflected more than one of these discourses in a single breath as they conveyed the contradictions of the space. They toggled between discursive frames throughout the interview, demonstrating how they flexibly navigate the discursive terrain depending on social context. For example, I noted that many of the interviewees spoke and thought primarily in the dominant discourse, where others toggle between two, or sometimes three discourses. They toggle discursive frames, speaking and acting with competency within the dominant, negotiated, or oppositional discourses, depending on the social context. For instance, some interviewees conveyed their confidence and competence as the only woman at a blockchain startup company in the language of the dominant frame, yet also cited the way they handle gendered micro-aggressions in the same space in the language of the negotiated frame. They may feel comfortable in their male-dominated work environment, and also highly value attending women in blockchain meetups, for different reasons. The

common denominator across all scenarios is that competency within the dominant discourse is a requirement for succeeding in the space at large. There are only a few select contexts where gender is socially acceptable to speak about or gather around, within the broader context where it is generally taboo.

The notion of discursive lens-switching is particularly applicable to women in work settings. Workplaces are often framed as disembodied, gender neutral spaces. Yet in practice, they are often dominated by male-centered discourses, which makes it more difficult for women to bring their full selves to work (Acker, 1990). This has been explored in both historical and contemporary literature, using different concepts related to toggling. For example, Dorothy Smith examined the context of work, where women must navigate "a male world in its assumptions, its language, its patterns of relation" through "a bifurcated consciousness" (1987, p. 6, 7). She was writing at the time about her work in male-centered academic institutions and considering how one might build types of knowledge that would centre women's experiences of social life, as they balanced paid and unpaid work.

In a more recent study that invokes the idea of toggling frames, a study of Italian entrepreneurs, scholars found that gender and entrepreneurship were both enacted as situated practices, as 'the codes of gendered identity are kept, changed, and transgressed by sliding between different symbolic spaces' (Bruni, Gherardi & Poggio ,2004, p. 406). They show how entrepreneurship, like technology, is coded as masculine. Yet those codes can be disrupted, just as gender itself can take a variety of forms. As a final example, one study developed an organizational strategy for gender equity called the 'bifocal approach,' which links the professional development of individuals (one lens), with structural change in the organization itself (another lens) as an intervention for effective change (de Vries & van den Brink, 2016). This approach represents an epistemological shift in thinking about these issues, from traditional ones where gender inequality is understood in terms of socialized sex differences, toward a transformative one where gender itself is seen as a set of empowering or oppressive social relations reproduced through social practices (Ely & Meyerson, 2000). This study further explores gender as social relations that are enabling or constraining, as observed through social practices at work.

As stakeholders toggle between discursive frames, meaning-making happens at both the denotative and connotative levels of these discourses in tension. Denotation refers to the precise, literal definition of a word as it may be found in the dictionary, whereas connotation refers to the wider array of cultural associations that many words carry with them. For instance, on the denotative level, the statement "I'm interested in blockchain because I believe it will make the world a better place" would ring true and be respected within each of these discursive frames. However, digging deeper to analyze the goals, values, and motivations associated with each of these discourses would paint a different story of the assumptions and motivations driving each frame. The dominant meritocratic discourse is focused on developing and promoting mass adoption of the technology, for various business and technological imperatives. The male-dominance of the space, or any talk of gender-equity initiatives are viewed as irrelevant, distracting, or divisive. The negotiated frame shares a similar goal of developing and promoting the technology but encourages the intentional inclusion of women. According to this discourse, this approach has a two-fold benefit: it is good for women in terms of career advancement, and it is good for business and technological development in terms of increasing market share and improving products by incorporating more diverse perspectives and seeing risks before they arise. The vehicle for 'all good things' in both discourses is the technology itself. In contrast, the oppositional discourse views feminist politics and social justice as the engine driving meaningful change through involvement with the technology. Through this lens, the technology is not a neutral tool but a gendered space that needs to be ameliorated through intentional gender equity initiatives, by both men and women, to bring about a more sustainable world. The goal is that equitable social conditions will create better technology and contribute to social progress at the same time. I now turn to describe and explore each of these discursive frames in more depth, including quotes from the participants to illustrate how they work.

Frame 1: Dominant Discourse – The Gender-blind Meritocracy

I refer to the first discursive frame as the ‘gender-blind meritocracy.’ This dominant discourse springs from blockchain’s libertarian roots, and continues to flourish in the postfeminist, neoliberal context of tech culture and society at large. It is almost

difficult to describe this paradigm since technochauvenism, or technology-based solutionism (Broussard, 2018) permeates the way we think about the role of technology in contemporary western society. According to this stance, anyone has an equal chance to participate based on individual effort, regardless of gender, race, class, or other non-merit factor. Therefore, if certain people choose not to participate, that is entirely based on their own choice. The guiding ethos here is meritocracy. According to American survey research over the past several decades, "most believe that meritocracy is not only the way the system *should* work, but also the way the system *does* work" (Castilla & Benard, 2010). The authors explore the 'paradox of meritocracy,' since they found self-proclaimed meritocratic organizations in particular tend to reward male employees over female employees. Postfeminism goes hand-in-hand with meritocracy, based on the notion that second wave feminism was successful, and is therefore less relevant to a younger generation of women whose sensibilities are shaped by neoliberal ideologies of individualism, empowerment, and choice (Fraser, 2013; Gill, 2011; McRobbie, 2008). While postfeminism has often been understood as an outright denunciation of feminist politics, it has more recently been framed as a critique of excessive or radical feminisms in favour of more moderate feminist politics (Dean, 2010; Lewis et. al., 2019). In the context of postfeminism, pre-feminist, feminist, and anti-feminist ideas are entangled in such a way that renders any talk of gendered experience pernicious and detrimental to contest (Gill, 2009). Within the 'gender blind meritocracy' discourse, raising issues of gender inequities is viewed as discriminatory. Any suggestion of gender-based discrimination is associated with victimhood, a social position to be avoided at all costs.

Blockchain's anti-establishment, libertarian beginnings were introduced in the pseudonymous Nakamoto (2009) paper on a peer-to-peer electronic cash system. One of my interviewees, Amy, was among the first readers of this paper, and one of the first Bitcoin miners, as a teenage hacker at the time. In her home office, she keeps a first-generation iPad she purchased with $625 worth of Bitcoin in 2011. At the time of the interview in 2019, that Bitcoin would have been valued at $1.7 billion dollars. She tells the story with a smile, recalling how everything in her life, from world travels to furnishing rental apartments, have all been bought through Bitcoin. She recalls:

> In 2008, the white paper was dropped in an IRC chat room that I frequented for crypto punks. And I largely forgot about it until about 6 or 7 months later, when a copy of the first Bitcoin software was dropped in there. And that sort of catapulted my career. See, Bitcoin mining at that time was only done

> by about 3 or 4 of us and we really treated it like a video game. It was about getting higher numbers, on your laptop, and whoever got the highest number won. It attracted a lot of anarchists, and hackers and black hats, and I've always been a part of that culture since I was really young, so it was just a natural progression.

Cryptocurrency mining is the process by which new coins are entered into circulation, which involves the maintenance and development of the blockchain ledger. At the present, this is executed by sophisticated data mining centres, many of which Amy has helped to set up in locations around the world. So the fact that she was among the first to do so on a laptop in the earliest days of blockchain culture was fascinating to hear about. Amy mentions how blockchain attracted anarchists, drawn to the compelling discourse of 'cutting out the middle man' of social institutions like banks through decentralized, peer-to-peer transactions. Blockchain enthusiasts in the dominant discourse, whether libertarian or capitalist, speak the language of 'technosolutionism,' or the idea that social problems can and should be solved through the development of technologies as opposed to broader political change (Morozov, 2013).

According to this discourse, the revolutionary, decentralized nature of blockchain makes it inherently democratic, and therefore indifferent to gender, race, class, or age, in terms of who may participate or benefit. Participatory technologies like blockchain are framed as open, democratic, and supportive of personal autonomy (Streeter, 2005). As interviewee Jessie, a former Wall Street executive, explained:

> In blockchain it doesn't matter if you are 20, 30, or 50. Your viewpoint is equally as important as anyone else's. Because for the first time, with blockchain technology, we're challenging the status quo, right? With all the other technologies, we inherited a world where, that's just how it works. The banks do this, and we just have to live with the pain points, right? We don't have control, they're wolves. You want to wire money? OK that's going to be 3 days, and 15 bucks. We don't even think about the fact that there could be another way. So with blockchain for the first time, you can totally do it another way. And so you're able to take a stand. So just because someone who's older, and they worked in a certain vertical with a certain set of rules, a legacy system, it doesn't mean their point of view is more right than yours.

Jessie's quote speaks to the heightened visibility of blockchain's 'interpretive flexibility' (Pinch & Bijker, 1987) in its early stages. She addresses ways blockchain empowers its users, through quicker and cheaper financial transactions. She then extends this democratic quality to include the equal opportunity of its producers, despite their age.

How the technology will be used and who it will benefit most feels undetermined yet hopeful. Through the dominant lens, new technologies are often framed as revolutionary tools that promote democracy and equity.

In terms of its stance on gender and technology, the dominant discourse is firmly postfeminist. In this frame, gender equality has been achieved and therefore sexism is no longer a problem (Gill, 2007). Scholars have shown that within postfeminist contexts, women are disinclined to label expressions of modern sexism as prejudicial (Barreto & Ellemers, 2005). Even for interviewees who clearly articulate sexist moments they have experienced in the space, the label 'women in blockchain' can make them bristle, depending on the context. In her recent book *The Culture of Women in Tech*, organizational communication scholar Mariann Hardey notes, “The emerging global popularity of the WiT [women in tech] label has helped to bring some of these problems into the public discourse, and yet it continues to be defined in such a way as to affirm the collective identity of women in the sector as being somehow ‘other’” (2019, p. 46). Interviewee Dara, a director of tech marketing in her late 50s, highlighted the discursive complexities at stake with women’s groups, and the fact that gender equity in tech has regressed over her decades in the industry:

> I find that there's a heavy female movement in blockchain, as far as a lot of 'women in blockchain' events and meetups and groups, which is great. I also see the flip side. I see a lot of women who don't want to be associated with the ‘women in blockchain’ specific things. They’re like "this is not about women in blockchain, this is about people in technology. And I don't want to be singled out and put on the stage because I'm a woman, I just want to go and talk about my project." I think for me, because I *have* been a woman in tech for a lot longer than some, I'm super disappointed that the gender gap is widening. Like, 10 years ago it would have been about 35% women in technology. Like, what's happening there?

We discussed the paradoxical fact that, at a cultural moment where diversity and inclusion initiatives are proliferating at a corporate level, gender remains a thorny topic, in both formal and informal work environments. Similarly, women in blockchain initiatives are successful in many ways on a material level. Yet they can also serve to reinforce the status quo of the male-dominated space on a discursive level at the same time. In this frame, the 'women in blockchain' label is perceived as problematic, in that it casts women as a separate or disadvantaged group within dominant masculine cultures of tech and finance.

To speak about gender in the dominant frame is to associate oneself with victimhood or to accuse the broader space of discrimination - charges that are vehemently denied in a meritocratic discourse. Interviewee Emily, a lawyer who moved to Canada from China to work for a crypto exchange, illustrates this mindset:

> I want everyone to just treat themselves as a human, rather than divide into male and female. I'm not paid less than my peers in my work. Like, if I'm one of the top sales during the month, I make more than my peers. Is it really necessary to force [women] or give them opportunities to find [tech jobs] interesting? If they really find fashion more interesting, they should just go ahead and do fashion. Do whatever makes your life happier. My department, last year this time, we were actively looking to hire women. Because the female percentage in my team is very, very low, and today it's only me. But it's not that easy to find a woman who wants to do this type of job. So it's not like there's no opportunities for women, there is *so much* opportunities for women out there. 'Cuz diversity and inclusion is a *huge* thing in Canada. It's just very hard to find a woman who wants to do it. And some women came to do it, and they quit 'cuz they can't handle the stress.

This interviewee conveys the enabling aspect of her work in cryptocurrency sales. Focusing on the material level of compensation, she felt satisfied based on equal pay in her line of work. She also conveyed the dominant stance that if women are not compelled to join certain domains, or have trouble advancing once they do join, it's because of a preference or deficiency located in them, not the space at large. Scholars of gender, culture and technology have challenged these assumptions of meritocracy, demonstrating that while it promises opportunity for all, it in fact creates new forms of social division (Hicks, 2010; Littler, 2017).

Social shaping scholarship focuses on the problems and solutions that arise for various stakeholders around a given technology. Within the dominant discourse, the main goal in blockchain is to develop and diffuse the technology, whether for political or economic reasons. Talk of gender is deemed distracting, or unnecessarily divisive to the more important tasks of developing the technology and increasing adoption. Tensions between and among various blockchain factions, ranging from grassroots to corporate, take the main stage in this discursive frame. Communication scholar Lana Swartz (2017) theorizes blockchain's social architecture, contrasting radical and incorporative initiatives. She describes a continuum of discursive modes, with radical stakeholders oriented toward social, economic, and political change, and incorporative stakeholders oriented toward improving the efficiencies of existing systems through blockchain.

Interviewee Sophia, a self-employed technical writer in the cryptocurrency space, described her experiences with each of these sorts of groups:

> I think that crypto can actually be divided into 2 different camps. To me there's the cypherpunks, like the true hardcore punks, and then there's people who are more from traditional tech - people who want to scale something and make it big. So they see an opportunity in crypto, and they'll scale it using traditional tech organizational infrastructure or VC capital or whatever. And it's that group, the traditional tech group, where I see most of the problems. But the group that's like, the hardcore Bitcoiners, they love everybody. If you're weird or crazy, girl, boy, or unicorn, they just love everybody. So I left the more traditional institutional focus and have gone back to the more "let's build for the community," and I have to say the difference is night and day in how it feels to work with that team.

Sophia uses the exaggerated phrase of 'girl, boy or unicorn' to express that gender is irrelevant in a friendly way in the 'hardcore Bitcoiner' space. One of the traits of the radical faction is that 'anyone who drinks the kool-aid,' or deeply buys into the vision of blockchain, is welcome. As stories emerged that directly or indirectly referenced this phrase, I began to code for it and observe how the discourse functioned in the space. Both Sophia, in the quote above, and other participants, described the idea of navigating the space through trial and error to avoid sexist groups or employers. I also noted how she referred to the sexism of the traditional tech stakeholders as 'the problems' instead of directly calling it out. As Gill explains, "the potency of sexism lies it its very unspeakability" (2011, p. 63). Many participants could cite sexist incidents that happened 'out there in the space' to others they knew, but it was much harder to name it in their own experience.

Alongside the enabling aspects of the space as seen through the dominant frame, interviewees also expressed constraints, both discursive and material. Aisha, a UX researcher who works remotely for a large blockchain organization based in New York, articulated some of the subtle yet pervasive dynamics that connote whether people can accessibly participate in this meritocratic space:

> I feel a lot of times, when people are learning about blockchain or making these work transitions, they're going via their network and events. And when people see the speakers and organizers mostly as men, that's not necessarily seen as a good sign. It's a sign that, "I can't be part of this, it's people who are technical and elitist." People who feel like they're so deep into it, they're down the rabbit hole and talking about things that are not normal to human beings coming from outside. Like, right now it's a very

> jargon-heavy space. And it's not talked about in a way which is very friendly to outsiders in general, including users [of our blockchain product], and we're constantly dealing with it and trying to improve. It can be difficult for people who are trying to contribute.

Importantly, this quote about the perception of men presenting themselves at events as 'technical and elitist' is by a woman who is herself in a technical role. This is not so much a comparison of skillsets as of culture. She also mentions that it is a 'jargon-heavy' space which makes it unfriendly to outsiders. This points to the discursive elements of creating insiders and outsiders. Here the dominant discourse is doing things on both the denotative and connotative levels. On one hand, anyone is welcome to enter the dominant discourse to contribute to the technological or business imperatives of the space. But it includes unspoken rules and parameters on what the main focus will be, and what will remain unspoken. Again, in this context, talk of gender, race, or inequity, is perceived as a distraction or threat to the focus of building and promoting the technology itself. This reflects the popular understanding of gender and technology as inhabiting two different spheres, instead of being interrelated.

To 'disrupt' the space by discussing feminist politics is strictly forbidden, as interviewee Alice learned when she volunteered to present a workshop for a grassroots blockchain community that hosts regular meetups:

> Part of why I'm interested in technology in general and blockchain especially had to do with gender dynamics. So I came into it with that very clear, and very willing to talk about it as per my history. And that was seen as 'divisive.' I was planning to do a workshop, a meetup that was entitled something like 'Women, Value and Blockchain.' And I was going to talk about the social side of things as much as the crypto side of things. And I mentioned the word 'safe space' in the description, and there's a big backlash to that language. The response was like 'SJW,' social justice warrior. People use that as a derogatory term. I'd never heard that, but it's a big thing. Which, from my background, I see as toxic. Anyway, [the workshop] did go ahead, and it had a good turnout. As a fun fact, it had as many men as women. And [the community organizers] commented afterwards saying "OK it wasn't that bad." So there was no apocalypse after. But there were disparaging comments nonetheless.

Both experimental and discursive research have established that challenging sexism is risky for most women (Worth, Augustinos & Hastie, 2015). Women who do challenge or speak up against sexism are perceived as uptight, aggressive, or humorless (Gill, 2011). Talk about gender and race is incompatible with meritocracy under the guise of a hollow

definition of equality, which purports to treat everyone the same. In contrast, the concept of equity recognizes and values difference. Those who advocate for equity can see that it does not simply happen on its own, which is why talks like the one Alice presented at the meetup are important. Gender equity requires us to name it, frame it, and explain it. Therefore, in response to this dominant discourse, women and people of colour have organized to facilitate greater community, education, and networking opportunities for underrepresented groups in blockchain. These are exemplified through the negotiated discourse, which echoes the enthusiasm of cyberfeminism and popular feminism, to which we turn next.

Frame 2: Negotiated Discourse – Lean into Blockchain

Within the broader sphere of the dominant discourse, there is a smaller yet significant negotiated discourse that views the meaning of blockchain through a different lens. I labeled it ‘lean into blockchain.’ It is ‘negotiated’ in that it aligns with the dominant discourse in terms of its stance on blockchain's role as a revolutionary technology with the potential to transform society as profoundly as the internet itself. In this sense, the negotiated frame is characterized by 'interest convergence' (Bell, 1980), or the overlapping space where the interests of dominant and marginalized groups overlap. Derrick Bell (1980) developed this concept to explain how the interests of Black civil rights coincided for a brief time with the interests of white elites, enabling the desegregation of public schools in the 1970s. In this case, it helps us to understand the dual reality of how women can achieve success in blockchain and remain a marginalized minority in certain contexts.

Yet the negotiated ‘lean into blockchain’ frame differs from the dominant discourse in that it does not discount gender as irrelevant. Rather, from this view, women ought to benefit from participation with blockchain, and blockchain ought to benefit from the additional talent and perspectives of women's contributions to the space. It does so without critiquing the technology at all, and with minimal to no critique the culture of the space. The negotiated frame echoes cyberfeminism's enthusiastic embrace of technology itself as a vehicle for women's agency, as well as liberal feminism's belief that the solution lies in helping women to enter the space through increased access, education, and employment. It also carries the message of popular feminism's (Banet-Weiser, 2018) neoliberal vision that women simply need to embrace

empowerment and confidence to succeed in the space. This message was perhaps most famously popularized through Facebook executive Sheryl Sandberg's (2013) book *Lean In: Women, Work, and the Will to Lead.* The book only minimally addresses the well-worn dilemma of work/life balance for working women, focusing primarily on how women can take charge of their own careers and be successful in a time when gender bias is more pervasive than most would care to admit. She argues the feminist revolution has stalled, both in terms of external measures of women in leadership, and internal measures such as lack of self-confidence. I named this negotiated discourse 'lean into blockchain' after speaking to a participant who attends a women's blockchain meetup in Seattle by the same name.

The negotiated frame views technology itself as liberating for women. As one interviewee, who focuses her full-time efforts on advocacy for women in cryptocurrency, explained:

> You know, we saw blockchain as a kind of a shortcut for economic wealth of women, 'cuz it tends to be that first technology adopters are not women, they're guys. And they tend to benefit the most, I mean economically, from being the first adopters. So we really felt that we could help if we bridged that gap. And it also created a kind of freedom internationally. This was not something that you only had to do in one country, it became potentially, you know, a vision, a solution, that women globally could benefit from.

This participant co-founded and leads a non-profit organization focused on blockchain education events for women and children. They have sponsored hackathons, sprint-like events where teams compete in collaborative computing innovation, specifically for women in Canada, the Caribbean, and Pakistan. The negotiated discourse raises awareness of the technology in order for more women to become more knowledgeable, gain confidence, cultivate connections, and feel more welcome in the space. This is an important prerequisite for any form of empowerment that may be associated with participation in tech spaces. Communication scholars have celebrated the fact that nearly anyone who engages with networked, digital technologies nowadays are both producers and users (Bruns, 2009; Jenkins, 2006; van Dijck, 2009). Yet Judy Wajcman qualifies this, noting that ICTs are indeed uniquely malleable, yet "for all the hype about the network society, the internet does not automatically transform every user into an active producer, and every worker into a creative subject" (2006, p. 783). She says those

with technical knowledge will be the most influential, and thus acquiring these skills is increasingly critical.

Importantly, key stakeholders and advocates within the negotiated ‘lean into blockchain’ frame may or may not identify with feminist politics at all. This demonstrates a contemporary dissociation between 'doing activism' and 'being activist' (Bobel, 2007, p. 148). Although this frame acknowledges the importance of gender, it is nested within the broader frame of postfeminist, meritocratic thought. Efforts to advocate for oneself or other women in the space are often motivated by furthering one’s personal goals and the technology. For instance, interviewee Anya works a full-time government job, and commits another 40 hours per week to a ‘women in blockchain’ group she founded, that hosts talks and events in several cities per month. As a cryptocurrency investor who often posts motivational messages and selfies on social media wearing Bitcoin-branded clothing, she seeks to involve women in the blockchain space with an evangelistic enthusiasm:

> I just think that people need to understand that it's a disruptive technology and you can't compare it to anything we’ve had before. The reality is, blockchain is like a black swan. It’s kind of like this unforeseen thing that came in and people are trying to rationalize it and I just don't think you can. This is a revolution, and I want everybody to join in. And clearly whatever is happening is not getting women involved. If you have 90% men and 10% women, there's an issue. And I want to be inclusive. Our events are for men and women. I don't want this *just* to be for women. But when women see [our events], they’re more encouraged to come. Like I’ve had women come and say, “Oh yeah, I came to your event because you specifically say it's for women.” They feel like it's a place for them.

Anya refers to Taleb’s (2010) concept of the ‘black swan,’ an event, positive or negative, that is deemed improbable yet causes massive consequences. This goes hand in hand with her view of the technology as ‘revolutionary’ reflected in both the dominant and negotiated discourses. She also shows how she intentionally creates blockchain events framed as ‘for women,’ although all genders are welcome at events. This discursive move creates opportunity for women to access a space that is otherwise demarcated as ‘male.’ Anya references the ratio of men to women in the space. She noted elsewhere in our conversation that balanced representation is needed for blockchain to be as effective as it can be. Again, this stance prioritizes the development of the technology, and encourages more women to join this important project.

Advocacy groups and social networks such as Crypto Chicks, She256, and Diversity in Blockchain have emerged over the past few years, to elevate women in the space through networking, education, and mentorship. These 'by women, for women' spaces ironically take gender out of the mix. The participants often referred to them as a 'comfort zone,' to share and build their areas of expertise without first having to prove to skeptics that they know something about the technology. For example, Jessie pivoted from a 20-year career on Wall Street career to start a blockchain-focused financial advisory a few years ago. As she reflects:

> When I got plugged into NYC Silicon Alley, and got to know the startup landscape, I met women founders, women investors. I came up the Angel curve, and I just really informally started my investment and advisory business. Because I felt, it's always the women feeling that you have to prove yourself, right? "This isn't my background, I don't know this." And that was probably the best education and sweat equity I gave myself, is really rolling up my sleeves and helping my own portfolio companies. And within that network were all these other women who I never would have met, because they were in different verticals. Like all of us about 20 years into our careers, accomplished in their own right, wanting more, right? The idea of empowerment, a collective collaboration, being more purposeful and deliberate with your money. Like, we just didn't know we could do that. Certainly we can't compete with the more established firms, like the Sequoias of the world, but still, the barrier really wasn't there. It was really just more education and awareness, right?

Here we see evidence of blockchain working as a "convening technology" (Baym, Swartz & Alarcon, 2019), opening up new spaces for the convergence of diverse publics and possibilities. Jessie also addresses the idea of women overcoming the internal obstacles of second-guessing themselves in bold moves at work.

Similarly, interviewee Elena, who co-leads a non-profit focused on educating women in blockchain, echoed this sentiment, noting how blockchain is a particularly accessible space for anyone to join in these early stages of its development:

> In some ways, it's even easier, simpler [than other tech spaces]. There's less competition, because of the decentralized nature, it lifts up the restrictions. And there's not the same requirements or certifications or anything like that. It's very democratic, and right now it's not very regulated as well, so lots of opportunities.

The success of this non-profit's events challenges commonly held views of the dominant discourse. For example, Elena's co-founder Nicola shared a story related to the myth that women are not that interested in technology:

> You know, we were the first to do a blockchain hackathon for women only. And when we were trying to raise money, we called TD Bank. And we had a guy on the phone and he says "there's no way you're going to be able to put together a blockchain only-for-women hackathon, you won't get enough participation." 'Cuz at TD they only had one [woman interested], and she was on the phone too. And then you know, we actually had to turn people away - we were like over-subscribed. And the reason we had to turn them away was just because of limited space.

This non-profit group recruits large banks and law firms to sponsor their annual all-women hackathon event. They ask the firms to contribute financially, and to send teams of women from their organization to participate in blockchain education. In this way, the organizations benefit by gaining blockchain knowledge, and the women attending the event benefit by gaining free access to this education. This type of appeal echoes Castells commentary on grassroots and corporate networks in the *Internet Galaxy* (2001). He notes that grassroots networks and their logics do not just move one-directionally, trickling up to influence corporate spheres. Rather, there are possibilities to appropriate the network society to make its logic work for particular ends, whether progressive or regressive, through a process Castells (1999) terms 'grassrooting the space of flows.' This concept acknowledges that societies are fluid systems shaped by conflict between dominant interests, and resistance to domination. In this case, corporate sponsorship facilitated local women in blockchain initiatives. Therefore, "while the space of flows has been produced by and around dominant activities and social groups, it can be penetrated by resistance, and diversified in its meaning" (Castells, 1999, p. 297). This particular 'women in blockchain' non-profit seeks to pave gender-conscious inroads into the male-dominated space of flows in blockchain.

Just as cyberfeminists in the 1990s celebrated the emancipatory potential of the Internet to close the gap of gender inequalities (Haraway, 1991; Plant, 1997; Turkle, 1995), blockchain enthusiasts using the negotiated discourse emphasize women's agency through the technology. For these, blockchain is viewed as a powerful 'next chance' to re-envision how technology mediates new and existing social contexts. It is framed as an opportunity to address the rising concerns for democracy in a networked society fueled by surveillance capitalism (Zuboff, 2019).

Within the negotiated discursive frame, stakeholders are likely to appeal to business and technology-focused imperatives, to explain why gender matters in blockchain. As one advocate for diversity and inclusion in tech puts in, "diversity in the workplace isn't just the 'right' thing to do—it's a financially savvy strategy in today's hyper-competitive digital marketplace" (Tulshyan, 2016). This statement appeals to the economic goals of the dominant frame and downplays moral imperatives as less important. It tends to locate ‘diversity’ within individuals and body counts, based on demographic categories like gender, race, age, or (dis)ability. It actively avoids what Sara Ahmed calls the 'scary' issues of social justice and structural inequality (2012, p. 66), which is the focus of the third discursive frame below. Within this second frame, women’s knowledge of blockchain, represents personal and professional power, as Nicola conveys:

> I think all new technologies create amazing opportunities. And that has been my experience. So if you are avant garde, and you’re in front, in the first part of the wave, and even understanding what the concepts are - so again you don't have to be a programmer or a techie - but you understand and you follow the concepts. There are women in law, in accounting, and professions that do have significantly higher numbers of women, they can benefit in their career by understanding the progress and the way the new technologies are moving.

Here we can sense that the very proximity to blockchain is advantageous for women, regardless of their career path. At the present, every profession is influenced by technologies. This discursive frame shows how blockchain can increase opportunity and advantage, which advocates aim to showcase and encourage for more women. As one young lawyer, Ariana, reflected:

> It’s an opportunity, I mean, it just really is. Sometimes the reality is just that if you are the only person [in the room who knows about blockchain], then people will be more likely to think more of you. Because the reality is, particularly in Canada, where we place a lot of importance on gender differences and gender equality and balance, people are more conscious of it, and so it does give opportunity to women. I started in the space in 2015. And because I was obsessed with blockchain, I started the first practice in Canada on crypto tax, across all of the big four. And it turned into a massive practice. It turned into a 3.5 million practice in a year, which got me a lot of credibility as someone who’s very junior.

On top of all the hard work and dedication she conveyed through her interview, Ariana's story above conveys the serendipitous element of being an expert at the intersection of blockchain and law in the earliest moments that this knowledge was highly in demand.

With that said, alongside the many enabling factors this negotiated discourse offers women, it also introduces some constraints. Interviewee Elizabeth, a seasoned researcher, noted how women's initiatives framed within the negotiated discourse can welcome women, yet also isolate them from the broader space:

> So I mean, I love the women's regatta [tech event] 'cuz it's focused on women, but I have to say that sometimes I do find it ghettoizes women a little bit, so I actually myself don't spend a lot of time. I like to dip in, but that's not the only one I would go to. I also participate in an executive women's swarm on IT security and risk management and privacy. And I have for years before I even got into blockchain space and I found it similarly useful, because we talk about women's issues. We always joke and say it's the only place where we can talk about menopause and cryptography in the same sentence.

This sentiment highlights the fact that while the interviewee enjoys the camaraderie, learning, and networking at women-focused events, she also views them as supplementary or counterproductive at times, in comparison to participation in the dominant discourse of the space overall. However, the fact that 'by women for women' spaces are inherently 'separate' contributes to their acceptance within the broader dominant discourse. This is because they are not framed as a direct critique to the dominant space, even if they function as spaces of resistance at times. In order to be successful, the negotiated discourse must be engaged strategically within the dominant discourse, to serve as a non-threatening value-add to the goals of the space at large.

Similarly to Elizabeth, interviewee Lisa attends events for women in tech and in blockchain, among other male-dominated networking groups. She is the co-founder of a blockchain startup. She finds value in women's events in and of themselves, for her own career growth. But as mentioned in other scenarios above, she bristles primarily at the discourses associated with them:

> Even the marketing, like everything's pink. And they call them like "chicks" or "wonder women" and I'm just not into that. Like just the language. It actually takes away from… It doesn't really matter that you're a woman in this space, but if you continue to highlight that and say, you know, "this is an event for just the girls," the language makes you feel re-victimized in a

> way, you know what I mean? Like, so what if it's an all-women panel? And you know what? Most guys actually don't care either.

Lisa points out that the cutesy labels and design associated with women's spaces are patronizing and infantilizing. As one journalist put it, "Female founders are changing the world. Please stop calling them 'mompreneurs' and 'She-E-Os'" (Buchanan, 2019). Lisa also notes that 'guys don't actually care' about anyone's gender in the space. Here she focuses on micro-level discourses based on her interactions at these events, as opposed to meso-level practices that might reinforce inequities.

Blockchain stakeholders who view the space through the negotiated discourse are constantly, strategically toggling lenses with the dominant discourse in order to be successful in the space. Organizational behavior scholar Debra Meyerson (2001) refers to those who successfully walk the tightrope between conformity and rebellion in workspaces as 'tempered radicals' who seek positive change through consistent, incremental means. In the case of the negotiated discourse, these changes often focus on personal growth and success, with greater gender representation as a by-product, as opposed to any collective feminist political goals. Most corporate diversity and inclusion initiatives reflect this discourse. The focus is to harness the talent of a wider pool of individuals to improve the quality of the technology and gain market share, and to benefit women in the process. Yet these initiatives, and this discursive frame, typically stops short of advocating for social justice as a motivator for gender equity (Dunbar-Hester, 2020). The oppositional discourse, to which we turn next, takes up this critique in blockchain.

Frame 3: Oppositional Discourse – Intersectional Inclusion

The final, oppositional discourse is called 'intersectional inclusion.' It takes an intersectional (Crenshaw, 1990) technofeminist (Wacjman, 2004) stance to critique the structural power dynamics that shape complexities of embodied social identities and technologies. The term intersectionality, originally coined by Crenshaw to analyze racism and sexism in the legal context, has become the central analytic framework for feminist scholars across various fields to examine the structural identities of race, class, gender, and sexuality (McCall, 2005). This discourse takes a proactive stance toward creating genuine inclusion over performative diversity in the blockchain space. In her book *On Being Included: Racism and Diversity in Institutional Life*, feminist scholar Sara Ahmed

writes, the “mobility of the word ‘diversity’ means that it is unclear what ‘diversity’ is doing, even when it is understood as a figure of speech” (2012, p. 58). This discourse aims to clarify and promote the value of diversity and inclusion, and ultimately transform the main space. Where the dominant frame focuses mainly on macro-level discourses of global social change, and the negotiated frame focuses mainly on micro-level discourses of personal choice and empowerment, the oppositional frame focuses mainly on meso-level discourses of structural and organizational elements in blockchain.

Examining the meso-level offers is important for understanding how discourses enable and constrain women in blockchain. For example, in both the dominant and negotiated discourses, the technology itself is regarded as inherently progressive and revolutionary. In these contexts, whether and how women choose to get involved is based on their own individual choices, knowledge, and confidence. The oppositional discourse critiques this line of thinking by analyzing the culture and biases blockchain is situated in. For instance, Ahmed (2015) defines sexism as a system for deciding whose confidence is warranted, and whose is not. When knowledge and confidence are positioned as the keys to resolving gendered inequalities, it places responsibility solely on individuals, and leaves socio-cultural structures unexamined. According to technofeminist scholar Judy Wajcman, both require analysis. She describes the pitfalls of viewing the social relations around technologies as too cemented, or too flexible:

> If the social relations of older technologies are presented in too rigid a form, then the new technologies come to be seen as too open and malleable. If the former give rise to an immobilizing pessimism, the latter obviate the need for feminist technopolitics (2004, p. 33).

Her theory of technofeminism aims to strike a balance between technophobia and technophilia to show technology’s plasticity: the same technology can have emancipatory or oppressive effects based on the social context of their use. Scholars of digital technologies have concluded that “specific local cultures of place and space… are decisive in interpreting the feminist potential” of a given technology (Wajcman, 2004, p. 74). In previous research on women’s use of smartphone apps, Peter Chow-White and I (2012) argue women’s use of technology can simultaneously enable and constrain their identities and experiences. For instance, social media has allowed for new forms of misogyny and harassment toward women while also facilitating women’s collective resistance against such mistreatment, as seen in the #MeToo movement (Mendes et.

al., 2018). Technofeminism offers a nuanced perspective from which to analyze the complexities and contradictions inherent in both gender and technology.

Within the oppositional discourse, blockchain is not inherently good or bad. It is 'in-the-making' (Cockburn & Ormrod, 1993). As such, it requires a diverse set of stakeholders developing all aspects to become meaningful, accessible and useful. In *Gender Codes: Why Women are Leaving Computing*, Thomas Misa contends that any tech reform efforts must first confront the distinctive culture of computing, beginning at the discursive levels: "if language creates culture, then computing has created its own universe… Popular images in advertisements, movies, computer games, and computer magazines all tend to reinforce the male dominance of the field" (2010, p. 12). In the rare moments when interviewees spoke of how culture, values, and politics become embedded into blockchain technology, they spoke the language of this discourse. For example, a common phrase in the dominant blockchain discourse and theorized by scholars is that "code is law" (Lessig, 2006). In contrast, one interviewee shared how she tries to raise awareness of how technologies have politics:

> Last year on stage, I was trying to preach to people. All these dudes are like, "code is law, code is law." Like, dude chill out, right? I'm not the engineer, I get it. But let's think about this. Like your programming, your code is law. But you're translating some type of language into code, and what language are you talking? At the end of the day, whatever code he's programming it into, it's *his* logic, it's *his* ethics, right? We as a human race, we don't agree, we don't have a moral consensus. What are our ethical values? We are nowhere near consensus on any of that. So how do you say "code is law" and focus so much on the tech? How could it *not* be flawed, right? It's so important to bring these cultural issues into it. Yes, you have to focus on the tech. But if you don't look at the world holistically, your code is very siloed.

This perspective analyzes the nature of culture, communication, and technology, and how they influence one another. It reflects the oppositional discourse in a way that only a few interviewees engaged in. The problem is not only the male-dominated nature of the field, but the way certain social relations are baked into the technology. Instead of seeing blockchain as neutral and revolutionary, or inherently compatible to women's interests, this stance views the technology as malleable and shaped by human intention, especially at this early stage of development and adoption. This marks a telling contrast between the negotiated discourse, which seeks to enable greater participation and representation in the dominant blockchain space, and the oppositional discourse, which

seeks to transform the gender politics of the dominant space. Lessig's concept of 'code is law' (2006) highlights how the architecture of the internet can expand or contract an individual's actions through technological means. With the introduction of blockchain, De Fillipi and Hassan (2018) have revised the phrase to argue that 'law is code.' In other words, through blockchain and smart contracts, code is assuming an even more powerful role in regulating people's interactions through the Internet. Where code used to have an effect on the law, law is now being defined as code.

The participant quote above raises another significant ideological contrast. Earlier in the chapter, an interviewee critiqued the negotiated discourse, saying she felt that *women's initiatives* 'silo' women. In the quote above, within the oppositional discourse, the interviewee identifies the *code itself* as silo'ing the interests of underrepresented groups. This is the underlying dynamic that is triggered and debated when those within the dominant discourse say, 'the technology doesn't care what color, gender, nationality, or religion you are.' These social identifiers are framed as separate spheres outside of technology and society, instead of the fabric that make technology and society possible. In contrast, the technofeminist stance frames gender and technology as mutually constitutive of one another (Wajcman, 2004), and considers whether a technology may or may not serve feminist interests. Layne (2010) argues that technologies can be considered feminist if their design and use, whether intended or unintended, improves the lives of women. Johnson (2010) builds on this by suggesting feminist technologies may take one of four forms: one that improvements the lives of women, contributes to gender equality, favors women, or elicits more equitable gender relations than those associated with prior technology. Technofeminism further augments this criteria by underscoring that we cannot uncritically assume a unitary motivation for technology development or use among women.

Intersectionality is another key concept that defines the oppositional frame. It provides a modality for breaking up the problematic idea of gender as a singular analytic category. In recent decades, feminist scholars have embraced intersectionality as a central tenet of feminist thinking for present understandings of gender (McCall, 2005). Jessie Daniels (2021), a scholar at the Oxford Internet Institute, examines white women's unintended complicity in racism in her forthcoming book, *Nice White Ladies: The Truth about White Supremacy, Our Role in It, and How We can Help Dismantle It*. She shows how seemingly benign everyday choices can harm communities of colour

and offers suggestions for moving toward true equity for all. Scholar Mary Maxfield (2021) teases out a common misunderstanding of intersectionality – the 'additive' approach, which does not capture the full extent of the term. Like many, she originally understood intersectionality in the terms of unique viewpoints based on various aspects of identity, such as race, gender, dis/ability, sexual orientation, or class. The problem with this simplified version, she explains, is that it treats each of these axes as separate and quantifiable, which can set us up for the baseless debate of the 'Oppression Olympics.' The point of intersectionality is not comparison. As Maxfield explains, it is about how multiple forms of oppression are experienced simultaneously and inextricably from one another, so you can't tell them apart. This is a more accurate representation of Crenshaw's (1990) original concept. She argues that Black women experience racism and sexism in a way in which you cannot clearly delineate where one ends and the other begins. In this scenario racism and sexism change the shape of one another in a co-constructive way, not unlike the co-construction of gender and technology. This is an important consideration within the oppositional frame. Stakeholders looking through this lens are quick to note that gender is not the only problem to be ameliorated in the space. Interviewee Jessie, the investment advisor, also organizes a local meetup that exemplifies this discourse. As she explains:

> So for me, diversity was, "I'm only going to feature women speakers at my events." And I can talk about some of the criticism I received for that. But it wasn't just women. Look at the diversity in the age, and ethnicity, and the various work backgrounds.

She shows how intersectionality is key within genuine gender equity. I explore Jessie's meetups, as well as other groups like Black Women Blockchain Council, further in the next chapter.

Another feature of this discourse is that stakeholders are unafraid to critique male-dominated tech culture and the social problems associated with dominant technologies in contemporary society. As Jessie continues:

> Look at our existing tech world, where the four big companies, Facebook, Google, Amazon, and Netflix, have all been designed by men. There's a lot of problems. Like, we can't have one demographic design our world for us. So it's more about, 'look at our world, it's not representative.' It's not just a blockchain problem. It's very, very complicated and it is a cultural problem. But I think blockchain, the reason why I feel like I'm spending my time on this, is because we're at the *beginning* stage. We have not even begun to

> imagine how it can impact the world. And right now I have a chance to actually encourage more women to come and influence the space with me. I can't do it in VC, or on Wall Street. Changing culture is very hard. So the first thing I did was I created this organisation. And it really was, "I don't know what to do about this, but history is going to repeat itself, and this is worse than Wall Street," because these guys got so rich, like 100x in a year.

She reinforces the urgency of wanting to participate in the early stages of the technology – but this is not motivated by the potential to get 'crypto rich.' It is to use blockchain as one pathway into social equity. Shoshana Zuboff (2019) critiques precisely these tech corporations and their misuse of power as a threat to democracy. She advocates for a digital future that amplifies human rights and individual sovereignty, as a necessary element to a true democracy. Proponents of the oppositional discourse would agree with Zuboff, viewing blockchain as a powerful resource to address social problems, starting from the social influence of the design process itself. Jessie sees blockchain as a space that can still be shaped culturally and socially to affect positive change, as opposed to the more entrenched infrastructures of longstanding fields such as venture capital and Wall Street. She is also transparent about the fact that she did not have a clear idea of how to solve these problems, she just stepped into the space and started experimenting with ideas. This resonates with the description of feminist collaboration, which communication scholars have characterized as 'reflexive becoming,' 'proactive improvisation,' and 'co-learning partnerships' (Long et. al., 2019).

Addressing the culture of the space, which directly informs the technology itself, is a key concern for the oppositional view. For interviewees committed to this work, it involves not only supporting women, but raising awareness and rallying support among men, to influence the dominant discourse of the broader space. Darcy, the VP of Communications, shares:

> I think it's totally fine to have events that are by women for women. Like with my not-for-profit, we do some cafe events that we advertise as a safe place to share intimately, and they're for women only. But if that's all we did, we would just be continuing on the disparity and the divide. We need *all* people, to *want* all people, to lean in. And that takes male champions. It takes male inclusivity. Males won't understand females unless they are included. You won't understand our perspective. So I think there is a place for both, right.

In contrast to the meritocratic discourse, the negotiated discourse, and even more so the technofeminist discourse, advocates for intentional inclusivity. And in line with third wave feminism, progressive masculinities are a key element of progress for people of all genders. Technofeminism critiques the history of technology design, production, and use as an inherently masculine enterprise. It does so by demonstrating how both the discursive and material planes of the field reproduce stereotypes of women as technologically inferior, disinterested, fearful, and passive. One interviewee describes the subtleties of exclusion versus inclusion, and gendered inequities from society at large that are reflected in tech culture:

> I was comfortable walking into a room, and no one particular person made me feel excluded. That's all true. But it was *upon me* to not feel excluded. It was upon *me* to feel comfortable. Like, most men wouldn't feel comfortable walking into a room full of women. They just wouldn't do that, right? But I grew up in that world. I've been in conferences where it's all dudes. And if we do nothing about it, and always leave it on the person who's different, it's similar to our culture right? Where it's all upon the woman to manage her family and career. It's not sustainable. It's not good for our world, our culture, in the long run. So we have to make it more meaningful, be more deliberate and intentional with how we do business. I can't change the entire world, but in this space, at least it's a forward-looking space.

These comments highlight several themes. The first elevates the concept of intentional inclusivity, as a directly oppositional idea to meritocracy. The second shows how gender inequities found in society at large are naturally reflected in tech spaces as well, a sentiment expressed by various participants. The interviewee connects these two concepts by placing blockchain at the centre as a potential pivoting point for more progressive gendered social relations both in tech and in society at large.

This final quote demonstrates the practice of toggling between discursive frameworks. Jessie explains how she introduces herself and her work, in various social contexts. In order to determine whether she can speak freely about her mission of gender equity, she treads lightly at first:

> If someone gets it, if they're somewhat philosophically aligned, then I can dig in deeper, right? If not, I kind of just tell people that I run an investment advisory firm, and I focus on blockchain technology, 'cuz I think it's the tool that can actually make a meaningful difference. And it's important to encourage more women in this new technology. That's generally what I tell

> people. But if there is more of an understanding, then I don't have to preach or change your mind. If you're already on board, then I go in deeper.

Here we see a two-step discursive process of testing the water before proceeding to assess whether talk of gender will be accepted, ignored, or derided. This is an important aspect of speaking and acting within the oppositional discourse, because if the goal is to challenge and reform the male-dominated culture of blockchain, the appeals must be made compellingly and non-threateningly. Also, since personal resources are limited for raising awareness of the role of gender in blockchain, as described in the following chapters, this is a practical, energy-saving tactic. The oppositional discursive frame is the most analytical and critical in its thinking about of both gender and technology, in comparison to the dominant and negotiated frames. It takes more of an activist approach in its motivations to develop blockchain, in comparison to the others. Yet all three discursive frames share the common belief that blockchain is, or can be further developed into, an incredibly ground-breaking and influential technology.

Conclusion

In this chapter, I explained how discourse is inherent to language, communication, and society, and why the discursive-material connection in scholarly research is important. I have engaged a variety of perspectives with different interpretations of how 'words make worlds.' At the present, discourses of new technologies are deeply implicated in these foundational processes that shape our everyday lives. This chapter offered a preview of how the blockchain space is a fertile place to explore fundamental ideas about personal progress, and social progress, which are sometimes at odds with one another. I presented this through a discussion of three discursive frames about gender and technology, that I observed in the data: (1) the dominant 'gender-blind meritocracy' frame, (2) the negotiated 'lean into blockchain' frame, and (3) the oppositional 'intersectional inclusion' frame. I re-envisioned and re-purposed Hall's (1980) encoding/decoding model of communication, to explore the complex phenomenon of how minoritized producers of a new technology toggle between frames to successfully navigate the space.

Analyzing the interview data through these frames exposed detailed contours of the space. There are various types of discourses at work in the space, some of which overlap seamlessly and others that cause friction between one another. For example,

there is a strong ‘social progress’ discourse permeating all three discourses, as well as a ‘gender equity’ discourse in frames two and three. Since each of these relate to social progress, you would think they would work well together. But in fact, there is some bumpiness between frames one and two, and even more friction between frames one and three. This goes to show how gender is perceived in the dominant blockchain context and society at large, as something outside of ‘the main frame.’ Since this conversation takes place in a male-dominated context, we can see how ‘gender’ automatically refers to women here. Discourses like ‘intersectional inclusion’ show us that the influence of all genders, as well as race, age, ability, and sexuality deserve to be analyzed in terms of how they shape technologies. In short, ‘social progress’ and ‘gender equity’ are deeply connected and compatible discourses for some, and separate concerns to others.

In *Hacking Diversity: The Politics of Inclusion in Open Technology Cultures*, communication scholar Christina Dunbar-Hester (2020) flips the stereotypical script on diversity in tech cultures. She investigates why activist efforts for diversity in open-source software communities have largely failed, arguing that promoting representative diversity in technical terms is not equal to generating social or political justice. Instead of asking how to recruit more women and people of colour to tech, she interrogates the motivations and discourses around these efforts, by asking “if diversity is the answer, what is the question?” (Dunbar-Hester, 2020, p. 17). To answer her question through each of the discursive frames I identify in this chapter helps to summarize them. The dominant frame might ask, “how can we solve this diversity issue, if it supposedly improves our product and makes our stakeholders happier?” The negotiated frame might ask, “how can we get more companies on board with the fact that diversity teams are more profitable and more innovative? If we can do this, more women will benefit professionally, which will benefit the overall economy.” And the oppositional frame might ask “what would a more just and equitable tech culture look like? And what kinds of technologies would they produce?” The dominant frame focuses mainly on the technology itself. The negotiated frame focuses equally on technology and gender. And the oppositional frame focuses mainly on social issues including gender, with technology as an important supporting feature.

The negotiated frame serves as a corrective to the dominant frame. And the oppositional frame serves as a corrective to both the dominant and negotiated frames.

For instance, through the negotiated discourse, cryptocurrencies may be seen as an empowering new type of investment women should participate in as a ‘shortcut to wealth’ as one interviewee put it. In contrast, an interviewee viewing cryptocurrencies through the oppositional discourse, was more apt to point out the cultural problems at stake with ‘crypto bros’ becoming ‘super rich’ in the first place. These differences illustrate key differences in how each of these discourses conceptualize gender and power in relation to technologies. The negotiated discourse encourages women to get closer to dominant forms of power in the existing space. Whereas the oppositional discourse says, this type of power is problematic and needs to be dismantled and rebuilt.

In this chapter, I showed how each of these three discursive frames influence the experiences of women in particular in the blockchain space. This includes participants operating solidly within the dominant postfeminist frame, who prefer not to acknowledge gender’s role in shaping their work in blockchain. Even those who explicitly do not want to ‘make a big deal out of gender’ acknowledged various enabling and constraining factors to do with moving through the space as a woman. This reinforces the fact that everyday life is inescapably shaped by and experienced through our genders, and other peoples’ perceptions of it. In the next chapter, I apply this discursive framework to examine meetups, conferences, and hackathons as informal but influential professional spaces where women shape, and are shaped by, blockchain.

Chapter 5. Women on the Block: Meetups, Conferences & Hackathons

Introduction

Communication scholar Anne Balsamo (2011) contends that technology and culture are inseparable. Advocates, analysts, and applicators who influence the culture of blockchain are key stakeholders in designing the technology itself. Investigating cultural practices and gender relations in the context of emerging technologies illuminates how 'technology is society made durable' (Latour, 1990). One of the places we can clearly observe this process in blockchain is through 'meetups,' conferences, hackathons, and other place-based events. In one extreme example of crypto culture at its worst, at a 2018 Bitcoin conference in Miami only three of the 88 speakers were women and the event concluded with a party at a strip club (Primack, 2018). Since then, advocacy groups and social networks such as Crypto Chicks, She256, Black Women Blockchain Council, and Diversity in Blockchain have emerged as supportive communities rooted in professionalism and entrepreneurialism. Feminist research has been instrumental in deconstructing the binary opposition between designer and user, production and consumption, and technology and culture, to show that the co-construction of gender and technology is pervasively interconnected (Cockburn & Ormrod, 1993; Wajcman, 1991, 2004). Emerging technologies facilitate opportunity for new forms of identity, community, and power. And technofeminist scholars remind us that gender relations are materialized in technology (Wajcman, 2007). In other words, the maintenance of gendered identities is produced through discourse in sociotechnical contexts.

In this chapter, I examine the gendered social relations at blockchain meetups and conferences. I do so based on data from 30 interviews as well as 17 participant observations I conducted at local blockchain events. I would like to clarify that the first eight of these participant observations were part of a collaborative project undertaken by me, two of my colleagues, and my supervisor in the GeNA Lab at SFU. Our insights from these observations were published in a book chapter called ‘Meetups: making space for women on the blockchain,’ in an edited volume on blockchain and web 3.0 (Adams et. al., 2019). I would like to acknowledge and thank them for their collaborative scholarship.

Our initial research provided the foundation and inspiration for me to continue attending and observing an additional nine events. These meetups became avenues for participant recruitment as well as a key topic of discussion in my interviews. This chapter focuses primarily on my interview data. But the participant observations grounded my sense of their importance, and my interview protocol.

In this chapter, I analyze how the interviewees' both encode and decode discourses and practices at various types of blockchain events. While my primary focus is on place-based gatherings, the data I presented also describes practices and discourses relating to their corresponding digital networks on social media, text, and email platforms. These are inseparable, especially in blockchain. To analyze these various types of events, I use the three discursive frames I outlined in Chapter 4. They include: (1) "gender-blind meritocracy," a dominant discourse of meritocracy and postfeminism, rooted in libertarian values; (2) "lean into blockchain," a negotiated discourse associated with cyberfeminism, popular feminism, and liberal feminist values; (3) and "intentional inclusion" an oppositional discourse associated with technofeminism.

I observed how different types of blockchain events correlated with each discursive frame. As I analyzed how discourses were encoded and decoded in different social contexts across the space, I realized the significance of who the event was *designed by*, and who the event was *designed for*. The first type of events I examine are the most plentiful and common in the space. They are 'by men, for everyone' meetups and conferences, which are typically male-dominated and sometimes include diversity gestures such as 'women in blockchain' panels. The second type are 'by women, for women' groups and events, such as women-only blockchain conferences or hackathon competitions. The third type are 'by women, for everyone' events, which aim to highlight women's expertise and improve social equity in the dominant space. My findings show how women’s identities and experiences are both enabled and constrained, sometimes simultaneously, through participation in blockchain events.

Blockchain's form and function begins to solidify through the discourses and practices that flow through online and offline social networks. Meetups and conferences play a pivotal role in blockchain education, networking, and professional development. They are a key entry point to the technology and the communities within it. This study asks, *whose voice is heard in these blockchain spaces? Whose knowledge counts?* I

examine meetups and conferences in terms of who organizes, speaks at, and attends these events. Castells maintains that “the network society works on the basis of a binary logic of inclusion/exclusion, whose boundaries change over time, both with the changes in the networks’ programs and with the conditions of performance of these programs” (2009, p. 26). The inclusion/exclusion logic of the network works as dominant groups and interests 'switch off' marginalized groups or interests dubbed as 'irrelevant' from the perspective of dominant interests. Yet in the context of digital social networks, Nahon (2011) argues there is a fuzzy, interactive power dynamic between 'gatekeeper' and 'gated' network members that allows for greater flexibility in these roles, in comparison to our traditional conception of elites. For instance, the same individual may hold the power of a gatekeeper in one network and remain a gated member in another network. This role shifts according to time, place, and social context. The data presented in this chapter illustrates this dynamic gatekeeper/gated role in the gendered social relations at blockchain meetups. For instance, interviewees who had established their own blockchain conferences or companies and achieved impressive reputations in their local social contexts were still more likely to be discredited in the dominant frame at blockchain conferences abroad based on stubborn stereotypes about technological competency and gender.

A ‘meetup’ is a face-to-face gathering of people with similar interests, often intertwined with and facilitated by digital social networks. These events are typically publicized via email or word of mouth, or publicly searchable on a website like Meetup.com, which enables users to search by interest topic locally and organize regular offline gatherings. In some cases, they are private, invite-only, and intentionally curated. Sander found that the website Meetup.com contributed to the creation of “alloy social capital” that “interweaves online and real strands” (2005, p. 4). Putnam (2001) delineates 'bridging social capital,' formed by broad networks of weak ties with people from different backgrounds, and 'bonding social capital,' based on strong relationships that offer trust and emotional support. Digital social networks tend to facilitate ‘bridging social capital,’ where participants connect about blockchain globally but casually or sporadically. And blockchain meetups are more likely to facilitate ‘bonding social capital’ where participants connect in person, locally, with the potential to create more meaningful and lasting connections. A combination of both of these types of social capital is important for success in the blockchain space, for women in particular.

‘Women in blockchain’ (WiB) meetups are significant spaces of support and resistance. Meetups may take the form of regular, informal gatherings in a local coffee shop, or more structured learning events in formal settings. A semi-professional peer group may emerge and meet periodically, as was the case with an invite-only WiB monthly drinks events I was invited to attend after meeting the organizer at a conference. Participants weave social networks through both place-based gatherings and digital networks in order to expand their personal and professional circles, support one another, and share information about events and job opportunities (Wellman et. al., 2003; Benkler 2006; Rainie & Wellman, 2012). These spaces represent strategies outside of the formal workplace that women use to address gender inequities in male-dominated industries. On a tangible level, these events offer professional networking, job opportunities, and skills development in a safe environment. On an intangible level, they also function as feminist infrastructures of support (Ahmed, 2017) for dealing with challenges and discrimination at work.

Scholars have begun to research meetups as valuable sites to study social networking and information-sharing in ways that differ from other spaces like workplaces or online communities. Sessions (2010) and Shen and Cage (2013) show how offline meetups influence the social dynamics of the online communities they are tied to. According to both studies, meetups often galvanize attendees' bonding social capital, at the expense of bridging social capital with members who are exclusively part of the online community. However, in this study, I focus on analyzing the discourses framing the meetups, across the online/offline continuum, and how interviewees use meetups and conferences as key sites of networking and negotiation to succeed in the space. Gina Neff (2012) notes the act of networking is pivotal to maintaining sociotechnical identities, and that Western tech industry workers are expected to put large amounts of time and effort into this practice. Some participants expressed the laborious and sometimes costly process of attending various blockchain events to find which were most valuable to them. Others expressed that after a period of exploring meetups and conferences as springboards into the industry, they generally avoided most of them after establishing themselves in the industry.

The co-construction of gender and technology happens in part through conversation, debate, and discussion in the public sphere. Lana Rakow articulates this cycle of co-construction: "communication creates genders who create communication"

(1986, p. 23). Blockchain events offer a prime site of inquiry to observe the ongoing co-construction of gender and technology in action. They are instantiations of interpretive flexibility (Pinch & Bijker, 1987) where meaning-making occurs, as the identities of both blockchain and its key stakeholders take shape. The aim of this chapter is not to compare men's and women's practices at meetups and conferences. It is to explore the ways blockchain is used discursively and materially to construct gendered individuals through the social practices that build, communicate, and diffuse the technology.

The findings presented in this chapter are drawn from both of my data sets, including participant observation at blockchain events, and my interviews with women who work in the space. First, I provide an overview of the most salient benefits and challenges of meetups and conferences in the dominant space. Then I analyze gender equity initiatives I observed at three different types of meetups, through each of the discursive frames. The first type of gender equity initiatives, within the gender-blind meritocracy frame, are seen in practices such as ‘women in blockchain panels.’ Whereas the following types of gender equity initiatives are new and emerging types of events themselves. These exemplify the ‘lean into blockchain’ and ‘intersectional Inclusion’ frames, in response to the dominant discursive frame. Within my discussion of each frame below, I outline factors that enable and constrain women in the space.

Gender-blind meritocracy: 'by men, for everyone' events

The majority of blockchain meetups and conferences are disproportionately male-dominated, which reflects the gender ratio in the blockchain space at large. Similar to the tech space at large, the sentiment that ‘anyone is welcome’ at these events rings hollow when surveying the demographics in attendance. They align with the dominant discursive frame of the 'gender-blind meritocracy.' Regardless, they represent an imperative, valuable site for networking and education for anyone’s success in blockchain. Each of the interviewees had attended these types of blockchain events for mixed-gender audiences, and expressed various benefits and challenges. I will first review several benefits. Interviewee Carrie, CEO of a cybersecurity company in Berlin, captured the interrelation and interdependence of digital and place-based networks in blockchain’s global context:

> I watch video talks from conferences, I read things like blogs or Medium for the latest analysis on certain topics, and I listen to podcasts to get a little bit more in depth. I do a lot of video calls with people around the world. And then another helpful forum would be meeting people in conferences in person - everything from sitting in talks to the one-on-one conversations. I mean the magic happens between all those things. You get in the one-on-one conversations to really figure out, “How can we do the next thing?” Whatever the next step is to push this area forward.

Carrie’s quote illustrates the fluid dynamic between digital and face-to-face networks. She underscores the impact of how these online and offline interactions add up to more than the sum of their parts in the phrase, “the magic happens between all those things.” Many interviewees toggled back and forth, referencing interactions that weaved through both types of social networks, as they explained how a singular story unfolded. As Castells (2001) puts it, society is a ‘network of networks.’ Meetups and conferences are just one type of network layered over other networks in blockchain. These multiple, shifting configurations have important implications for trust, participation, and power. Social media and texting platforms such as YouTube, Medium, Twitter, Whatsapp and Telegram play a key role in how participants engage daily with the blockchain space. Yet participants also emphasized how the face-to-face nature of meetups and conferences has the potential to deepen, crystallize, and humanize those connections.

A convening technology

Blockchain is a 'convening technology' that opens new spaces and initiates conversations that "can address issues far beyond what it may ultimately be able to address itself" (Baym et. al, 2019, p. 403). Convening technologies attract resources and networks representing various forms of power. Ariana, a blockchain-focused lawyer who spoke at 50 conferences in 2018, valued this aspect of gatherings around emerging technologies:

> Generally the conferences themselves are not useful to me. It’s the people who come around the conference. So when I attend a conference, I will do my panel, but then I’m in meetings the rest of the time. Even if the conference content is not that good, I can identify a new idea, or company I can collaborate with. It’s also a prime time to connect with my clients who run start-ups. Once they raise money, they don’t have any more time. But I can actually get an hour of their time at a conference.

This point illustrates the importance of participating in embodied, place-based elements of blockchain's 'space of flows' (Castells, 2000). The traditional 'space of places' exemplified by conferences and meetups may have become less important in the day-to-day context of disparate, remote blockchain work, yet they still play a pivotal role. They are the interfaces between digital and place-based spaces. For 'convening technologies' in particular, these spaces attract people with common interests and facilitate collective decision making in an ongoing, iterative fashion, as both Carrie's and Ariana's quotes above demonstrate.

On-ramps to blockchain

At the local level, meetups function as an instrumental on-ramp to engaging with blockchain, on both cultural and technical levels. For example, community organizer Alice identified the social scene around meetups as key to facilitating her initial cryptocurrency acquisition:

> We were at a meal. I paid for [a guy's meal], and he gave me crypto. So it was just, like very easy. He told me which wallet to download, all that type of stuff. If I would have just been searching stuff on the Internet, I would have never, ever bought crypto.

Most interviewees had acquired cryptocurrency as part of their involvement in the space, whether or not their work in blockchain was directly related to cryptocurrency. Many recounted the challenges of setting up digital wallets or dealing with cryptocurrency exchanges for the first time, as this process was notoriously unfriendly for users in its initial stages. Alice's story of the crypto-for-cash exchange at a restaurant following a meetup by a well-known grassroots group in Vancouver, is a good example of how interviewees engaged on both discursive and material levels with the technology through place-based events.

Speaking as a significant act

Finally, several interviewees highlighted public speaking experiences as the most useful aspect of meetups and conferences for them. Amy, an interviewee with deep technical expertise in blockchain, reflected on this opportunity now that she has transitioned from a grassroots leadership role to a corporate role in the industry:

> Mostly the value for me has been the speaking experience, and the teaching aspect. The more people I talk to, the more people that ask questions, the better I get at explaining things. ‘Cuz I'm now in a world where blockchain isn’t common. Where most people don't even understand how it works. So the more people I can explain it to, the better I’ll get at my own internal explanations. That makes me a better teacher and a better leader.

This demonstrates the importance of the discursive/material connection that crystallizes at events. In this case, public speaking at meetups and conferences presents key opportunities for personal and professional development. Meetups are also key spaces where tensions between dominant and resistant discourses are negotiated and materialized in particular ways, as I establish below.

Shortcomings and constraints

Interviewees also reported drawbacks and risks to do with meetups and conferences, including fatigue from the expectation to attend so many events, and the high cost of entry fees or travel costs associated with some events. For example, one of the biggest and most popular, the annual Consensus conference organized by CoinDesk, costs $2,000 per ticket. Even Ethereum founder Vitalik Buterin, a well-known figure in the industry, criticized and refused to attend based on this overcharging (Helmore, 2018). As interviewee Kacia reflected:

> I think that's the biggest thing for me. If I'm going to use my time and money to go and, and I mean it's *exhausting* going to all these events and meetups, it's got to bring value. In the startup and blockchain space, it's totally on your own dime to go to these events. So if you want to develop your personal repertoire, you have to actually go out of your way to do that.

As a startup employee, Kacia reinforced that she did not have the safety net of a professional development allowance or the sense of job security she might have at a more established tech company, since regulation and market conditions in the blockchain industry remain in flux. Many of the interviewees were self-employed or working for start-ups, which is common in emerging technologies. Therefore, since conference and meetup fees are typically not covered by employers, many interviewees carefully and constantly considered the cost/benefit ratio to do with each event, in terms of both time and money.

As part of the process of judging the value of place-based events, interviewees spoke of the struggle to find a feeling of belonging as well as professional development in blockchain's predominantly male-dominated scene. These feelings ranged from a familiar, underlying knowledge that the space was not designed for them, to outright misogynistic sentiments. For example, showing up as a woman and bringing 'your whole self' to an event, especially as a mother, is certainly still out of the norm. Tara, CEO of a blockchain research firm, described this:

> One of my proudest moments and a bit of a statement moment was bringing my nine-month-old daughter to Consensus in New York. It was my first crypto conference, and I had her strapped on in the chest carrier for three days. Just 'deked out' whenever she needed to nurse. And she brought life to the whole thing. She got dubbed 'the earliest adopter.' But there was definitely a mixture of comments, you know. I was holding down some business meetings with her strapped to me, and I was totally in my groove. Of course as a mum, you're always of split-mind especially when they're attached to you. But I noticed that split-mind was of different proportions for the people across the table. It was like, "damn right, mom can work at the same time as being a mom. But pay attention to what I'm saying because I'm going to close this deal right now." And then there was a moment of course, where she went through her whole shrieking phrase, and the entire ballroom and panel goes quiet. But I guess I was making a point to myself and to other moms. Do it. Roll your life as you want. And it actually made me contemplate hosting childcare services at our event.

In this conference context, especially a male-dominated one, Tara was much more visible as a woman and a mother than as the blockchain expert or economist she also is. As someone self-employed and leading a blockchain startup, she was able to travel flexibly and mix business with parenting. Yet on top of this double duty, her position involves the additional layer of social labour to prove her expertise in the space. For example, she recounted that in one meeting, the party on the other side of the table said they would wait until her CEO arrived to begin the meeting. Again, she was the CEO.

Simran, a blockchain entrepreneur in her mid-20s, realized in retrospect that one of her main motivations to attend the larger, male-dominated events was to meet others like herself to navigate the space more competently and comfortably:

> When I look back to some of those meetups, I would say one of the reasons I went was specifically to meet more women in the space and connect with them as human beings. Sharing issues that are related to gender or imposter syndrome or just feeling vulnerable with somebody that you might connect with. And it's harder to do that with men, especially when they're

> high-powered. So having someone to talk to about managing those pathways, or uncomfortable power dynamics, scenarios that might get sexual. It just makes it easier. If you connect with other women on that level, they really want to help you push forward.

Many interviewees expressed similar sentiments about both the need and the enjoyment of connecting with other women in the industry. Place-based meetings facilitated important connections with people of all genders. However, making connections with the other few women in the room also proved to be an important element of solidarity, for personal growth and insider knowledge to defend against discrimination or harassment in the space.

These narratives demonstrate how women constantly toggle between personal and professional dynamics at male-dominated blockchain events, in ways that men generally do not need to. They also speak to the problematic hierarchy of who is assumed to 'belong' as a competent participant or leader in the space. When men make up the vast majority of attendees, women are seen as 'other' at best, or made to feel unsafe at worst. In the case of one blockchain meetup at a local pub, UX designer Aisha felt so uncomfortable, she ended up leaving before the talk began:

> I went in and there were three people talking amongst themselves. No one paid attention to me, and then one person asked, "Are you here for the event?" And I said, "yes." And they're like, "OK, are you a student?" I was like "No…" [*laughing*]. The assumptions begin from there, you know. And they're like "OK, do you work in blockchain? Are you looking?" Once I said I worked at MetaMask, then all their attention was there. And then they're like, "Oh, really." And all these questions come up and they're suddenly interested. Then they take me to some other room inside, which was really dingy and disgusting to be honest. And I felt so uncomfortable. No one else was there yet, for the event, and I was somewhere inside in a room, and they were talking to me about a game that they started. It just felt very much like a boys' club. I felt weird, so I was like, "I'm going to go."

In this scenario, Aisha was made to feel out of place from the outset, and then progressively uncomfortable enough to the point of leaving before the meetup talk officially began. Besides the talk, she had also hoped to connect with some blockchain developers from CryptoKitties, whom she had seen on the attendee list, about a technical aspect of their analytics. Instead, she introduced herself to them briefly on her way out. They exchanged cards and made a plan to meet at another time. Various interviewees echoed the themes expressed in this scenario. Its hallmarks include an assumption of their ignorance about blockchain, followed by a quizzing about credentials

when they reply about their work, and moments of feeling uncomfortable, unsafe, or embarrassed.

In many conference environments, deep-seated patriarchal gender norms persist. For instance, on a recent trip to Australia, interviewee Elise, a 'women in blockchain' meetup organizer with a master's in computer science gave an opening speech at a large meetup attended mostly by men:

> It was over 100 men, and they invited women to this meetup as speakers and participants. And following my speech, there was a panel of six very, very brilliant ladies in the space there. But before the event started, I noticed men were talking and discussing, and one of them said to me, "This meetup is kind of like a strip club, where women are on the stage and men are in the audience." So, you know, that was certainly something that I didn't appreciate.

This panel of women in blockchain was a well-intentioned bid toward highlighting the speakers' expertise. Yet the culture of this male-dominated event reflected open misogyny from some men in the audience. Women speakers were objectified, and their professional skills easily overlooked. This sexist perception of being on stage was echoed by interviewee Gabrielle, who shared, "If you look at the comments on my TED talk, some of them are horrible. They are very much about the way I look, the way I dress, the way I am, the size of my boobs."

As with other toxic tech spaces, gendered discrimination and objectification of women comes into play at various blockchain events. This was clearly illustrated by Ella, founder and CEO of a blockchain marketing group, who cited the Bitcoin conference in Miami mentioned at the beginning of this chapter as one of her favourites, despite the negative press attention it garnered in 2018 for hosting its wrap-up party at a strip club (Katz, 2018). She discusses the paradoxical lenses she saw this episode through, as it unfolded:

> I should have been at that party, but I had a business dinner that was absolutely amazing. I heard about this party and I lost my marbles. I was in a chat group with three women who *were* at the party, and we were incensed. I think I remember at 10:30pm, [the organizer of the conference] basically said, "I don't see what the problem is, it was a party." And then with the outrage, someone wrote an article with comments from the three women I mentioned, which ended up in Forbes. By 1:30, 2am, he was like, "We made a misstep." [*Laughing*]. Like yeah, OK, let's call it that. And then this year, [the conference] was smaller. And they had really great things,

> like they put on the back door of the women's washroom, "If you're not feeling safe, text or call this person." I'd never seen that before. Because he was trying to do a bit of PR damage control. I'm also a big believer in, you know, he's very young, but really smart, and he realizes the error of his ways, so I'm willing to cut him some slack. I think he's maybe 22, 23? I was not that responsible at that age, I can tell you that.

Ella toggles between discursive frames as she walks through her complex sentiments in this story. As illustrated above, there is a distinct 'both/and' nature to these events for women. They are *both* genuinely valuable and necessary to their success in the field, *and* they also come along with gendered microaggressions or in this case outright misogyny. Whether women choose to avoid or address these incidents, they come at a personal and professional cost. In the case of Ella's account above, she speaks through both the 'lean into blockchain' discourse, which takes gender into account. This frame allowed her to express anger and bewilderment at the offensive event. Yet at the same time, she also hedged her judgment of the incident through a 'gender-blind meritocracy' discourse, which framed the offense as one young individual's error in judgment, as opposed to a systemic and persistent cultural problem in the space. Various interviewees reinforced that the problem of dealing with sexism to progress in the field is not unique to blockchain. Rather, blockchain and tech culture are examples of spaces influenced by the pervasive sexism in society at large.

Challenging the gender-blind meritocracy discourse is punished by exclusion from the powerful, dominant network. As per Alice's narrative in Chapter 4, women who call out gender discrimination are labeled 'social justice warriors' as a derogatory slur and discounted as serious professionals in the space. Women must therefore toggle discursive frames at these events, to gain the benefits of the conference, while side-stepping or confronting discriminatory aspects. Meetup and conference organizers have begun addressing these thorny dynamics through various types of gender equity initiatives to which we turn next.

Gender equity initiatives in the dominant frame: 'women in blockchain' panels

In response to the growing critique of gender inequity in blockchain (Bowles, 2018; Green, 2018; Elizabeth, 2018), organizers of male-dominated blockchain events have made various strides toward diversity and inclusion. These include a movement

against all-male panels, as well as the rise of 'women in blockchain' (WiB) panels. Conference organizers have also responded to calls for gender equity through 'diversity and inclusion' tracks, in the form of discounted tickets, to increase access for underrepresented individuals to attend events. In addition, networking receptions for women, tagged onto larger conferences, have become more popular. But these typically involve an additional cost or what some participants referred to as a 'pink tax.' In the context of male-dominated events, each of these initiatives represent an ‘add women and stir’ approach, to put it in colloquial terms. They are strategies for addressing gender inequities in the space, some more effective and well-received than others. Each of these gender-conscious initiatives involves a double-bind for women participants. They openly acknowledge the gender gap, which is important, yet they can also work to 'keep women in their own lane.' I explore the affordances and constraints of these initiatives below.

First, one enabling act that emerged from the data for promoting diversity in male-dominated spaces is simply boycotting attendance or moderation of all-male panels. The growing movement against all-male conference panels, sometimes nicknamed ‘manels,’ has received support by many men and women across business, tech, and academia. April, the CEO of a compliance consultancy shared:

> Yeah, I'm pretty straight up about it. I have publicly stated that I'm not going to events that do not have any female or non-white speakers, because you can't tell me that you can't find experts. Like, if you're trying, you will find them. We’re fucking legion at this point. So when I get the invites to them, I'll actually respond and say “Hey, this is all male and pale, and you probably need to address that.” And the weirdest, most common response is, “*you* should come and join said panel.” And it’s like, a panel on healthcare [*laughing*]. You should probably look at my bio, and then find a woman who's an expert on healthcare.

April expressed bewilderment and frustration at this stubborn ‘blind spot’ in the ‘gender-blind meritocracy’ discourse. Such reactionary invitations from conference organizers only reinforce the stereotype of the ‘token women or person of colour’ on a panel, who is invited mainly to fill a representation gap that was pointed out. Where ‘diversity’ initiatives are often associated with attempts to improve the optics of an event, ‘inclusion’ efforts are less performative and more qualitative in nature. The difference has to do with whether there is a genuine invitation for the panelist’s expertise to be heard and respected, versus improving the representation optics of the event. Within the gender-

blind meritocracy, such efforts are often dismissed as unnecessary pressure to be politically correct.

Second, on the opposite side of the spectrum from the all-male panel is the ‘women in blockchain’ panel. In comparison to other panels, which tend to focus on a particular blockchain-related topic, this type of panel is curated based on the participants' gender. While the discussion may involve their various types of professional expertise, the discursive framing of the panel highlights this one aspect of their identity. The conversation often involves the question *‘what is it like to be a woman in blockchain?’* One CEO, who has spoken at a wide variety of events, contrasted the difference between 'by women, for women' events, and 'women in blockchain' panels at male-dominated events, which she finds problematic:

> So [by women for women groups] are really good, just in terms of meeting and interacting with other professional women. But I want to caveat that, because there's a thing that I will not do. I will not attend a conference and be on a “women in” panel, if it isn't a ‘women's only’ type event. And my reasoning for that is, I'm really good at a lot of things, and talking about gender isn't necessarily one of them. I'm not a gender expert. I have my own experience of those things, but if you’re a tech audience, you're probably going to get far more from hearing me talk about your regulatory obligations.

This participant clearly conveyed the arbitrary, sexist nature of panels organized based on gender at male-dominated tech conferences. She contrasts the benefits of women’s only events, versus the drawbacks of gendered panels at broader industry events. While well-intentioned, WiB panels are problematic on both discursive and material levels, which reinforce one another. Discursively, 'women in tech' (WiT) labels frame men as the default experts in the field, and women as a separate category of professional in the field. Mariann Hardey critiques “the straitjacket of the WiT label as a status characteristic,” in the social construction of gender difference in professional workspaces (2019, p. 44). She argues that the label’s origins, from mainstream media discourses intended to disparage women’s individual and collective worth, limit women’s opportunities to get outside the stereotype determined by its use. This reflects Wendy Faulkner's (2009) concept of the 'in/visibility paradox' in which women in engineering workplace cultures are highly visible as women yet invisible as engineers. The data in this study shows that founders of inclusivity initiatives are increasingly wary of labeling themselves into second-tier categories, to avoid the dismissive terminology of ‘diversity

speakers or hires,' similar to 'she-E-Os' in the business world (Buchanan, 2019). Through the discursive analytical framework used in this study, I show how labels can function in complex, contradictory ways based on the politics of who encodes and decodes them.

Interviewee Jessie, a financial advisor in New York, recounted a story about WiB panels, in which she flipped the narrative on its head to show how tone-deaf the concept can sound to the women featured:

> So in March, I was in LA at a conference, and they had a women in blockchain panel with six or seven women on stage. Someone I knew was moderating it, and she said "It was *so hard* to moderate it, 'cuz it wasn't even curated. It's just 'cuz they were 'women in blockchain.'" And the organizer at one point asked me, "What did you think about the 'women in blockchain' panel?" And I said, "do you want an honest response?" 'Cuz he was expecting a pat on the back. And I said, "how would you feel if you walked into a panel and it was 'short, bald white dudes in blockchain'? And he didn't find it funny. I said, "No, I'm serious. Like, curate it. What was the topic even about?"

The exchange between Jessie and the male conference organizer illustrates the differences in how gender equity initiatives at events are encoded and decoded. The conference organizer believed they had made positive efforts toward diversity, yet the panel was not experienced as such by everyone. On a material level, 'women in blockchain' panels are problematic because they are curated based on gender, and not on the speakers' expertise. Therefore, as Jessie notes above, they tend to be less cohesive or informative. Instead of the well-intentioned initiative of highlighting women's expertise it purports to be, these panels can be experienced and perceived as a mechanism to keep women 'in their own lane.' It gives them a small space to present, without sacrificing a spot on a panel about a more serious, important, or technical topic. For example, at one of the day-long conferences I observed, women were featured as speakers on panels about blockchain's role in healthcare, art, and marketing – all fields where women have a greater presence and could therefore be seen as knowledgeable. In contrast, the panels on blockchain and business, finance, or technical considerations remained completely male-dominated. In response to this, Jessie and a colleague curated a conference called 'Women on the Block,' featuring over 50 blockchain experts who were women, for an audience of women, which I will discuss further below in the next section of this chapter.

Another gender-based initiative at male-dominated events is the rise of women's networking receptions and mixers tagged onto larger conferences. Although valuable in and of themselves, Simran described some of the frustrations inherent in these:

> So one of the things that I find interesting, actually makes me quite upset, is that if you're going to a women in blockchain event or any woman in tech event, the majority of them involve additional fees. So you already have the barrier to entry when it comes to just plainly being who you are entering that industry, but then an additional financial cost to have access to other people like you in your industry, which makes no sense. Why would a 'women in blockchain' event have an extra charge when you're already paying for the conference itself? It's usually sponsored as well, so why is it special? I've seen this at quite a few different events. The BC Tech Summit women's event had an extra charge. The one at Seattle's blockchain conference had an extra charge. I was lucky 'cuz I was volunteering, and my friends were part of it, so they were just like, "Come on by." So I felt very privileged in that regard but if you don't have those connections, it's like you are further excluded.

This is an example of the 'pink tax' associated with women's events tagged onto larger tech conferences. Although these conferences aim to provide separate, safe, valuable spaces for women to network and socialize, the additional cost adds insult to injury. As Simran notes, showing up to a male-dominated event as a woman presents a barrier to entry in itself. Additional costs can be an additional deterrent. I navigated this barrier myself, as I aimed to conduct participant observation at as many events as possible while keeping costs down. After interviewing in downtown Vancouver one day, I wandered over to the BC Tech Summit and asked if I could be admitted to the women's event as a researcher. As I went in, I noticed that the main conference and booth areas were bustling with male attendees, while the women's panel and mixer felt segregated down the hall of the convention centre.

In contrast to the pink tax, there are also diversity and inclusion initiatives to lower the cost of entry for women, people of colour, and other underrepresented individuals. For example, at the Collision conference in Toronto, tickets for women were discounted to 10 per cent of the normal price. At other conferences, such as the cryptocurrency Ethereum's annual conference, there are reduced costs for attendees or speakers who represent underrepresented groups. As Ethereum developer Bailey recalls:

> DevCon, the main Ethereum conference, did have a diversity track and funds set aside to bring in people that wouldn't otherwise be able to afford it, or persons from underrepresented groups. I know a little bit more about the behind the scenes 'cuz I know the person who was running that. And it was like pulling teeth, but it happened, which is good. At one point a couple months ago, I mentioned to someone off-handedly, "Yeah I'm going to be in Krakow for this thing, giving a talk." And the response was, "Oh yeah, of course they need some diversity in their lineup."

Bailey notes both the value of the initiative, as well as the backlash inherent in being viewed and treated as a 'diversity requirement,' even if you are there based on exceptional merit. Although valuable as a progressive, material gesture to welcome a wider span of underrepresented experts at the conference, the discursive implications of diversity and inclusion tracks can be decoded within the dominant discourse as special treatment or unnecessary tokenism. Regardless of a speaker's expertise or credentials, if they benefit from a 'diversity and inclusion' track, this can be seen as a de-legitimizing crutch or lower bar of access to the professional community. This double-bind is another example of the microaggressions women and people of colour face along the journey of gaining and sharing expertise in the field. In the dominant frame, women often need to navigate the tension between their gender, and their role as a blockchain expert. In the male-dominated context, these traits are often assumed to be mutually exclusive until proven otherwise.

Beyond these gender equity initiatives examined and critiqued above, the data also reflected several hopeful examples of conference organizers incorporating diversity and inclusion into their events with an intentional, subtle approach. Interviewee Bailey also reflected on the inclusive speaker line-up at 'DogeCon,' the conference associated with the cryptocurrency DogeCoin. This 'alt coin' emerged in December 2013 as a 'joke currency,' featuring the likeness of a Shiba Inu dog from the "doge" Internet meme as its logo, and reached a capitalization of $60 million by January 2014:

> In the late spring, DogeCon was here. In this building, in fact. And the organizers absolutely made an attempt to have a wide, diverse representation. People who agreed and disagreed with the topics, as many people as they could find from different backgrounds, visible and invisible minorities, the whole spectrum. They didn't make a big deal out of it. I just noticed after the fact, "Ohhh OK, there seems to be some diversity on this panel."

In contrast to the 'add women and stir' approach, this style of conference curation can be seen as a 'show, don't tell' approach. Where 'women in blockchain' panels reflect a performative effort towards diversity, conferences that simply represent a greater range of identities and perspectives across all panels show a quieter, more meaningful commitment to diversity of thought and representation. In the next section, we turn to the next type of event, gatherings designed 'by women, for women.'

Lean into blockchain: 'By women, for women' events

Beyond the blockchain boys club, gatherings designed 'by women, for women' represent a significant, emerging movement shaping the space (Griffith, 2018). Larissa Petrucci categorizes gender-inclusive meetups as “out-company strategies that women and non-binary people take to address gender equality in male-dominated and professional industry” (2020, p. 546). These stand in contrast to the many in-company diversity initiatives that have become a popular presence in organizations, yet yield limited results. These ‘by women, for women’ events in blockchain serve to help women develop their own social infrastructures, and to progress in the industry at large. Many interviewees had experienced these types of blockchain meetups and conferences as meaningful networks of personal and professional support and resistance to male-dominated tech culture. On one hand, these groups and events represent a corrective response toward the hyper-masculine status quo of the field. Women have taken the proactive step to 'make a space of their own' to learn, lead, and network. Yet they can also be seen as complementary networks within the dominant space. These events are representative of the gender-conscious 'lean into blockchain' discourse.

At these events, blockchain is framed as advantageous both for women's success in the tech industry, and for improving the quality and market reach of the technology itself through greater diversity of talent. In this sense, blockchain offers value on both individual and collective levels. 'By women, for women' events range from 'blockchain 101' education and competitions, to private socials and full conferences. Each of the gender equity initiatives described in all three frames may be loosely associated with different, overlapping forms of feminism, but they all take place in the broader postfeminist social context. Across these contexts, I observed ‘trickle-down feminism,’ or the idea that ‘once a few women break the glass ceiling and achieve prominent positions in business and politics, this power will trickle down the ranks and

empower all women' (Kennedy, 2013, p. 6). This idea is demonstrated in some scenarios, and challenged in others, below.

I named this 'lean into blockchain' discursive frame directly from the data on this topic. Part of Sheryl Sandberg's 'Lean In' (2013) philosophy involves women's active involvement in forming local 'Lean In Circles' as part of the material network of women supporting women in the workplace. Interviewee Miranda founded a 'Lean into Blockchain' meetup group to do exactly this:

> It brings together women that are actively working in the blockchain space, leading blockchain companies, or just passionate about the space. And we meet on a monthly basis to talk about various technical topics, to network, and to kind of support each other in our explorations in the tech space. We've had one woman actually be hired by another woman in our group who leads a cryptocurrency algorithm trading platform. So we've been able to kind of concretely support each other in our career pathways, which is really, really exciting.

Miranda describes how these types of 'by women, for women' groups can be personally supportive and professionally productive. They exemplify the ethos of the 'lean in' discursive frame, which is to equip women with the skills, confidence, and connections to succeed within the dominant space. Faludi (2013) argues that these circles promote individualistic approaches to organizational equity, by aligning feminist and neoliberal values. In the quest for belonging and success in blockchain, WiB groups are an important interface between blockchain's online/offline space of flows (Castells, 2000). Yet, as with events in the dominant space, they are not considered universally valuable by women who work in blockchain. WiB groups have their own set of shortcomings to address, which I will outline at the end of this section.

Women's involvement in 'by women, for women' social networks is key to their overall success within the dominant professional sphere. Recent research by Yang et. al. (2019) shows that while both men and women who occupy central positions in their social networks are most likely to achieve greater prestige and pay at work, women in particular *also* had to have an inner circle of close female contacts to achieve these success levels, even if they had similar qualifications to the men in the study. My findings on WiB groups demonstrate the value of precisely these social networks. Since women often face cultural and political hurdles in tech that remain subtle but pervasive,

they benefit from the chance to share private information about blockchain organizations' attitudes toward women, opportunities in the space, and hazards to avoid.

Infrastructures of support

According to the data, one of the top reasons participants valued WiB events, was their sense of a comfort zone or non-threatening women-only space to connect about blockchain and other similar interests. Facilitating these 'infrastructures of support' among women is a prime example of the practical solutions Sara Ahmed (2017) outlines in her book *Living a Feminist Life*. These networks connote several assumptions, as described by Alice, who had attended various WiB meetups in Vancouver, Oakland, and New York:

> I found that going from one group to another, it was pretty consistent in terms of the values of the people you would find there. It was really nice, actually, to be so 'at home' already. There's sort of an edge that 'for women' groups have, and it's an assumption of inclusion instead of 'prove something to us right now.' Because I've been in those environments, and the contrast is that you can just let your guard down. Just a feeling of solidarity. Why I'm mentioning it is because at other tech events, or most male-dominated areas, there's always kind of the itching question of "is this for work? Or are they trying to hit on me?" So you can kind of let that go a bit more.

Alice sought out WiB meetups as ideal spaces to meet like-minded people as she visited different cities. Many participants echoed an appreciation for the sense of ease found within these groups, based on the assumption that attendees are generally there to support, encourage, and connect one another to new opportunities. Attendees can worry less about the layers of social labour they need to toggle between at other professional or meetup settings. For those who are the only women at their workplace, they look forward to talking shop in an environment where they are not the 'other' in the room. For example, Alice conveyed that after working all day as the sole woman on her team, she would think twice about whether to go to a male-dominated blockchain meetup, "even if it wasn't always overly 'bro-y,'" or hypermasculine in its social context. The prospect of potentially debating issues with people viewing the space through the dominant lens is a form of additional social labour that takes a psychological toll: "I kind of save my energy in case I would have to get into those conversations. I don't want to 'work' everywhere I go."

There are various discursive and material distinctions of WiB events. For example, one of the WiB meetups I attended in Vancouver played up its feminine focus, opening the event with wine and appetizers in a lounge setting before attendees took their seats at tables with fresh cut flowers. The women in attendance ranged in age, occupation and blockchain expertise. Some were medical doctors who had come to learn about blockchain for the first time, some were blockchain programmers, and some were successful cryptocurrency investors. The presenter opened her educational talk on blockchain with a rallying cry about how women are missing out on great opportunities if they do not invest in cryptocurrency. She recounted how men have disproportionately benefited from the early stages of financial and technological innovations in the past. In one of her introductory slides, she used side-by-side screenshots of Reddit and Pinterest to highlight online communities dominated by men and women, respectively, to illustrate the gendered, socio-cultural aspects of these tech platforms. At this event, unlike other types of blockchain meetups I had attended, each of the 50 attendees were invited to briefly introduce themselves and their motivation for attending to the group before the presentation began. This discursive move widened the focus to include not only the presenter's expertise but the overall group dynamic. One interviewee described a similar sensibility in another group I joined during my data collection, a private monthly WiB drinks event:

> I think women take on what I see as 'the academic approach' to conferences and meetups. It’s not just presenters speaking at you, it's having conversations that are a little bit more thought-provoking. I mean academic in the sense of a small group gathering with conversation-starters that bring out those who are shy or outgoing, and give them an even playing field. That was kind of something I saw through my university career. Whereas with the events that aren't necessarily 'by women for women,' they simply don't have that. There’s quick conversations, but you don’t really make that connection. So I think that that's one of the biggest differences I've seen, is really trying to have that intimate setting that can allow any personality to thrive.

I observed this emphasis on creating time and space for genuine connection and collaboration at several WiB events I attended. At several, the talk or panel discussion was followed by a semi-structured small group discussion time that felt more purposeful than a typical networking or mingling time. Forming social support systems is key to weathering the struggles of facing racist and sexist barriers in society.

Consistent with the broader postfeminist social context of the moment, I found that many of the women who organize or attend women in blockchain meetups and events would not necessarily consider themselves feminists, activists, or organizers (Bobel, 2007), even as they pioneer work that aligns with precisely these values. They view themselves primarily as individuals aiming to grow their careers. This reflects the contemporary ethos of ‘networked individualism,’ which shifts the primary focus from social groups, organizations, and institutions, toward individuals as the primary units of connectivity (Castells, 2001; Wellman et. al, 2003; Miyata et. al, 2005). The rise of social media, in which each person is a switchboard between ties and networks, is a prime manifestation of this. For example, interviewee Anna founded an informal, invite-only, monthly gathering of women who work in blockchain, averaging around ten attendees at each event. Participants shared local blockchain information, 'asks and offers' to do with hiring or switching jobs, and requests for speakers at events, both in person and via email. These events provide a safe space for networking, and a welcoming platform for women to share blockchain expertise. Yet the social ties that bind these WiB groups are often rooted in their instrumental value for building their careers and affinity group networks (Joseph, 2013). For example, Anna was motivated to start the group while running a local chapter of a larger women in tech organization, which attracted 50 to 85 women per meetup, yet none of them seemed to work in blockchain. She encouraged members of this small, private blockchain meetup to invite any other women or non-binary folks, based on the flexible criteria that they would "add value" to the group. And as another example of the discursive tension around the term ‘women in blockchain,’ this under-the-radar group never settled on a name for itself. There was simply an ongoing inside joke that the group still needed a name, “anything but ‘women in blockchain.’”

The data showed that the founders of WiB groups were confident and capable in their own tech or finance careers, and none of them had originally aspired to cultivate such communities. Rather they pivoted, paused, or added to their primary line of work, out of a sense of necessity to grow their networks and help other women in the space. Each of them shared the view that blockchain and cryptocurrency are revolutionary innovations, which motivated them to ameliorate the gender gap for different reasons including: advancing women’s careers opportunities in the early stages of this emerging tech, improving the diversity of the field so that the technology is developed as wisely as possible, and promoting greater blockchain adoption by exposing a wider demographic

to its benefits. Without a clear roadmap or plan, most of them simply sought to create more space and opportunity for women in blockchain, each with their own focus, style, and goal. This is a good example of ‘enacting everyday feminist collaborations,’ whether or not they consider themselves feminist at all, through practices such as reflexive growth, proactive improvisation, and co-learning partnerships (Yang et. al., 2019).

That is precisely what Jessie did when she and a co-founder swiftly launched the 'Women on the Block' conference in New York in 2018 (Moy, 2018). Over 50 women in the industry gathered to present their expertise on topics such as raising capital, creating startups, and legal issues, with proceeds going toward a charitable fund to support women and girls in technology:

> I was busy with my own work, but then I accidentally co-founded Women on the Block. It was the first conference that featured female thought leaders in blockchain. I guess it was making a statement: women exist in this space. And it went bananas, right. It was a super duper success. Congresswoman Carolyn Maloney came. It was all volunteer. Because I think it was a reaction to the conferences that men were dominating, and the after-parties at strip clubs. It was about *doing* something, instead of just talking about the problem. My philosophy is like, I'm not going to ask for permission, I'm going to try to make it happen. So it was never meant to be a full-time job but there was so much ask, globally. We were invited to do the event again, as part of the Singapore Fintech Festival Week. And again the reception was amazing.

Jessie echoes the sentiment of various women’s event founders, in stating that she ‘accidentally’ co-founded the conference as volunteer advocacy work, in addition to her paid work in financial technology. This type of advocacy is an additional form of voluntarily, social labour. Next, she articulates that organizing the event was a tangible response to the gendered inequities she and many others perceived in the dominant space. She emphasizes that instead of complaining about the unacknowledged sexism in finance or tech, the best solution she could envision was to simply take action without waiting for support or permission. The overwhelming response to the initiative demonstrated the need for it among women in the space. Although they may sound similar to WiB panels, 'by women, for women' events represent a distinctly different set of social conditions. On WiB panels at male-dominated events, women are singled out based primarily on their gender. At a women's-focused event, women are seen primarily for their professional expertise. At a gathering like this, there is no need for a WiB panel. Gender is, ironically, taken out of the equation for a moment. There is no need to overtly

discuss the gendered experience of working in the field, so more attention can be given to professional and technical conversations.

Another example of ‘building infrastructures of support’ at 'by women, for women' events, is the simple yet pivotal peer support fostered when speakers and attendees meet and strengthen their professional networks. The data showed that many women were either the only woman, or one of very few women, in their workplace. The very knowledge that there are others like them in the broader blockchain landscape helps them to feel less alone as they navigate their day-to-day male-dominated workplaces. One interviewee identified this connection as a highlight of the women in blockchain event she organized that was sponsored by IBM:

> I think for the speakers themselves, it was important to me that they got to meet each other on the panel. On the ‘next-gen panel,’ there was a leader at Cornell who has her own project, and I wanted her to meet women from the University of Albany, and Barnard, and another recent graduate who's a software engineer. I wanted them all to meet, 'cuz your peer group is so important, right? And the fact that now they know each other makes me feel so good. The young engineer, she was not just the only female engineer on her team, but the only woman on her entire team. For her to be surrounded by four other female software engineers in blockchain was amazing to her. And so those moments were very, very meaningful to me.

It is notable that this event curator referred to the young, recent university graduates as ‘leaders’ in blockchain. This quote demonstrates the importance of women’s leadership in designing and encoding these events. They facilitate peer support for young women who are less visible leaders in the field. It is unlikely for younger women to be singled out as leaders or speakers in the space, unless they are known by others in the network and invited. In this case, the women organizing the event worked around the students’ exam schedules to ensure they could participate in this panel. The spectrum of WiB groups and events highlights the need for these important points of social connection throughout the professional journey.

Increasing skill, confidence and opportunity

While some ‘by women, for women’ groups focus on connecting women who are early to mid-career in blockchain, others focus on the role of education and information for blockchain beginners of any age or stage. This work addresses the often-debated 'pipeline problem' of equipping more women to apply for the burgeoning number of jobs

in the space. For example, CryptoChicks is a non-profit organization focused on educating women and youth about blockchain, with chapters in Canada, the United States, the Bahamas, Pakistan and Switzerland. Two of its founders, women with extensive education and experience in technology, formed the group after installing an Ethereum wallet on one of their computers. They were excited by the concept of blockchain, but felt that the process should be more user-friendly, and more widely understood by women in particular in order for it to be successful. As one of the members, Elise, explained:

> I'm used to being the only woman in the room. And [in blockchain], that was even more exaggerated, right. Like I was literally just a single woman in the room of hundreds of participants. My friend and I decided to start working on it because we were really concerned. We liked the technology but we felt it was not going to move forward if we only have part of the population involved. Lots of blockchain companies I know, they suffer from lack of diversity on all levels. If only blockchain developers try to put together a startup, then it falls apart because people just don't have a variety of ideas and backgrounds. So my initial experience was not bad, but I recognized right away, we need, of course, more variety and diversity.

Elise addresses the need for greater diversity of gender and professional skills involved in blockchain development. This goal is primarily framed as a means to increase the efficacy, stability, and mass adoption of the tech. Therefore this type of 'lean into blockchain' discourse promotes women's involvement in the space by appealing to the goals of the dominant 'gender-blind meritocracy' frame, without critiquing the male-dominated culture as inherently problematic. The non-profit achieves this by running mentorship programs and idea incubators such as 'CryptoChicks Hatchery,' and hosting conferences and hackathons exclusively for women participants.

A hackathon is a design sprint event, in which teams of computer programmers, graphic designers, project managers, and domain experts collaborate intensively on projects, to create the best functioning software or hardware by the end of the event. As Elise mentioned above, blockchain events including hackathons tend to be heavily male-dominated. Brooke (2020) recently conducted a study of gender performance and boundary-making at one of these types of hackathons. By participating in the hackathon with teammates over an intensive 24-hour period, she observed through the sharing of memes and ironic jokes, that gender is the mediator of legitimate technical knowledge in these spaces. Her study argues that sexism is a fundamental part of tech culture.

In contrast to this, the CryptoChicks hackathons are events designed 'by women, for women,' which also include mentors and influential judges of all genders. Hundreds of CryptoChicks participants have been hired in blockchain and AI, or started their own businesses in the space, with many inspirational success stories along the way. For instance, one young woman emailed from Zimbabwe to ask if she could participate in one of their hackathons remotely, which they facilitated. She coded a blockchain application for farmer's markets, which Microsoft took interest in developing. One of the CryptoChicks founders told this participant's story to a contact at Draper University. They offered her a blockchain development job as well. In another case, Elise described how a "15 year-old blockchain genius won one of our events single-handedly," competing on her own instead of with a team. One of the judges worked at Consensys and hired her right away.

One aspect of liberal and popular feminisms associated with this negotiated frame, that has been heavily critiqued by third wave feminists, is the idea that women need more technical skill and confidence to succeed in dominant, meritocratic spaces. But the data reflected how important each of these elements are. Elise from Crypto Chicks described the differences in gendered socialization in relation to technology:

> We're not trying to drag women into it. We're just telling them about the technology and teaching them how easy it is. You know, women want to be perfect, so they're the most concerned that they're not good enough, that programming is too hard, right? But from what I see, because we do events sometimes for men as well, is that men don't even think about it. Sometimes they enter the competition without even having any doubt that they can do it, right? First they enter, and then they think. Women though, I have hundreds of emails from them, and they're asking "Oh, did I do this right?" or "I think maybe I'm not ready, maybe I'll do it next year," this kind of thing. So it's not that they're not interested, it's just that they're not sure. It's the mindset.

By encouraging women in these scenarios to participate whether or not they feel qualified, CryptoChicks has been successful in promoting education and opportunity for women in the space. They reassure participants that they do not need coding skill to compete in a hackathon, since people work in teams with different roles, including business, communication, or legal aspects of the innovation. The quote above illustrates the work necessary to dismantle well-worn, binary perceptions about gender and technology – not only to do with stereotypical perceptions about who is an expert in tech, but personal, internalized sociocultural norms and expectations. 'By women, for women'

events can re-write the script, in terms of women's perceptions of themselves in relation to technology.

At these events, some of the goals of the gender-conscious 'lean into blockchain' discourse are aligned with those of the dominant 'gender-blind meritocracy' discourse. People who subscribe to these discourses would agree that more women should be equipped and empowered to succeed in the space, and that blockchain would benefit from having more talent and perspectives in all roles related to its development. Instead of complaining about a lack of women in the space, or critiquing the male-dominant space, groups such as CryptoChicks are inadvertently working to advance the liberal feminist goal of increased skill and access in attempts to change that. They do this by focusing on their goals for the technology, as well as their goals for women, without criticizing the culture of the dominant space itself. Yet the data on 'by women, for women' groups also revealed examples of how women used these networks to safely and successfully navigate some of the risks and challenges in the dominant space.

Resistance to the male-dominated space

Interviewees recounted effective strategies for overcoming some of the practical, material realities of navigating the space as a woman, as facilitated by WiB networks. For instance, April noted one way women support each other in ways that translate from discursive to material spaces in the online/offline continuum:

> There's a women in blockchain Whatsapp group, and it's nuts to me how cool it is for a bunch of reasons I didn't realize. One of them being, when you're going to a conference, and you're like, "Oh no, all the rooms at this hotel are booked." Women will be like, "Hey, is anyone going to this? Does anyone want to share a room or get an AirBnB?" And these things, they're not super safe to do as a woman except in the context of a bunch of other women you can interact with. So it's really neat from an op/sec [operational securities] perspective.

April's quote highlights the reality that travel and accommodation can pose different risks for women than for men in terms of physical safety. This type of risk-mitigation is another example of the additional layers of social labour women must perform beyond their professional work to be successful in the space. WiB groups provide an effective resource for working around some of the problematic aspects of male-dominated spaces. To be successful in the space, women need to be able to safely participate in

the meetups and conferences of the dominant space. Gender-conscious social networks allow them to navigate the broader network more efficiently. These social networks are a resistance-oriented example of the 'infrastructures of support' discussed above.

In an example of how 'networked solidarity' (Brophy et. al., 2015) can influence gendered experiences in the space, marketing CEO Ella commented on one of the distinctions of 'by women, for women' groups that struck her as most valuable. She recalled a story of moral support that emerged out of her monthly WiB dinner meetup, that also had a corresponding group chat via text message:

> So sometimes you might not be sure how to respond to a certain situation that you might be in. And talking about it with other women can definitely help you. I remember, I was very surprised - I mean, this women's group has some serious power names that you read about in the newspaper. And this one lady talked about her experience. She said "you know, I'm speaking at a conference soon, and there's this person I don't necessarily want to interact with there and here's why." And just the responses that she got. People just chimed in, "Here's what you can do." It kind of made me think, so if I'm ever in that situation, suddenly I've got a new perspective on what I can do. And it was really, really good. And I don't think she realized that the head of that organization was in the [text chat] group too. And 3 days later, she chimed in, "So just looking at this now, I'll DM you, tell me who this person is, we'll kick them out, and here's what you can do." And it was amazing. Like I don't always have the right answer to everything but hearing other perspectives sort of helps shape the way you're going to react to other things, which is good.

In her recounting of the woman's story, Ella did not even need to overtly state that she had experienced sexism or misogyny. It was clearly implied. Although Ella was exuberantly positive about her experience in the space at large, this quote illustrates the need for infrastructures of support and resistance to achieve that. The scenario above demonstrates how women can simultaneously be powerful gatekeepers in particular networks, and gated members of others (Castells, 2009). The inclusion/exclusion criteria that holds networks together is always dynamically shifting. 'By women, for women' networks play an important role in improving women's conditions in the space overall. However, they are by no means valuable for all women in the space.

Shortcomings and constraints

Although the data above demonstrates the immense value of 'by women, for women' gatherings, these spaces are not universally useful to women working in

blockchain. The intersectional challenges of finding a meaningful affinity group can often be overlooked in this emerging movement. Some interviewees indicated ways in which these groups were problematic, or not meaningful for them at all. Just as women have often been sidelined in the dominant, male-dominated space, the voices and experiences of women of colour, LGBTQ women, disabled women, transgender, and non-binary folks tend to be sidelined within mainstream WiB circles. They are often dominated by white, straight, cisgender women. Recent research has shown that a narrow focus on gender in gender-inclusive meetups, can result in centering whiteness – even when intersectionality is stated as a goal in their mission statement (Dennissen et. al., 2020). Practicing intersectionality remains a challenge for many 'by women, for women' groups in blockchain. Meaningful affinity groups are not created based on one-dimensional similarities in gender. Age, race, sexuality, professional role, and level of blockchain expertise are other axes of difference that matter. For example, as programmer Bailey reflected:

> I haven't - bizarrely, actually being a lesbian - found women-only spaces to be particularly useful, I guess? 'Designed by women for women' is great if you want to talk about certain blockchain topics or gendered experiences, I guess. But events that are explicitly for networking like the drinks night, I don't find I get a ton of value because I'm often the only technical person there. So even talking about the sort of work I do, I may as well be speaking a different language, because I'm in a totally different area. If I'm going to a conference, it's probably a technical conference. I want to talk to people who could have an impact on my thinking, or I could have impact on theirs, which is orthogonal to their gender.

Bailey's commentary is an important reminder of the diversity of intersectional identities and professional roles among women in the space. The very few technical women in the space are often in a lonely position, without a valuable affinity group among the male-dominated dominant space or the 'by women, for women' space. This makes the sociocultural dynamics of work and events particularly challenging for them. In Bailey's scenario, shared gender does not equal shared experience. These groups do not provide a path to the types of support or resistance that might be most useful in her day-to-day work in blockchain. Most women's meetup spaces are dominated by those in business, communication, or operational roles. This highlights the intersectional challenges related to finding belonging among these groups.

Another challenge that emerged with WiB groups, stems from difficulties to do with effectively managing groups that are rapidly increasing in membership, with participants of all different levels of expertise and types of motivation within the space. Blockchain lawyer Ariana shared that the online WiB group she helped to launch in 2017 had become "the least valuable Whatsapp group" she was in, after it expanded to over 200 women. She found that over time, the conversation became less substantively focused on the industry, and more of a moral support group for women entering the space. As a result, she and another influential friend in the group decided to create a sub-group with a more explicit focus on high-powered deals and partnerships in blockchain:

> My friend, who you've probably interviewed, she's very well known in Canada, very powerful woman in blockchain, she said "I'm tired of this collective hair-braiding session." So we decided to kind of fork the group and say, "this one is focused on business and making opportunities for women." You know, let's focus on what we're good at. Let's try to build each other up. My focus for being a woman in blockchain is, I *do* get to sit at tables that other women don't get to sit at. And I want to be able to bring other women to those tables. So for me, I have access to funding. Here in the Middle East a lot of people have money. I said to the women, "come with your ideas and projects. I want to help fund those." Or if I need to hire a developer for a project, I would go there first.

Ariana's annoyances, and subsequent solutions, highlight the need for a greater critical mass of women in the space to build a wider array of infrastructures of support. Since women make up such a small percentage of the overall space, the leaders of women's groups can quickly become overtaxed and overwhelmed in trying to meet all the needs and requests that flood their inboxes and social media accounts. Ariana made it clear that she is not against the large, supportive women's groups. But she felt the need to develop a new network with clearer parameters to suit her particular needs and connect with others at her level of expertise in the space.

In terms of racial inequality, women of colour make up their own minority group within the WiB minority group. Several of the interviewees had helped to launch 'by women for women' spaces that create more meaningful affinity groups for themselves and others like them. For example, Taylor, an entrepreneur and consultant with a doctorate in public health, is a key stakeholder in a blockchain group specifically for Black women and girls:

> I think blockchain is a field where there can be silos. A lot of times you start seeing the same faces, same people, same voices. And so the goal with Black Women Blockchain Council is to create a platform to give women of colour access to funding, to create funding, as well as more opportunities to work together. And then also to begin to educate younger populations and girls, not only in blockchain but STEM in general. So it's a way of elevating those of us who are already working in the space, as well as those who are coming up or unaware of what blockchain is. We're trying to build an entry point to get more women involved, especially women of colour. Utilising their current levels of expertise in business, law, or science or health. All these different areas that play into the future of blockchain.

Black Women Blockchain Council serves to educate and promote individual Black women and girls in blockchain and Fintech (financial technologies using blockchain), as part of its overall goal to promote social and economic inclusion. They support the development of cryptocurrency as an important tool for eliminating traditional barriers to wealth creation, which disproportionately affects Black communities. The group's monthly newsletter, 'The Stand,' features news and articles written by members, educational resources, and links to work by Black blockchain thought leaders such as Isaiah Jackson's (2019) 'Bitcoin and Black America.' One newsletter featured a quote by Sinclair Skinner, co-founder of pan-African bitcoin remittance firm BitMari: "We say that Satoshi is Black. But Satoshi was probably a Black woman because a man would have never been able to walk away and not take credit" (DiCamillo, 2020). This race- and gender-conscious discourse, in reference to Bitcoin's pseudonymous inventor, sparks the sociotechnical imaginary (Jasanoff & Kim, 2015). It opens up new possibilities for what blockchain can mean for stakeholders who are often made to feel marginalized or minoritized in the space. Wondering aloud about the identity of the mysterious persona of blockchain's inventor highlights the cultural conversation around who belongs in blockchain, and who gets to influence its development.

Founders of WiB meetups and conferences aim to cultivate networks of support, education, and resistance, to increase the quality and quantity of women's participation in the space at large. As a secondary goal, these groups promote awareness that a more diverse blockchain culture would increase the technology's adoption, usability, and applicability. But these discourses, commonly circulated within WiB groups, are often dismissed or overlooked in the dominant space. The vision to bridge this gap is seen in the third type of event I observed, 'by women, for all genders' events. These groups and gatherings align with the "intersectional inclusion" discursive frame outlined in Chapter 4.

Meetups and conferences of this type represent a pathway for what a more genuinely inclusive blockchain space might look like, and how this might affect the technology and society at large.

Intersectional inclusion: 'by women, for everyone' events

Blockchain events that exemplify the third discursive frame, ‘intersectional inclusion,’ include those designed by women, where people of all genders are welcome. The labels for these events may or may not include anything about diversity or gender. The hallmarks of these gatherings include: (1) a heightened sensitivity to intersectionality (Crenshaw, 1990); (2) a stance of proactive inclusion that amplifies the voices of women, racial minorities, non-Western perspectives, and LGBTQ experts in blockchain; and (3) a vision for transforming the dominant blockchain space, rooted in social justice, as opposed to ‘adding value.’ Participants grounded in this school of thought recognize various axes of social inequity and seek to improve the blockchain space, and society at large, by ameliorating them. I had not heard of these types of groups or events before conducting this research. Even though they make up the smallest ratio of the types of events I studied, ‘by women, for everyone’ gatherings represent an important signal for progress in the space. These types of meetups and conferences aim to cultivate a more sustainable, equitable blockchain, through proactive efforts toward genuine inclusion. They are designed to break out of the silos of women-only spaces. They do so by rallying the education and support of male allies to promote gender inequity in the dominant space, and actively gatekeeping toxic patriarchal behaviour out of these inclusively designed spaces. According to Ahmed (2017), to build a fair and equitable world, we must first critique the problematic dwellings that have been built, and then start to envision and build new ones as a hopeful collective.

Acknowledging gender inequity is a crucial first step to addressing it. Even in domains where women have reached gender parity in terms of representation, gender bias persists in terms of women’s quality of experience and opportunities for leadership – and this is perpetuated most often by those who believe it is not happening (Begeny et. al., 2020). Stakeholders in the ‘intersectional inclusion’ frame see this as a current problem to be solved in blockchain. As third wave feminists have highlighted, gender inequity requires more than the collective action of women. It must also include men who promote and exemplify gender equity in the dominant social sphere. In contrast to the

prevailing postfeminist milieu, which aligns more easily with meritocracy and neoliberalism, third wave feminism argues for the active promotion of intersectionality, equal pay and opportunity for women, and the dismantling of rigid gender norms and binaries that harm boys and men as well (Finneman & Volz, 2020; Heywood, 2006). Blockchain events that exemplify this discursive frame are designed to amplify women's expertise and welcome men as allies and advocates in order to transform the dominant space.

A proactive, intentional stance

As Wajcman contends, "new technologies may be 'epistemologically open,' but many of their current forms are similar in their material relations to pre-existing technologies" (2004, p. 75). In the case of blockchain, its early social infrastructures are rooted in the historically male-dominated cultures of tech and finance. 'By women, for everyone' events demonstrate an overt effort to shape the social make-up of the blockchain space at this early stage of development. They aim to critique and transform the dominant space, in a particular way that 'by women for women' groups are not designed to focus on. Since critiquing the dominant space is a risky move for those who are already marginalized in the space, influencing change requires a strategic, palatable approach. This is evident in the way one meetup founder described navigating through the dominant 'gender-blind meritocracy' in blockchain:

> I will say that it is a very complicated issue. You can't convince someone, right? They have to see it. And even for me, it wasn't until I got into the space, and it was all young dudes. I'm like, this is crazy. This is like 30 years ago with the Internet. And yet, I think it's wrong to accuse people of being 'exclusive.' No one's going to react well to that, so let's stop doing that. 'Cuz we know the response is, "It's an open invite, if you don't want to come, that's on you." Well, yes, but that's the problem right? It's not that you're being exclusive, you're just not being intentionally inclusive. And if we believe in this technology, and we think it can impact the world for the better, and we want to stay in this space, then we need to be intentionally inclusive.

This participant was disheartened that blockchain's social scene at meetups and conferences looked as white-male-dominated as a scene from the early Internet days decades ago. She recounts a typical interaction between someone positioned within the 'gender-blind meritocracy' and the 'intersectional inclusion' discursive frames. Those rooted in the dominant discourse would refute the allegation that anyone is excluded

from blockchain. Those working toward intersectional inclusion know that they need to gently and compellingly prove that welcoming different types of people into the space is not only necessary, but good for society at large. This discourse involves an acknowledgement of the value, talent, and perspective that visible and invisible minorities bring to emerging technologies. It takes a proactive stance to increase their ranks.

Organizers of blockchain conferences often defend their male-dominated speaking rosters by arguing that no women or people of colour applied to present. Yet as a sign of progress, with the rise of diversity and inclusion awareness over the past several years, organizers of the biggest and most popular tech conferences, including WebSummit, CES, and TechCrunch Disrupt, have begun to actively research and invite a more diverse line-up of speakers. They do not rely on inbound applications. They make outbound offers. This stance is predicated on the understanding that white and Asian men are most often afforded these types of opportunities in blockchain, and "if women of color and non-gender conforming immigrants had the same opportunities and benefit of the doubt, they would be just as well known" (Kostecki, 2019). Blockchain is emerging in a moment of increasing social awareness of the importance of diversity and inclusion. This discursive frame reinforces that greater mindfulness in curating speaker line-ups is necessary to avoid perpetuating an echo chamber of speakers.

For example, Jessie illustrates the difference between speaking opportunities in well-established industries like finance, versus emerging spaces like blockchain. She critiques the dominant meritocratic stance, and advocates for the oppositional frame's inclusive stance, based on her experiences:

> I hear women say, "who cares about gender, just do the work, you'll get recognized." But again, it's about intentional inclusion. So what I would say to them is, well I was on Wall Street in structure product for 20 plus years. And I had a very good reputation. All the sales guys came to me. I knew what I was talking about. Of all the conferences I went to, I got stuck with meetings 'cuz I was also doing investor relations. Not once was I asked to be on the panel. I'm in blockchain for less than two years, and I've been on stage at the US Chamber of Commerce.

This story clearly conveys the differences between heavily institutionalized spaces such as finance, and relatively non-institutionalized spaces like blockchain. There is a hopeful sense that things could be different if advocates intervene to welcome more types of

people and their situated knowledges (Haraway, 1988) to the space. This hopeful sense speaks to the fact that blockchain's interpretive flexibility is still perceived as malleable in these early developmental stages, and not yet stabilized or closed.

Men welcomed as allies

When men are invited to join 'by women, for everyone' meetups, conferences, or hackathons, the typical gender ratio of blockchain meetups is inverted. For instance, one participant involved with the Crypto Chicks describes how this dynamic operates at their hackathons for women:

> I mean 4 years ago, there were like no women. You'd go to a conference with a couple thousand people and there'd be like… three [*laughing*]. We didn't even make up one percent. So now when I go to events globally, it's significantly better. You do have young women coming into play. It's still predominantly male, however it's not as skewed as it used to be. You're mixing technology and finance. And I would say the techie groups tend to be much kinder than the finance group. So if you go to New York and you deal with brokers, most are men, and that hasn't changed. And it tends to be a much louder, arrogant kind of group. The techie group are meeker, a little bit more considerate. I'll give you an example. Our hackathons are all-women blockchain teams, but the mentorship is diverse, so it's men and women. We have a lot of guy mentors so it's actually really great to see that kind of technology transfer. A lot of them stay for the whole 48 hours to help, and you can kind of see that they're shy. I don't think there've been around that many women in their lifetime [*laughing*]. You know, they're in their early 20s, and they really put their heart into it. So it's actually a really good thing, a healthy dynamic.

First, this participant speaks to progress in the gender gap in blockchain. Then she describes how their hackathons have helped to flip the typical gender ratio at blockchain events and to incorporate the important element of male allyship. This is not a dynamic that happens spontaneously based on the number of women in the room, but through intentionally inclusive design. As a contrast, when discounted tickets are sold to women to increase their numbers at a male-dominated tech conferences, it fosters a useful but different dynamic. At events like the Crypto Chicks hackathon, the social conditions are intentionally designed by and for women, and clearly communicated through the discursive frame of intersectional inclusion. These gatherings present new alternatives for what the blockchain space might look like.

Women centred as experts

The simple, radical act of women designing their own events, and featuring women as knowledgeable speakers on blockchain, alters the typical narrative of who is seen as an expert in the field. Blockchain events organized and headlined by women, are usually decoded as 'events for women,' even if they are encoded ‘for everyone,’ and the intended audience is people of all genders. When women organize blockchain events for other women, the dominant discourse is not challenged, so there is typically less backlash. But when women position themselves and other women as top speakers in the dominant space, they are more likely to receive an equally bold sexist response from the more patriarchal corners of the field. Banet-Weiser (2018) details how displays of popular feminism are swiftly and harshly met with displays of popular misogyny. Interviewee Kacia, a project manager at a crypto mining company, recalled the reaction to one well-known blockchain event that breaks this mold as a 'by women, for everyone' conference:

> I would say one of the stand-out events that I went to was Crypto Springs, which was in Palm Springs. It was made by women, and it wasn't necessarily *for* women, but I think in a way it became that because of the speakers that were brought on. However, there were definitely male attendees. I would say about 20%. The 'crypto bros,' which we like to call them, which are just the headstrong crypto enthusiasts that you can't get away from on Twitter, they were hating on the event a lot at the early stages because the branding had some pink in it and the speakers were female. I think it was about 30% male speakers, 70% female speakers. And the founders of the event were simply saying, “these are the most influential speakers that we see in the industry right now, who can talk to projects that are making moves and technology that's innovative, so this is what we're doing.” And the crypto bros were *not* having it. They did not want to accept that as reality. They wanted to say that it was discriminating against them and all this bullshit.

This reveals both the ground-breaking nature of ‘by women, for everyone’ events, and some of the thorny backlash associated with them. Kacia notes that much of this discursive tension between the ‘crypto bros’ and the women organizing this event, who are widely considered some of the top leaders in blockchain, was facilitated by Twitter. In blockchain’s online space of flows, dispersed groups of like-minded stakeholders can organize events to meet in person. Although if they are women, they are more likely to suffer the type of ‘trolling’ described above as a collective form of identity-based harassment (Ortiz, 2020). They challenge the male-dominated status quo, as women

position themselves as influential voices in the field instead of staying in their own self-contained groups. As Wajcman argues, "to be in command of the very latest technology signifies a greater involvement in, if not power over, the future" (2004, p. 12). Since the cultures of masculinity and technology are deeply coterminous, women's leadership in technology spaces is decoded as an affront to the very identity of a hypermasculine crypto bro. Kacia contrasted the open, relaxed culture of Crypto Springs to previous crypto conferences she had attended characterized by 'bro culture,' where women in the industry had made meaningful connections with one another while avoiding guys standing next to their Lamborghinis with bikini-clad women on them. Crypto Springs was their response to these conferences. She also mentioned that besides the contingent of vocal dissenters, many men who attended the event publicly applauded it as the most valuable blockchain event they had attended that year.

While the data reflected examples of crypto bros who reject the possibility that women could be authoritative figures in blockchain, it also showed a variety of cases in which men were keen to support, learn from, and network with women as experts in the field. For instance, interviewee April observed the effect of this inverse gender dynamic when she accidentally brought two of her male colleagues to an event she did not realize was intended for women:

> We got there and we were like, "uh oh, we didn't realize." Because this group did some events for women, and some for mixed audiences. So I went to the organizer and explained, and she said it was fine for them to stay. So fascinatingly, after that event [my colleague] said to me, "That was amazing. I've never been at an event where so many women would just walk up to me and talk to me. It was a very different environment than most events, because everybody understood that I would get trounced if I tried to hit on anyone." So he was the most non-threatening that he had ever been as a man, and he loved that. He was like, "This was great. I got to have all of these very cerebral conversations with all these very cool women in this context that I don't normally get to experience as a man."

The contrast explained by April's male colleague reinforces the fact that the discursive framing of events, in this case one of 'intentional inclusion,' matters. He and the women he spoke with could easily have met in the dominant frame of a male-dominated industry event. He articulates that the social conditions of this event, overtly designed to support women's leadership and expertise, created the conditions to have more equally-footed, professional, engaging conversations about the technology. The event created a context

that put women’s expertise, and not their gender or minatory status in the space, at the forefront.

However, April went on to explain that the inclusion of men at women's events is a delicate dynamic to balance in terms of the intent of the event, and whether the presence of men helps or hinders the overall goal. For instance, she recounted meeting "a young woman from a very traditional family at a hackathon who would never have been allowed to attend the hackathon if it weren't an all-women's event." In other words, her family would not have allowed her to work on a team with men, competing around the clock in a 48-hour hackathon. She was only permitted to compete because her family perceived an all-women’s event as a safe, appropriate space to learn more about the technology. Stories like these highlight the need for both women-only spaces, and women-led spaces for all genders. These variations in social context promote greater blockchain accessibility, accommodating a diverse range of preferences and cultural backgrounds.

Quality over quantity

Events organized through the ‘intersectional inclusion’ frame involve the leadership of women, and the allyship of men. For meetup founder Jessie, the goals of diversity and inclusion are realized in a 'quality not quantity' style. This influenced the design of her lunch gatherings featuring a short talk by a woman in blockchain. She reached out and invited specific men and women to join, keeping the groups small enough to foster genuine connections, and facilitating communication for attendees to remain in touch. At the end of each event, she would briefly but overtly petition the mixed-gender audience to be active allies, by suggesting several concrete steps to take at other meetups and conferences in the space:

> I say, “First, let’s not moderate an all-male panel. Insist on diversity. Second, let’s not participate in an all-male panel. And third, if you see an all-male panel, point it out to the organizer. Tell them to be intentionally inclusive. You don’t have to give up your life, your career. You don’t have to give away money. These are very simple things. They take seconds, but if we all do them, we’re going to see changes, right? Let’s commit to doing this for even one year and see where we land.”

Jessie’s appeal to male allies in the room highlights that they can actively support women in the space without giving up money, time, or power in the process. This

dismantles the myth that gender equity is a zero-sum game of winners and losers. It is a concrete bid for men to practice micro-inclusions, or small, symbolic acts which “signal to those at the margins that they are included” (McDowell, 2016). The discourse of intersectional inclusion highlights that without proactively welcoming a diversity of voices to shape the technology, blockchain is in danger of re-inscribing the existing power structures it purports to dismantle.

Gender parity advocates receive regular questioning and backlash about why they do not feature men as experts at their events. They need to communicate strategically and tread lightly in order to compel both men and women to become allies for genuine inclusion. They approach the unspeakability of gender bias as a micro-aggression: more of an unintentional blind spot, than intentional discrimination. Their events welcome, educate, and connect stakeholders across different discursive frames to influence the dominant space. Participants, like Kate, the co-founder of a crypto mining company, have been encouraged to see men practicing Jessie’s suggestions above. She was involved in a group conversation about an upcoming conference. People were debating whether it was worth attending. As she explains: “There were several men in the conversation who said they will not attend any conference where the panels are not [gender balanced] 50/50. So I see that as very positive. When I see men taking that stand, that’s helpful."

Event organizers as gatekeepers

The data showed another way organizers of ‘by women, for everyone’ events demonstrate intersectional inclusion is through their role as gatekeepers who set the tone and create safe spaces for women to speak and participate. Miranda, a blockchain consultant with a tech firm, commented on how one meetup organizer proactively stated the group's discussion guidelines to ensure women's voices were heard:

> There is a ‘women in blockchain’ meetup here in Seattle, led by a lawyer who helps startups position themselves for token sales and other go-to-market strategy. And that was really the first meetup that I went to in Seattle where I felt, it's just an amazing community. Very welcoming. So all the speakers are female. We have rules like, if you’re a man you’re welcome to attend, but you always have to let a female ask a question or make a comment ahead of you. And so I think [the organizer] has done a really great job of bringing in a lot of voices that I haven't heard anywhere else in any of the other meetups in the space.

The efficacy of this discursive gatekeeping technique was confirmed in a recent study that measured women's visibility at seminars by the question-asking behaviour of participants, through observations and surveys (Carter et. al., 2018). Researchers found that men are more than 2.5 times more likely to pose follow-up questions to the speakers, but only when a man asked the first question. When a woman did so, the gender split disappeared. In a recent comparative study on the discursive influence of men and women in political arenas, Beauvais (2019) identified how gendered discursive inequities reinforce existing patriarchal structures. She shows that although disempowered group members are not formally barred from public arenas, asymmetrical power relations can exclude them from participating in influential ways. Inequalities of social authority and status can foster ‘internal exclusions’ (Young, 2002) in those nominally present. As evidence of this, participants in Beauvais’s study were more willing to revise their opinions after hearing a man’s counterargument than after hearing a woman’s identical counterargument. This problematic tendency erodes the conditions necessary for genuine democratic discourse.

In the case of a cryptocurrency mining conference I attended, I learned of the organizer's effective gatekeeping role in curating the speaker line-up when I later interviewed her. Tara, an economist and CEO of a blockchain research group, shared about how she dealt with a difficult situation. It was brought to her attention that one of the speakers they had signed on, had a popular Twitter profile that included "racist, bigoted, gender-violent material." She felt strongly against giving a speaking platform to this person. This launched a discussion with her male-dominated team about the limits of free speech. They would likely have let it go, but she felt compelled to address it directly:

> It became really, really stressful. Finally I said, “That's it, I'm not leading a company that's going to give a platform to this type of voice, so let's talk to him directly.” And we did. And he was so shocked. I said “we’re revoking your invitation as a speaker, but if you clean up some of this material online you're more than welcome to come as a guest.” And within 24 hours everything was cleaned up. We had a couple of reconciliation calls where he said, “I realize my behaviour is inappropriate, and the damage it can do, and how it can make people feel unsafe, yadda yadda.” But I think it was also a bit of a life-changing moment. He said, “people have been saying this to me all along but now that it's implicated my profession and my business, I understand that this is real.” So going back to your earlier question about proudest moments, that one took a lot out of us because there were a lot of pretty serious affiliations involved as well, and we didn’t

> want to poke the bear. So I had to sort of create this diversity and inclusion policy, and stick to it and enforce it, as much as a company can.

As the leader, and only woman, in a small blockchain organization, Tara used her influence to make a difficult, proactive decision to respond to the complaint about the speaker with the offensive Twitter feed. Where her colleagues were more apt to view this behaviour as separate from his blockchain expertise, she did not view it this way. Even though the event itself featured mostly male speakers and attendees, she did not want to amplify a voice that had perpetuated racist, sexist messaging. She demonstrated an understanding of how to cultivate an inclusive space, even if it was male-dominated.

Shortcomings and constraints

One of the most prominent constraints for blockchain stakeholders who view the space through the ‘intersectional inclusion’ frame is burnout for advocates. Ultimately, and ironically, the goal of women in blockchain groups and events is to eradicate the need for them at all. Jessie has organized a ‘blockchain lunch’ series for all genders, as well as the 'Women on the Block' conference for women. She reflected:

> Now there's more diversity-conscious events in blockchain, and I'm very happy to see that. My goal is to not have to do this anymore. So I can focus on being an operator and learn more, and write thoughtful pieces on the tech. I don't have time to do that right now. I'm so exhausted by this narrative. It's always, "what about women?" I don't want to be seen as this martyr. *I’m* exhausted by it. If we do any future events, we are working on changing the name of ‘Women on the Block’ to 'Satoshi's Table.'

Jessie’s comments underscore several important points about gendered labour and indicators of progress in the blockchain space. She is encouraged to see more welcoming spaces for women and racial minorities in the space, since her goal is to work herself out of the job, so to speak. She also demonstrates how advocacy work represents an additional layer of social labour: if blockchain was more inclusive, she could spend her valuable time and expertise working in different, valuable capacities to develop her own knowledge and the technology. She then notes, on a discursive level, how even the champions of gender equity bristle at the repetitive narrative of fighting for increased diversity in the space. No one, especially well-accomplished women in tech, wants to be seen as a victim or a martyr. Jessie and other leaders of these groups would rather put their valuable time, energy, and expertise into the work at hand in blockchain.

This tension highlights a significant contrast between two discourses: in the dominant space of the ‘gender-blind meritocracy,’ the ‘lean into blockchain’ narrative is seen as a distraction from ‘the real work’ of blockchain. Yet, gender-conscious advocates argue that correcting the gender disparity in the space relates directly to developing more robust, useful versions of blockchain. If talented women in tech spend inordinate amounts of time building their communities, that translates to a loss of resources from prospective advocates, analysts, and applicators of the technology. Acknowledging women’s situated knowledges (Haraway, 1988) in blockchain represents a useful ‘interest convergence’ (Bell, 1980) between the dominant and negotiated frames. Finally, Jessie’s comment about changing the name of the group highlights a discursive aspiration toward progress. If the goal of this type of advocacy work is to promote gender parity in the space on a material level, then one way to work toward that on a discursive level is to change the group name to the gender-neutral ‘Satoshi’s Table,’ although it would remain a ‘by women, for women’ initiative. This shows their understanding of an important concept STS scholars have highlighted – that language not only describes but also tends to produce the phenomena they set out to describe (Star, 1999). In other words, these stakeholders realize that words create worlds.

As another constraint, these initiatives are so few, relatively disparate, and difficult to scale to effect change. Out of 30 interviewees, each of them fluently spoke the language of the ‘dominant discourse,’ a majority of them toggled at select times into the ‘negotiated discourse,’ and perhaps only four or five ever toggled into the ‘oppositional discourse.’ Among those, only a few of them were involved in leading or curating events. So although event design in the ‘intersectional inclusion’ frame reflects some of the most progressive ideas in the space, these stakeholders represent a minority within a minority group. Taking on the challenge of transforming the dominant space is a David and Goliath scenario, but the underdogs are filled with precisely that kind of hope.

Conclusion

Meetups, conferences, and hackathons are ideal places to observe gender and technology in the making. As cultural practices they are an "essential site of struggle" that can "play an incalculable role in the raising of consciousness and the transformation of our subjectivity" (Barrett, 2014, p. 113). In this chapter, I explored how women’s participation in a variety of blockchain events were both enabling and constraining,

depending on the design and social conditions of the event. Gender equity initiatives that sound similar were experienced differently by interviewees. For instance, 'by women, for women' blockchain meetups serve as important spaces of resistance and support for many, whereas 'women in blockchain' panels at blockchain conferences ring hollow as inclusivity gestures, instead highlighting the exclusivity of the male-dominated status quo. The technofeminist discourse analysis in this chapter demonstrates how gender equity initiatives are encoded and decoded in different ways that shape social contexts and outcomes. It also reinforces the importance of intersectional approaches that highlight women's diverse experiences in the space. None of the events discussed above were 'one size fits all' in terms of their value to interviewees.

Organizing events and building culture around gender equity ideals in blockchain is a complex process facilitated by networked individualism (Castells, 2001). Each of the gender-conscious initiatives described across the three discursive frames are associated with different forms of feminism, but they all take place in the broader postfeminist social context. While these social bonds are formed online and in-person through a deep sense of networked solidarity (Brophy et. al., 2015), they are typically designed to facilitate women's individual empowerment and entrepreneurialism, as opposed to that of the collective. Therefore, even the organizers of diversity-focused events are more prone to speak of them as simply 'more inclusive' or 'improving the space' as opposed to anything to do with feminism or activism. I observed that the participants who subscribed to the dominant 'gender-blind meritocracy' as their primary lens on the space dismissed gender as an unimportant factor to show how things 'can be' or 'should be' in blockchain. This is their way of exemplifying that women are already empowered and successful in the space, and that others can be too, through the idea of 'trickle down feminism' (Kennedy, 2013). Yet this stance does acknowledge that the space is not yet 'as it should be.' While women *are* knowledgeable and successful in blockchain, they are not often recognized or rewarded as such.

This brings us back to the questions of *'whose voices are heard, in which social contexts?'* and '*whose knowledge counts?*' from the beginning of the chapter. The reason participants improvise and develop 'by women, for women' and 'by women, for everyone' events is precisely to create spaces for women's voices to be heard, and to increase the likelihood for women's knowledge to count in the dominant space. Here is a simple metaphor to contrast each of the gender equity initiatives I observed in the culture

of blockchain events. The dominant ‘gender-blind meritocracy’ claims its ‘by men, for everyone’ events are like an open field. While each of the interviewees has participated and benefited from these events, some described them as more of a fortress designed to keep certain people out. Inside this fortress, ‘women in blockchain panels’ are like a small room, separate from the larger spaces where more influential, interesting things happen. In contrast, ‘by women, for women’ events are like bridges designed to welcome more women into the fortress. And in contrast to those, ‘by women, for everyone’ events point out that simply entering the fortress is not good enough. The very structure of the fortress needs to be transformed for it to be an ideal place for all sorts of people to gather. Therefore these events are more like scaffolding inside and outside the fortress, trying to transform the space to be more hospitable for the marginalized stakeholders who may enter.

The diversity of meetups, conferences, and hackathons described in this chapter reflect the successful cultivation of supportive groups of like-minded people organizing around shared concerns. They represent important, informal professional spaces. However, these strategies for organizing outside of the workplace are “focused on individual-level changes [and] ultimately do little to disrupt organization-level gender inequities” (Petrucci, 2020, p. 545). For this reason, I studied both meetups and workplaces as two distinct yet interconnected professional spaces where gender and blockchain shape one another. In the next chapter, I examine blockchain workplaces through the discursive analytical framework.

Chapter 6. Doing the Work: From "a Seat at the Table" to Building Tables

Introduction

Emerging technologies like blockchain are increasingly global and systemic, which heightens the importance of communication and STS scholarship to examine them. They involve work cultures mediated by sociotechnical networks, that are simultaneously online and in-person. According to technofeminist scholar Judy Wajcman, "technologies not only change the nature and meaning of jobs and work activities, but they also reconfigure relationships between people and the spaces they occupy" (2006, p. 773). The gendered sociotechnical politics of blockchain are rooted in various discourses that shape material realities for those who work in the space. To analyze these contexts through a technofeminist lens, I ask: *how do discourses about gender and technology enable or constrain work who work in blockchain?* In this chapter, I use the analogy of the boardroom table to ask, *who has a seat at the table? Who gets to speak, and who is heard at the table?* I explore these questions by analyzing the relationship between discursive frames and work-related practices across different types of blockchain work contexts.

Analyzing blockchain as a culture foregrounds the gendered nature of tech work, and the nuanced power relations at stake. Work in blockchain involves maneuvering through many of the same contradictions of Silicon Valley: "It is a place of deep diversity and divisive discrimination, of countercultural aspirations and unabashed capitalism" (English-Lueck, 2018, p. e65). In a recent study of gender equity ideologies in a Silicon Valley tech firm, Alison Wynn (2020) found that executives tend to favour individualistic and societal explanations of gender inequalities in the workplace. When leaders focus on macro and micro spheres as the main spaces where gendered social relations play out, less attention is given to the meso level of groups and organizations. Yet the everyday practices that shape both gender and technology often occur at work, across both digital and place-based cultures. This makes them important sites to research for understanding more about women's diverse experiences in blockchain.

A cultural approach to communication highlights its role as a "symbolic process whereby reality is produced, maintained, repaired, and transformed" (Carey, 1992, p.

23). In the same vein, Canadian physicist Ursula Franklin urges us to think of technology as a practice or mindset, as opposed to a device, exposing the deep cultural links involved, which “saves us from thinking that technology is the icing on the cake. Technology is part of the cake itself” (1990, p. 9). Scholars who view technologies as primarily cultural prompt us to pay attention to the ways ICTs shape our experiences of space and time, and our individual and collective responsibilities. In the quest to bridge the gap between academic theory and political practice, Wajcman (2004) has called for a greater focus on production and work as research sites, as way to contextualize research on identity, representation, and technology use. The concept of “imagined affordances” is a way for communication theorists to analyze “the duality of materiality and communication technology: namely, that people shape their media environments, perceive them, and have agency within them” (Nagy & Neff, 2015, p. 1). The empirical data in this chapter elucidates how the interviewees’ work in blockchain exemplifies this theoretical concept. Below, I review the three discursive frames using a boardroom table analogy. I then analyze the most prominent enabling and constraining factors participants reported in work cultures that exemplify each frame.

Revisiting the discursive frames: a boardroom table analogy

I begin with a brief overview of the three discursive frames I used to analyze the data, which is detailed in Chapter 4. I use a boardroom table analogy to help visualize how each frame plays out in various blockchain work cultures. For example, the idea of having a 'seat at the table' can refer to 'having a say' in a professional decision-making context. But having a seat at the table does not guarantee one's voice is welcomed or heard. Performative diversity gestures are experienced as tokenism or ‘diversity theater’ (Fussell, 2021). Social context matters in blockchain work cultures. A leader's identity, vision, and awareness of social equity influences the factors that enable or constrain women's experiences in the space. There is a growing social awareness of the importance of 'equity, diversity and inclusion' (EDI) initiatives in contemporary Western society, and thus across each of these discursive frames. However, stakeholders operating in each frame interpret EDI efforts in different ways.

First, the dominant discursive frame of the 'gender-blind meritocracy' is cultivated and reflected in the majority of blockchain work cultures, where women are considered fortunate to have a seat at the table. These work contexts are typically male-dominated

teams, ranging from larger blockchain companies such as Consensys to smaller startups. They also include corporations such as legal or professional service firms that offer blockchain-related services. This frame is based on the logic of individual meritocracy, which actively diminishes talk of gender, race, or class in the name of 'equality.' Therefore, proactive EDI initiatives are often seen as 'pressure to be politically correct,' based on the notion that 'everyone is already welcome.' Kate Miltner (2019) conceptualized 'the politics of sociotechnical belonging.' She found that students in a coding academy were regarded as 'favourites' regardless of race or gender, based on their level of commitment to neoliberal, individualized, bootstrapping approaches to success, in ways that align with the values of Silicon Valley (English-Lueck, 2017; Marwick, 2017). In other words, those who subscribe to the high-pressure values of the dominant gender-blind meritocracy frame are welcome and more likely to succeed.

However, Miltner (2019) notes that winning a place of sociotechnical belonging in tech does not come without great personal cost. Both she and Marwick (2017) argue that the political economy of the tech industry is governed by the *myths* of meritocracy, openness, and entrepreneurialism. Within these tech cultures, there are often no women at decision-making tables. When women do take a seat at the table, the question remains as to whether their voice will be heard. This is a significant dynamic to explore in my study, since half of all participants cited being 'the only woman on the team' in their work. Some experienced this as an empowering position, while others felt a hollow sense of tokenism, depending on the discursive frame of the workplace. The idea that one woman or person of colour on the team fills a diversity quota reveals a scarcity mentality about power and resources within company culture. More importantly, it is dehumanizing. It reinforces negative, inaccurate stereotypes about who is an expert in technology.

Second, in response to this, the negotiated discursive frame, 'lean into blockchain,' is cultivated and reflected by women 'building their own tables.' The negotiated frame overlaps with some of the work culture and goals of the dominant blockchain space, but women's leadership sets the tone for the values and style of work. This discourse takes a more expansive view on building spaces where women are more likely to be able to bring 'their full selves' to work in blockchain, as opposed to having to fit into male-dominated work cultures as an 'other,' even when they do not wish to be viewed this way. Examples of these types of work scenarios include blockchain startups

founded by women, and self-employed women who contract to companies in the dominant frame. To continue with the table analogy, these work contexts may be one small table a woman has built for herself, as seen in self-employment. They may larger tables a woman has built for herself and teams of all genders. Within this frame, the decentralized philosophy at the heart of blockchain is seen as highly resonant with the collaborative work styles often associated with women-led teams. This frame is characterized by 'interest convergence' (Bell, 1980), or the overlapping space where the interests of dominant and marginalized groups overlap. This concept helps us to understand the dual reality of how women can achieve success in blockchain and remain a marginalized minority in certain work contexts.

Thirdly, the oppositional frame, 'intersectional inclusion,' is characterized by trying to increase equity, diversity and inclusion (EDI) at the boardroom tables in the dominant space. It takes as its starting point the belief that the people and values associated with blockchain projects are inextricably intertwined with the technologies produced. This third discursive frame critiques aspects of both the first and second frames. Similarly to the ‘lean into blockchain’ frame, the ‘intersectional inclusion’ frame is built on gender equity advocacy. But this frame defines gender equity intersectionally (Crenshaw, 1990), including considerations of race, class, age, and sexuality. Acknowledging these social axes is key to breaking down hierarchies in both male-dominated and feminist spaces. Here the concept of inclusion conveys something more meaningful than the rhetorically flexible term of diversity in corporate environments. Scholar and activist Terence Lester (2020) delineates social power relations in EDI initiatives using the table analogy: “Diversity invites people to the table, but inclusion empowers your voice to be heard while you’re at the table. Diversity without inclusion is cheap marketing.” For proponents of this third frame, the intersectional inclusion of women and people of colour is not a matter of skill acquisition, or greater numbers of minorities in the field. Instead, it addresses the very definitions and boundaries of technical practices, cultures, and work. The small minority in the space who advocate for this lens see blockchain as encompassed within a larger frame of social equity, moral obligation, and sustainability.

If members of the dominant frame 'make a seat at the table for a woman' and members of the negotiated frame 'build their own tables,' then those in the oppositional framework work to ‘make tables in the dominant space more inclusive.’ In the

oppositional frame, there is no diversity quota to fill. The table isn't owned by members of a dominant demographic who offer seats to those lower in social hierarchies. Companies within this frame seek to have as many different perspectives represented as possible. They believe that genuinely inclusive work cultures are key, not only to produce better technologies, but to solve the social problems blockchain aims to address. Examples of these work contexts include self-employed women of colour who elevate the importance of gender equity within each blockchain role they take on. Others include blockchain companies led by women or men, that make explicit efforts to foster a welcoming and equitable work culture for a broader range of identities and talent. Below, I discuss the most salient themes that arose within each of these discursive frames, as enabling or constraining factors to women working in blockchain.

Gender-blind meritocracy: a 'diversity' seat at the table

In this section, I present the most salient themes interviewees shared about their work in the dominant blockchain space. I interpret the data that emerged from these social contexts through the discursive frame of 'the gender-blind meritocracy.' The most enabling factors included: (1) openness (2) freedom and flexibility, and (3) brilliant, collaborative people doing fast-paced innovative work. The most significant challenges included: (1) technical roles as most hostile for women (2) presumed incompetence, and (3) tokenism. Each of these challenges is rooted in pervasive sexism, which is why it is not listed as a challenge on its own. In other words, sexism is not the elephant in the room, sexism *is* the room. And women who are 'making it' in the space are adept at navigating it.

'Openness'

One of the most salient enabling factors interviewees reported was the 'openness' of blockchain's less institutionalized 'wild west.' Openness is an umbrella term for projects fostered by collaborative, networked communities, such as open-source software. The libertarian origins of Internet culture in the US, and techno-culture more broadly, have elevated openness as an idealized, democratic ethos (Turner, 2006). Beyond technical arrangements, the concept of openness "weaves together ideas about authorship, agency, the circumstances under which knowledge and code can and

cannot be exchanged, and the social ties that are legitimate and illegitimate to make" (Nafus, 2011, p. 670). Interviewee April, CEO of a blockchain consulting firm, described some of these dynamics in the space:

> I think because it is an emerging technology, because it's all open, you can make of it whatever it is that you want to make of it. And there isn't necessarily all of the same institutionalised structures of… bullshit, really. In comparison with traditional finance, there are a lot of engineers in blockchain, and the way they have conversations is really interesting to me. So I mean while there's very intense, passionate debates, there's not a lot of sweeping stuff under the rug. People are very forthright regardless of what it is.

April's reflection conveys a sense of transparency in the work structures, culture, and communication she's experienced in blockchain, in contrast with her previous work in the heavily institutionalized realm of professional services. Besides openness in the participatory sense, she also conveys that the culture and meaning of blockchain remains open in terms of its 'interpretive flexibility,' which remains malleable (Pinch & Bijker, 1987). April conveys that various social groups are still 'passionately' debating what blockchain means and how it will operate.

Another trend that reflects blockchain's openness on a material level is 'flat' or non-hierarchical, digital-based organizations. For example, in comparison to the sprawling campuses of Google or Facebook, many blockchain companies are proudly digital-only, with no brick-and-mortar buildings. Teams often work remotely in self-organizing groups, as interviewee Aisha explains:

> This is the first time I've worked somewhere with no explicit hierarchies. We're a fully flat organization, so I literally have no boss. And I feel that's made a big difference in how I carry myself [to the work]. The role of a UX consultant is something I know I'm good at, but in the past it's been a box that's stopped me from contributing my best. When I tried to push beyond my role in traditional organizations, I've had push-back like "no, that's not your role, you shouldn't be doing that," even if I'm good at it. But when men do that, it's seen as growth and career development, right? And if it's structurally present, it's hard to push back on. So now, I'm wearing different hats just because I can. No one would say "no, you can't do it."

Here, Aisha highlights how the flat organizational structure has fostered opportunities for personal and professional growth. She works remotely from Vancouver for a large blockchain company in the US. Although she mentions having 'literally no boss,' she does mention elsewhere in the interview that the director of her 70-member design team

is a woman, and that she appreciates the diversity within the company. She also identifies a gendered bias as ‘structurally present’ in traditional organizations where she has previously worked. If the relationship between gender and technology is one of mutual shaping, this demonstrates how technological and organizational change can precipitate the renegotiation of gender power relations (Wajcman, 2006).

A final indicator of ‘openness' that emerged from the data, is the fact that individuals can enter the space from a variety of educational or professional backgrounds without a prescribed set of credentials. In this sense, blockchain work can be seen as ‘new collar’ work, a label championed by IBM that emphasizes self-determination for tech workers as they reinvent themselves out of the ‘white’ or ‘blue’ collar dichotomy of traditional work (Cox, 2020). "It's not all very expert and conventional stories," said interviewee Aisha, the UX Researcher quoted above, as she described a team leader at her organization who began his career as a street artist in Hawaii. "It’s beautiful to see the different backgrounds people come with. And I feel like that’s also a very blockchain thing. It resonates with people who are passionate about diversity and inclusion. And a lot of the technology is about inclusion." Here Aisha connects one of the celebrated aims of blockchain – fostering financial inclusion – with the varied demographics of those who build the technology.

The interviewees reflected similar variety in terms of educational background (see Fig. 4 in Chapter 3), with backgrounds ranging from a self-taught hacker with no post-secondary education to a PhD in materials engineering. Interviewee Jessie, who runs a blockchain-focused investing consultancy in New York, contrasts blockchain’s openness with her years on Wall Street. She says the venture capital space consists primarily of an exclusive East Coast club of MBA graduates from Harvard and Wharton who have passed the “unspoken, arbitrary requirements. You’re just kind of ‘in.’” She goes on to compare that while this isn’t generally the case in blockchain, the landscape is shifting as “more of the traditional spaces have moved in over the past two years.” This illustrates how stakeholders in blockchain are currently negotiating the tensions between libertarianism and legacy culture from tech and finance, as more of those companies embrace the technology.

Freedom and flexibility

Interviewees cited ‘freedom and flexibility’ as the most popular response to what they liked most about their work in blockchain. This encompassed the nature of their day-to-day work, the blurred lines between personal and professional life, and the tendency to change work scenarios frequently in the space. Interviewees navigated this terrain personally and professionally through networked individualism (Castells, 2010). The meaning of work and leisure is reconfigured and often conflated in the contexts of networked individualism (Frizzo-Barker & Chow-White, 2012). This concept, which focuses on digitally networked individuals as the basic unit of connectivity, has developed from a prescient idea in the early 2000s, to a normalized infrastructure of contemporary society.

For example, interviewee Tara loves the fact that blockchain is "totally leading edge," and that her work is based on "the freedom to explore this very innovative technology." As CEO of a research group, she explains, they have developed their company on a "go and learn" model: "Find what fascinates you, really dig into it, and write about it. It’s quite exciting. There's not really any confines to it." This sense of possibility and autonomy relates to both blockchain and their way of life. She and her colleagues live in a small town a few hours away from Vancouver:

> Our whole team functions in a fluid way. You can come to the office - we rent a coworking space - or you can work from home. We have weekly meetings, but for the most part the team is working around the clock however suits their own personal style. Some of the guys work at 2 o'clock in the morning ‘cuz that's when they’re up. For me, I'm running a regular business day. We're in between [our town and the city] every week, because it allows us to have the sort of lifestyle that we want, while still being connected.

Tara’s husband is also on the team, and they juggle their work schedule around life with their two young children. Women undertake many overlapping roles in the ‘acceleration of life in digital capitalism’ (Wajcman, 2016). Tara’s team works with a range of clients and pride themselves on independence from “any other institution or interested party within or outside of the space.” Each of these qualities to do with freedom and flexibility reflect broader social transformations for workers in de-regulated environments who have been ‘set free’ from both workplace organizations and social institutions (Giddens,

1991). This has been theorized by sociologists as ‘liquid modernity’ (Bauman, 2012), and the ‘risk society’ (Beck, 1992).

For many interviewees, work in blockchain has become inextricably tied to their personal identities more so than their hometown, company, or social circles. Interviewee Gabrielle, CEO of a tech development team, could not easily answer where she currently lives, since she has apartments in Canada and the Middle East, and travels for her work in blockchain so frequently. But she reported this in a happy tone, as one of the perks of the job: "It gives me freedom to do what I love. And I don’t consider it work." She visits family and friends in different cities as she travels for work, and her remote team members are located around the world as well. Although networked individualism shifts our focus toward individuals, we observe this significant shift through organizational and cultural systems: “It is the move from densely-knit and tightly-bounded groups to sparsely-knit and loosely-bounded networks” (Wellman et. al, 2003, p. 3).

In contrast to traditional notions of ‘going to work’ at an office in a particular city, work is fractal and heavily communicated over geographical distances. Blockchain work becomes a way of connecting and communicating in and of itself. Community organizer Anya expressed this in her story about a time she went on a cruise, and had no cellular reception:

> I went *crazy*. I was like, get me back online. I have the best time doing this. I could be sitting at an all-inclusive, but you know, I travel the world to amazing conferences. And the next thing I know, my friends there help get me sponsorship to run an event on social impact. I can’t get more satisfaction.

During the time Anya was cut off from her digital networks and thus her work in blockchain, she felt cut off from part of herself. Melissa Gregg’s (2011) book *Work’s Intimacy* explores how prospects for online connectivity feed into the middle-class passion for work as a source of self-esteem. Canadian communication scholars Enda Brophy, Nicole Cohen, and Greig De Peuter, developed the concept of “networked solidarity” as reclaiming ICT infrastructure for the benefit of workers, based on the “recomposition of a disconnected, flexible, yet altogether digitally adept labor force” (2015, p 321). Gina Neff (2018) notes that these ideas are rooted in Durkheim’s compelling metaphors of organic and mechanical solidarity. In contrast to outmoded

models of analyzing ICTs and work, she suggests that contemporary communication scholars consider these networks of ‘empathy and social cohesion’ as intellectual anchors for analyzing work in the network society.

Jessie contrasts the fluidity and intrigue of blockchain work to her predictable former career on Wall Street. If she had continued in traditional finance, she could have accurately predicted her career moves for the next twenty years. Now in blockchain, her career moves come more frequently and almost serendipitously as she "follows the pulse" of how the field is developing. This captures the sense of blockchain as a ‘space of flows’ (Castells, 2000) that allows for multiple, overlapping sociotechnical practices to occur regardless of physical location, as opposed to the traditional ‘space of places’ of the corporate world. I coded for the theme of ‘freedom and flexibility’ equally among those who were self-employed, those working for start-ups, and those working for more established companies in a blockchain role. This highlights that these qualities are not tied to one type of work environment, but the nature of work in emerging technologies. The ‘space of flows’ and the ‘space of places’ are not mutually exclusive. It is in the interface between the two where tensions between “uniformity and autonomy, of domination and resistance, and of instrumentality and experience” are negotiated (Castells, 1999, p. 294). As opportunities in the space rapidly proliferate, stakeholders are able to make meaningful connections, or transitions in employment. Even after my interviews were complete, I continued to observe this theme in real time. Since I remain loosely connected to the interviewees via social media, I noticed when they changed their titles, companies, or locations. Between my data collection and writing this chapter, I calculated that more than half of the interviewees had made changes in their work scenarios. Some had taken offers from different companies, some had started their own companies, and some were on maternity leave. This leads us to another enabling aspect of blockchain work at large: a sense of the space as comprised of ‘brilliant, collaborative people, doing fast-paced, innovative work.’

Brilliant, collaborative people. Fast-paced innovation.

A final theme interviewees cited as enabling in the dominant frame, was 'brilliant, collaborative people’ doing ‘fast-paced, innovative work.' These aspects were often reported together as a pair. Participants described the archetype of people in the space as collegial, out-of-the-box thinkers. Blockchain podcast host and interviewee Sam

captures the sentiment: "It's not just what they do, but their *mindset*. How innovative, creative, and *invested* they are into all of this. And also how kind everyone is." And interviewee Anna, who works in operations and business strategy for a blockchain development group, explains:

> I will say that specifically in blockchain, women and men in general are a lot more open and willing to educate others. They're less pompous than in other areas of tech, because it is so new and everyone is learning. So if you don't know what an ERC-20 is, whatever, it's fine. And I think that makes it a little more open for women to kind of carve in and learn. Because people are willing to teach them, which is what happened with me and my boss.

Like many in the space, Anna was recruited to the position with no prior knowledge of blockchain, based on her business background and experience developing a smartphone app for helping inner city students gain skills to be successful in university. She notes the sense of a more level playing field, associated with the newness of the technology. The ERC-20 acronym she mentions as an example of industry jargon, refers to one of the most significant Ethereum tokens that has emerged as the technical standard. Both Sam and Anna invoke warm images of 'kind' men and women who are busy yet generous in making time to meet in person. It is significant to note this combination of attributes, and their traditional associations with both femininity and masculinity. Gabriella Coleman (2012) has noted the common practice of men exhibiting 'non-masculine' values such as sharing, humility, and reciprocity within the ethics and aesthetics of hacking communities. The interviewees stressed blockchain's mix of 'collaborative' and 'innovative' people, which opens up space for participants to sandbox new ideas about gender norms in the context of emerging technologies.

Another compelling aspect of this 'fast-paced work' that emerged, is the opportunity to build both blockchain projects and career trajectories without the bureaucracy of traditional work environments. Interviewee Amy, a hardware developer who came up in the space as a hacker and now works in a corporate blockchain setting, shared:

> Blockchain is an 'in the moment' ecosystem. So you just have to run at the speed of light when you're working with this technology, and your business needs to match that. It's been a constant lesson to teach the entire team. You have to blitz scale. You have to take risks. Don't sit around talking about why it can't be done. Instead figure out how it can be done.

This quote evokes Mark Zuckerberg's motto of 'move fast and break things,' which has been both celebrated and more recently critiqued (Taplin, 2017). Moving fast can mean achieving some things while neglecting other important things. Yet the speed of blockchain work hails participants to the space, for personal and professional reasons. As Anna explains, "It's just so much faster. Things can change so much quicker. And I think being able to have that impact, even if you have 2 years or 5 years experience, is incredibly contagious and inspiring." She had previously aspired to work in government or corporate business, but lost interest due to the slow pace. In contrast, blockchain work combines capitalist and libertarian ideologies, framing participation as a new form of personal agency in a climate of disdain toward established institutions such as finance, government, and big tech. Castells' recent monograph *Networks of Outrage and Hope* (2015) and edited volume *Another Economy is Possible* (2017) convey the sentiments behind these contemporary concerns in their titles. Work in blockchain represents taking part in global efforts to fix socio-economic systems that are currently broken.

Early adopters (Rogers, 2003) take pride in their involvement with new technologies. Many participants conveyed a visceral sense of wonder as they reflected on the opportunity to contribute to a global network building a relatively niche technology with potential for significant social implications. As Sophia, a content developer and technical writer, expresses:

> We are working with something completely new. It feels like the late 80s early 90s of the Internet days. That feeling is sort of irreplaceable. And it just feels like you're part of something kind of bigger. And I'm a bit of a finance nerd. For a long time I've felt it was such a shame, you know, the recession, the centralization of big banks, our lack of autonomy, so all of this just really resonates. Being able to explain the value of that to people makes me feel proud of what I do.

Sophia prides herself on understanding the technology, its social implications, and how to communicate it to consumer audiences better than the tech developers themselves. This is another example of the mutual shaping that occurs as a stakeholder brings their situated knowledge to blockchain work, and the space shapes their identity as they progress through. Sophia conveys the meaningfulness of being part of something 'bigger' than oneself. Participants working in blockchain across various sectors echoed this sentiment.

One final quote aptly bridges the discussion from enabling to constraining factors reported within the dominant discourse. Carrie, CEO of a company in Berlin, observes some important nuances to do with the shifting social make-up of the space:

> What I've seen in blockchain and cryptocurrency is, it's not perfect in terms of how many women are there. But there does seem to be a bit more flexibility coming in the space. There's women in all kinds of roles. In other areas of tech, it has felt like there are certain roles women just didn't do. And in the blockchain space, it's kind of more like the wild west, and that's very good. However, one thing that's carried over from other tech spaces is, women developers or women in engineering, I still see just as little of that in the blockchain space as I have in any other tech space. So you'll see women in all kinds of roles, but not those, and yeah that's sad. It would be a good problem for all of us to work on fixing now.

Carrie's quote captures the uneven progress for women in the space, and highlights that not all women's experiences are the same. Each type of professional role comes with its own subculture. Finally, in another nod to the current malleable state of blockchain, Carrie notes that the lack of women in technical roles is a problem everyone in blockchain should try to fix in these early stages.

Constraints in the gender-blind meritocracy frame

In addition to the enabling factors associated with blockchain work discursively framed through gender-blind meritocracy there were also numerous constraints that emerged from the data. Two prominent themes I observed that resonate through each of these challenges outlined below are: double standards and assumptions rooted in sexism, and the additional social labour required to navigate them for women to succeed. As we discussed these barriers during interviews, participants generally conveyed responses with a tone of acceptance or humour, in tandem with their strategies for overcoming the barrier swiftly and subtly. Within this discursive frame, participants mainly framed talk of gendered inequity in terms of how to avoid or deal with it.

Technical roles as hostile

In contrast to participants in business, marketing and communication, research, sales, design, or advocacy roles, those in technical roles experienced more hostility at work in blockchain. Researchers have investigated and substantiated this phenomenon

from a variety of scholarly approaches (Misa, 2010; Hicks, 2017; Hardey, 2019). According to the data, this hostility did not simply correlate with male-dominated work environments, but particularly with highly technical roles in male-dominated tech cultures. Half of the participants reported being the only woman on their team and enjoying their overall work experience. I was only able to interview four women in technical roles, despite my efforts to recruit more. So I can not claim to make any generalizations about this sub-group. But based on my data set, their experiences were markedly different than women in non-technical roles.

Ethereum developer Bailey identifies the barriers for women in technical roles in blockchain as primarily cultural ones, in blockchain spaces dominated by young, white men. She reflects on several challenges:

> It's surprisingly difficult. One of the organizers from the foundation asked to see my Twitter profile so he could follow me. He saw the little rainbow flag, and he's like, "Oh, you're gay, how's that been in this community?" Actually, honestly, nobody cares that I'm gay, but being a woman has been much more challenging. I've almost exited a couple of times, out of sheer frustration with the culture. Prior to blockchain, I was in functional programming, which is also famously unfriendly, and I was able to handle that reasonably well. But blockchain has actually been absolutely brutal. People do not trust that you know what you're talking about. They talk down to you. Mansplaining, the whole nine yards. It's beyond frustrating. The politics in Ethereum, and in the blockchain space generally, can be challenging. For example, there is a group working on making some significant changes in Ethereum, and there's some unanswered questions and problems with the project. But it's like political suicide to actually say, "is this a good idea?"

Among the intersectional aspects of her identity, the simple fact that she is a woman has been the most difficult. She describes the patronizing way she is spoken to. The term 'mansplaining,' which entered popular lexicon as a 2010 *New York Times* word of the year, refers to a discursive act in which a man presumes to explain something in an overly confident and sometimes incorrect way, to a more expert female speaker (Solnit, 2015). A telling sign of mansplaining is when one refuses to backdown or admit a mistake after it has been authoritatively pointed out, exposing a sense of entitlement about who gets to be considered an expert (Manne, 2020). Bailey also notes that it is 'political suicide' for anyone, let alone a woman, to question the decisions of a small group of influential, male Ethereum developers. In contrast to the decentralized design of the technology itself, De Filippi and Loveluck characterize the politics of Bitcoin as a

“highly centralised and largely undemocratic development process… built on automated technical rules designed by a minority of experts with only limited accountability for their decisions” (2016, p. 2). Bailey’s experience demonstrates clear, gendered hierarchies in a space that prides itself on democratic participation. It stands in contrast to some of the other participants’ comments above about how people in blockchain tend to be more kind and collaborative in comparison to other areas in tech.

In another example of hostile work culture, Amy was one of the first ever Bitcoin miners, who fell into blockchain as a self-taught teenaged hacker at the time Nakamoto's (2009) white paper dropped into the IRC chat room she frequented. Like Nakamoto, she contributed to the blockchain space under a gender-neutral pseudonym until 2016 when her work began to require in-person, global travel to consult on major projects. She tried a few times to 'be herself' online but was immediately shut out of chat rooms she had participated in where important blockchain discussions occur. Sian Brooke (2020) conducted a social network analysis across tech communities that offer anonymity such as Reddit, Twitter, and 4chan. She documents how the inferred gender of contributors can by predicted by how they are spoken to. She identifies gender as a key mediator of legitimate technical knowledge even in so-called meritocratic environments. This demonstrates the deeply engrained, structural nature of sexism in tech culture.

Amy has worked globally and never met another woman with similar expertise in software and hardware design for cryptocurrency mining. She attributes the progress she was able to make in the space to her ability to hide her gender identity online. "Sorry to tell you, it's kind of a taboo to do this job as a woman," she explained. She goes on to describe the grassroots cryptocurrency community's reaction to her work when she revealed her identity as a woman:

> It was the first time that I came out publicly and said, “Hey, here's how you design a proof of work algorithm for hardware.” It showed a lot of talent, and a lot of people got very excited about it, until they realized a girl had written it, and then it was met with so much hate. “Oh, that slut is on a podcast now.” “She’s such an attention whore.” "Stereotypical manipulative woman." These kinds of things. I can firmly say that if I was a dude, I would not have the amount of hate that I do. Being a woman just gives people an avenue for easy attack. There's a lot of drama and nonsense about it. And it's bled over into my current work. I really don't like when my crypto life bleeds over into my professional life.

It is significant that Amy views her 'crypto life' and her 'professional life' at a blockchain company in the US as two separate worlds that can affect one another. In order to successfully navigate the blockchain space, she has to toggle between her identities and interests across these spaces. It is also telling that the hateful backlash she received was from the ‘open, meritocratic’ crypto sphere. Kate Manne (2017) explains that misogyny should not be understood primarily in terms of hatred some men feel toward all women – more precisely, it is about policing, punishing, and exiling women who dare to challenge male dominance, through the ‘shock collar’ that is misogyny. In this case, Amy notes that people were excited about her work, until they realized it was innovated by a woman.

It requires additional ‘emotional labour’ for women to participate in open-source tech communities (Menking & Erickson, 2015). The concept of emotional labour draws on Hochschild’s (1979) idea of ‘emotion work’ involving ‘deep acting,’ where a person evokes, shapes, or suppresses feeling in oneself, to fit into the social environment. In contrast, Goffman’s (1959) dramaturgical concept of the ‘presentation of self’ focuses on the outward management of expression and can be seen as ‘surface acting.’ Taken together, these internal and external forms of acting involve a heavy layer of social labour women perform in order to engage in male-dominated tech spaces. Unsurprisingly, research on emotional labour has shown that “workers who are required to feign emotions are more likely to suffer ill effects than those who are able to deep act their emotions,” and that women are disproportionately plagued by this dynamic (Polletta & Tufail, 2016, p. 401).

In the interviews, I asked participants about micro-aggressions they may have seen or experienced in the space. Micro-aggressions are derogatory slights, delivered implicitly or explicitly, which communicate bias against marginalized people or groups such as women and racial minorities (Torino et. al., 2019). Most participants needed to think for a while before replying, or circle back around to answers that came to mind later in the interview. I came to see this delayed response as a logical coping mechanism for steeling oneself against the everyday microaggressions women deal with in the space, because over the course of the interview, more would flood to mind. However, a handful of participants including Amy and Bailey immediately offered multiple stories of overt verbal abuse, aggressive misogyny, and even physical threat. "The progress I've been making in the last two years has gotten me swatted, it's gotten death threats," says Amy.

"There is a reason I live way up in the mountains away from civilization." Being 'swatted' refers to a relatively recent type of internet-fueled crime originating from the gaming world, in which bad actors call the police, or SWAT team, on a fellow internet user who has angered or offended them. This so-called prank intended to terrorize the victim, has even caused deadly consequences (Ellis, 2020). In Amy's case, she literally chose the location of her home based on personal safety in relation to her work and involvement in blockchain. According to the data, gendered discrimination for women in technical roles is more overt and visceral than for women in other types of roles.

Presumed incompetent until proven capable

The second constraining factor is a well-cited micro-aggression for women across numerous fields, and the most commonly reported one from this data set: 'being dismissed or presumed incompetent until proven capable.' Participants reported 'the little sister' treatment and the 'difficult' label, as examples of everyday sexism in this vein. Women are more likely to be infantilized, villainized, sexualized, or generally disrespected in patriarchal work contexts. A recent comparative study of feedback men and women receive at work, men are encouraged to set vision, leverage politics, and claim space, where women are encouraged to focus on operational tasks to execute other peoples' vision, cope with politics, and work cooperatively (Doldor, Wyatt & Sylvester, 2019). This reflects who we view as capable leaders and innovators in organizational culture, and even more so in organizational tech culture.

Interviewee Rebecca, a woman in her mid-20s, oversees business operations for a fleet of cryptocurrency kiosks across Canada. She is the only woman in “a very sexist environment” at her workplace, which is financially and temporally tied to a traditional financial firm. Although she is in the most senior management position and paid the most at her company, she says she has had to create more of a flat structure in the company, because one of the men on the team said he has never had a female manager before and therefore finds it hard to take direction from her. She is simply not seen as an expert or even an equal, despite her leadership position. This flat work structure was not proactively designed to be open and equal, but reactively instated under pressure to diminish a hierarchy that placed a woman at the top of a traditional, patriarchal team. Rebecca's boss runs this blockchain startup with similar business models to his financial firm. Financial firms notoriously use hiring, grooming, and seeding practices that enable

patriarchal elites to maintain monopolies over financial resources, which reproduces structural inequalities in the workplace (Neely, 2018a). Within the gender-blind meritocracy, the 'common sense' response to these barriers is that if women show up with skill and confidence, and do good work, they will be recognized and rewarded for it. Yet even women who subscribe to this sentiment note that constantly proving oneself, and correcting gender stereotypes about women in tech, is an exhausting form of social labour layered on top of professional work.

I wondered whether these micro-aggressions correlated with participants' gender presentation. For example, a recent study of San Francisco based women programmers, technical writers and engineers found that racially dominant (White and Asian) gender-fluid women who were willing to invest in masculine 'geek culture' found greater belonging in their workplaces than conventionally feminine, heterosexual women, based on male colleagues' perceptions of their competence (Alfrey & Twine, 2017). The researchers identify a "spectrum of belonging" based on the "dynamic forms of inclusion or exclusion that women experience according to their race, sexuality, and gender presentation" in male-dominated socio-technical spaces (p. 30-31). In my own study, I spoke with women who expressed feelings of exclusion, regardless of how feminine or masculine they presented. For instance, Gabrielle, an engineer and CEO with a glamorous, traditionally feminine style, said:

> As much as I like to say, "we're citizens of the world, it doesn't matter if you're a man or a woman," I think it *is* difficult for women, because they look at us like sexual objects. They sometimes treat us unfairly. They don't take women seriously. When people look at me, they may think, "she's very feminine," this and that. But when they sit down and speak with me, they quickly understand that I'm very serious, dedicated, and professional.

In another case, Bailey, an LGBTQ developer with a genderfluid aesthetic, reflects:

> For my entire time in tech, I have basically tried to blend in with your typical programmer style. I was in hoodies and jeans. And I didn't even particularly like it, but I thought, "for people to take me seriously, I have to do this." And that's false 'cuz they treat me exactly the same when I don't do that. Even when I was wearing super nerdy t-shirts at a conference, I was getting the assumption that I was my co-founder's personal assistant. Even if the section that we just ran is *my work*. In fairness, once they saw my resume, they spent the next two hours trying to hire me. But it's this assumption that I don't know what I'm talking about.

I was struck by the fact that these women, regardless of their different gender expressions, essentially told a similar story about being dismissed. They were only later taken seriously after proving themselves capable. Some scholars have suggested that women in male-dominated tech cultures walk a tight rope between “appearing ‘unfeminine’ in their connection to technology or ‘too feminine’ by attracting unwanted male attention” (Nafus, 2011, p. 671). Yet such arguments about the relationship between gender and technology simplify the complex issues at stake, reinforcing heteronormativity (Landström, 2007). They assume there is an ideal form of femininity that women in tech are punished for presenting or lacking. In contrast, I found that women presenting a wide range of feminine or masculine sensibilities were met with discrimination, both in person and online.

Participants cited pre-emptive measures they take to try to minimize demeaning assumptions about their lack of competence. For example, several described well-rehearsed, clearly intentioned scripts they use to introduce themselves. Blockchain content writer Sophia has used this technique. She describes the subtle but pervasive inequities she has experienced:

> I try not to focus on the fact that I'm a woman, and just march in, and do my job, and say what I think. But the reality is that when a guy goes to work, he can just be himself. But as a woman working in this space, you have a good time if you work with people who are open, and you have a bad time if you work with people who just want to hear other men. I think it’s an internal bias that we're working against. You just have to go with it and keep pushing forward. You can't call everybody out, or you'll be called bitchy, so it's a fine line. It’s not fair that women have to put that much work into everything we say and do, and be afraid of how we’re represented, but I don't know how to fix that.

Sophia cites the double standard of not being able to fully be yourself at work as a woman, rooted in pre-existing, gendered bias (Friedman & Nissenbaum, 1996). She notes how women need to identify and partner with those who are 'open' instead of those who 'just want to hear other men' to secure better working conditions, as another form of social labour required to succeed in the space. To return to the board room table analogy, scenarios with 'men who just want to hear other men' reflect patriarchal work contexts, where any seat reserved for a woman in the dominant frame exemplifies 'performative diversity' without genuine inclusion. Sophia notes that confronting gender

bias is a risky move. Her presence may be valued for her communication skills. But that does not mean she is viewed as an equal or credible stakeholder.

Tokenism

Another constraint in the gender-blind meritocracy is the thorny issue of tokenism (Alegria, 2019). On one hand, 'reserving a seat at the table' for a woman can be seen as a tangible measure of progress. Yet it can also be experienced as a back-handed compliment when the practice is conducted as a company's perfunctory diversity initiative. Individuals are only ‘diverse’ in particular social contexts, not in and of themselves. ‘Diversity’ has become shorthand for ‘women or people of colour’ in predominantly white, male-dominated work cultures. The token diversity seat at the boardroom table can feel demeaning, as though the bar has been lowered for a woman to join, even if she is fully qualified. In the examples of tokenism below, women are expected to turn a blind eye to the cultural challenges at the tables they are invited to, while companies publicly take credit for women's achievements as though they have enabled them in the process.

In a prime example of tokenism in corporate work culture, Ariana, a lawyer, was featured in a promotional video for the professional services company she works for, after establishing Canada's first legal practice specializing in crypto tax as a junior associate, which garnered $3.5 million in its first year. She recounts:

> You know what's really difficult in the corporate environment? To come to this level, having built this [blockchain practice within the company], it required a massive amount of fighting. So it wasn’t just being a woman in blockchain, it was also being a woman building a business that the firm did not believe in at the time I started it. And that is an additional fight, in my opinion. Because when I see men fighting passionately for something, the firm looks at them so differently than they look at me. So ultimately my firm has backed me. They made external marketing videos about me, like “Look what you can do when you’re a junior.” [*Laughing*] But the truth is, they make it look a lot better than what it was like. They were using that opportunity to say, “look what you can do at [our company].” But to do that, you have to give up everything else. They make it look so wonderful, like “Oh, she was so passionate and look what she built.” But it’s like, if only it were that easy.

Ariana describes a type of 'bait and switch' scenario. The marketing video was an outward display designed to take credit for the impressive achievements of a young

woman of colour. On one hand Ariana was proud to be featured in the video. On the other hand, it felt disingenuous to her experience, which involved struggle, less support than a man would have received from the firm, and the personal sacrifice of 'giving up everything else.' Gestures of tokenism ring hollow. They are valuable to the company's image, but the person singled out for being 'different' does not feel genuinely valued, heard, or supported.

Another negative side effect of tokenism is the expectation to fit into the dominant frame's cultural context with a posture of gratitude, even in the face of offensive, sexist behaviour. Interviewee Anna recalls how she processed a sexist incident at a company dinner event:

> One of the guys who works in our umbrella organization showed up to a banquet dinner with a tuxedo that looked very nice, and on the inside of his jacket lining was porn photos on the liner. He was a few years younger than me. And everyone thought it was just hilarious. All men at the table. I'm the only woman. And you know, I talked to my coach, like "I didn't know how to handle this situation." First off, I was shocked. Secondly, all these other men were encouraging him or laughing, where I felt like someone needs to step up and be like, "you can not fucking do this. This is not appropriate." So after walking through different scenarios of what I could have said or done with the coach, I ultimately decided I didn't care enough to say anything to him after the fact. In the moment, I didn't say anything. But he knew I didn't think it was funny. I could not hide that.

The suit, and her colleague's jovial response to it, reflects the openly sexist work culture Anna is expected to fit into. She could not hide her disdain, yet it was also too risky to address it. She then spent time, money, and energy reviewing the offensive incident with her business coach. Mariann Hardey (2019) proposes two cultural-spatial dimensions through which the construction of gendered identities is influenced by material and digital settings in tech culture. First, she argues that tech clusters "entail *dominant conditions of space* – physical characteristics, location and history that are both gendered and gendering," and second, that "women experience these spaces as *gender-spatial boundaries"* in which direct experiences of marginalisation occur (Hardey, 2019, p. 72). In Anna's story above, she had to navigate both of these spaces, during and after the offensive incident, in her the role as a woman in the gender-blind meritocracy.

In this first part of this chapter, I presented some of the most enabling and constraining aspects conveyed by the participants about work culture in the dominant

frame. In the next section, we turn to examine the ‘lean into blockchain’ discursive frame, in which women 'build their own tables.' It represents a smaller pocket of blockchain work culture, that demonstrates how gender and blockchain shape one another in different ways.

Lean into blockchain: women building their own tables

In one of my conversations with Jessie, a self-employed, blockchain-focused investment advisor and WiB conference founder, I cited a quote by Shirley Chisholm, the first black woman elected to the United States Congress in 1968: “If they don’t give you a seat at the table, bring a folding chair” (Carr, 2017). She quickly added, “Or create your own tables.” That mindset captures the second discursive frame, 'lean into blockchain,' and the women-led work cultures that reflect it. In this section, I examine the most prominent enabling and constraining factors to do with women creating their own work cultures in blockchain. In these scenarios, women are not the exception to the rule as in male-dominated work culture. Rather, in this negotiated discourse, women's various leadership styles and values set the tone for work culture, without having to prove themselves as competent at every turn. In this discourse, women's innovations and contributions to the dominant space are framed as mutually beneficial examples of 'interest convergence' (Bell, 1980).

Below, I present the most notable factors that enable and constrain the interviewees in their work within women-led and self-employed work contexts in blockchain. I interpret the data from these scenarios through the second, negotiated discursive frame, 'lean into blockchain.' The most salient enabling factors include: (1) a decentralized, collaborative work ethos (2) embracing feminine styles of work and leadership, and (3) self-employment and companies led by women. The top constraining factors include: (1) the lack of value placed on women's time and compensation, (2) ‘stay in your lane’ limits to success, and (3) the instability and precarious work associated with an emerging space.

Decentralized, collaborative work ethos

One of blockchain's most defining characteristics is its decentralized design. Decentralization has been elevated as the discursive emblem of blockchain, just as ‘disruption’ was for venture-capital investment in Silicon Valley (Schneider, 2019). The malleable term is evoked in relation to a broad array of socio-political leanings, from leftist libertarian anarchism (Winner, 1986) to right-wing extremism (Golumbia, 2016). Ethereum founder Vitalik Buterin (2017) delineates that blockchains are “politically decentralized (no one controls them) and architecturally decentralized (no infrastructural central point of failure), but they are logically centralized (there is one commonly agreed state and the system behaves like a single computer).” For many of the participants in this study, the significance and appeal of this concept extends beyond the technology itself to the organizational contexts surrounding it, and the meaning decentralization holds for them personally. In decentralized organizations, decision-making and everyday practices are distributed away from a central leadership model, and toward a flatter, more democratic model. Interviewees noted how this ethos is associated with the blockchain community at large, but even more so in women-led organizations. For example, product manager Alice recounted:

> There is this fantastic workshop on decentralization that [a local blockchain organizer] and a couple other people put on. She really decentralized her own power, so it was truly a collaboration, not a top-down approach, about 'regenerative' leadership. My current manager also comes to mind as an example of this. She’s very much a facilitator, very inclusive, and someone who is a 'leader as a host.' She intentionally creates opportunities for people, and for connections between people, which is super fruitful.

Alice notes how the workshop facilitator demonstrated the decentralized model in a ‘show don’t tell’ fashion. Both examples she cites convey a theme of generous leadership that seeks to proliferate power in others around them, instead of consolidating it. The idea that emerging technologies can facilitate social progress for women is reminiscent of cyberfeminist celebrations of the Internet. Sadie Plant praised virtual worlds as more than just new spaces for women to explore within existing culture, but spaces that “undermine both the worldview and the material reality of two thousand years of patriarchal control” (1996, p. 170). While the technical features of decentralized technologies do not create democratic working conditions, they do attract like-minded people inspired by the potential implications of the technology. As a convening

technology, blockchain's "utopian hope can allow diverse stakeholders to convene in new ways, bridging difficult divides and opening alternative approaches to endemic issues" (Baym, Swartz & Alarcon, 2019, p. 404).

Participants connected the decentralized model with characteristics traditionally associated with feminine work styles, such as democratic communication and collaboration, in contrast to the highly individualistic, competitive ethos associated with corporate capitalism. Kacia, who oversees operations at a blockchain mining company, reflects on the work culture she has observed among women in the space:

> I always see it as kind of two-fold. It's difficult because it's often harder for women to get their voices heard in [the dominant] system. However I think the flip side of it is, there's a small-knit group of women, especially in blockchain, that are very passionate and will lift each other up rather than tear each other down. So I think if we can maintain that supportive network and keep bringing people into the supportive network, you know - not excluding them because we had it hard to begin with - then I think that it will eventually lead to the success of women. And men can compare themselves, they can tear each other apart and climb to the top, while we are lifting everyone up together.

Kacia contrasts the traditional, competitive, male-dominated work culture with the small yet significant contingency of what feminist scholar Sara Ahmed (2017) calls 'infrastructures of support.' Kacia envisions welcoming more women into these networks, and growing their ranks, as a path to improving work culture for women in blockchain. Similarly, interviewee Nicola, founder of an advocacy group for women in blockchain, rapidly listed off examples of women leading blockchain organizations as prime examples of the decentralized work ethos:

> Lucia from Emerge, Anu from Crypto for Kids, and Women Investing in Women, everybody's trying to help each other, on every level. 'Cuz I think we're all trying to create something. It just feels healthy, there's none of this kind of competition and kind of throwing under the bus. People are really dedicated, they want to make a difference globally, they feel that blockchain is potentially a solution or the beginning of that solution.

These descriptions of cooperative, solution-oriented work cultures in the 'lean into blockchain' discourse convey some of the meaningful qualities that compel participants to identify themselves as part of a larger project, for both blockchain and gender equity. The malleability of the term decentralization makes it an ideal vehicle for 'imagined affordances,' which can be thought of as "the communicative ground through which the

meanings of technology are negotiated and renegotiated by users through perception, mediation, and materiality" (Nagy & Neff, 2015, p. 7). For example, participant Darcy, a communications officer, cited "the whole decentralized philosophy" as the most significant thing about blockchain-related work, describing it as such:

> I'm excited about being able to own our own identities and make decisions ourselves about how it's used. I'm excited about the world becoming a smaller place by taking out a lot of the discrepancies between the 'haves' and 'have nots.' Equality can go a lot further with the use of blockchain. And on the gender side, I like that the voice of women from the early stages is going to shape a technology that meets our needs as much as any kind of male-dominated needs.

This quote shows how 'imagined affordances' can encompass personal, social, and gendered visions of progress based on the idea of decentralization. Feminist scholars of technology have reflected optimism about its potential for socio-political transformation (Haraway, 1991; Plant, 1997; Wajcman, 2004). Importantly, Darcy's optimism is not based on technology itself, but on the liminal discursive and material spaces opened up by its use. She suggests that 'equality can go a lot further' with blockchain as a vehicle. Darcy speaks of the ability to own one's identity, as a benefit of the data privacy features associated with blockchain. She also cites the idea of 'the world becoming a smaller place,' which both scholarship and public discourse have attributed to information and communication technologies over previous decades (McLuhan, 1964; Castells, 2000). Darcy also applauded what she called 'feminine input' that she sees in the early stages of blockchain, which she connects to the greater likelihood for women's needs to be addressed through it. Similarly, in her book *Invisible Women*, Perez amplifies the importance of gender representation in designing technologies for everyday life: "when women are involved in decision-making, in research, in knowledge production, women do not get forgotten. Female lives and perspectives are brought out of the shadows" (2019, p. 140).

Embracing feminine styles of work and leadership

A closely related theme that emerged from the data had to do with embracing a style of work and communication that has traditionally been associated with femininity. The 'powerful yet feminine' persona is emblematic of popular feminism, which encompasses a wide variety of feminisms under a generalized brand of modern

womanhood (Banet-Weiser, 2018). This is a marked contrast from second wave ideas of the “biological female who acts as a social man” to be successful at work (Acker, 1990). The examples below reflect social dynamics at work, as well as how women are able to bring themselves to work. For example, interviewee Tara, CEO of a blockchain research agency, reflected on her work experiences with teams made up of women, versus male-dominated ones. Women's teams tend to have an unspoken code of "drop your ego at the door," which she contrasts with the male-dominated blockchain and crypto spaces, where she says, "there's a good amount of egos walking around." Women are often socialized to be more deferential, in contrast to the more ‘entitled’ way men are socialized to take up space (Manne, 2020). A deferential disposition can be seen as a sign of weakness or passivity for women in the dominant space, even if it is a valuable trait in and of itself. In women-led spaces, it is more likely to be viewed as a benefit to team members of all genders.

Gendered differences in work and communication style are prevalent through both digital and place-based spaces in blockchain. Similarly, Wikipedia, the “online encyclopedia that prides itself on being open and collective [and] to democratize knowledge institutions” has a gender equity problem (Ford & Wajcman, 2017). A study of gender and communication among Wikipedia contributors found that female contributors communicated in a way that promotes social affiliation and emotional connection more than male contributors, regardless of their status in the community (Iosub et. al., 2014). This reflects the ways women are often expected to be caring and relational in both personal and professional settings. Women who led blockchain teams talked about how this translated into everyday practices. To return to the analogy of the board room table, interviewee Liz conveyed how she fosters a collegial meeting environment where everyone’s voice is heard:

> During meetings, I make sure that if someone looks like were about to say something, but somebody else had a louder voice, I circle back to them and say, “Hey, it looked like you were going to say something, do you have something to say?” Just making sure that they feel heard. Or sometimes I’ll set ground rules at the beginning of the meeting, that everyone is going to say something, little things like that.

This emotionally attuned, invitational approach often associated with femininity, makes space for all team members to be heard. Social psychologists have shown that women’s heightened performance of empathic accuracy, inferring the thoughts and feelings of

others, is the result of motivational differences, not ability (Klein & Hodges, 2001). The propensity to create these conditions is significant for blockchain development settings. STS scholars remind us that the criteria for judging whether an emerging technology 'works' is contestable, based upon their acceptance by relevant social groups (Wajcman, 2006). Who are the relevant groups represented at the table? Gender equity requires the intentional construction of work environments in which favoured projects can be seen and heard as viable in the first place (Law, 1990). Therefore, these 'little things' participants do to democratize their board room tables are significant.

As a final example, interviewee Gabrielle would like to see more highly skilled women able to join the space without having to change their personal or professional style:

> It's very important for women to try and get into more difficult technical roles, such as blockchain which is very complicated, to express their voice so that other girls can follow. I'm a little bit unique because I'm an engineer, I'm a CEO, very outspoken, I like to dress a certain way. There's a whole philosophy behind it, because I do believe that women need to be free to express themselves. Your femininity, your sexuality, whatever you want. We need to encourage women to *not* try and be like men, which is like to pound on the table and show her muscles. No. You have to embrace your femininity and realize that you're one in the room among many others that are not like you. And that can be an advantage, right? I don't think women should try to look a guy, act like a guy, hide their body. I think that's the sort of forward movement that I would want to encourage women to do.

Gabrielle rejects the idea that women should try to look or act masculine to achieve success at work. She takes pride in being unapologetically feminine at the board room table. Previously in this chapter, I noted that neither her classically feminine style nor Bailey's gender-fluid style resulted in greater respect in the space. In the quote above, Gabrielle starts out by expressing one of the core sentiments of the 'lean into blockchain' discourse. She suggests that women need to become trained for, and pursue, more difficult technical roles in blockchain, to promote greater representation of women in the space. She then pairs that with a sentiment from the 'intersectional inclusion' discourse, which is that women should feel be able to dress, speak, and act however they feel comfortable at work in tech spaces. This shows how women adeptly toggle between discursive frames to highlight their beliefs that align with aspects of each frame depending on social context.

Self-employment and companies led by women

Finally, one of the most salient themes to emerge from the data in this discursive frame, was the trend of self-employment and companies led by women. These exemplify 'women building their own tables.' More than half of the participants fell into this category, citing a variety of motivations for being self-employed or founding companies. Participants often forged these entrepreneurial paths in blockchain to shift away from exploitative business practices in the dominant frame or to address the needs of a particular demographic or market. STS scholars have conceptualized the idea that redesigning the development process in emerging technologies can empower workers rather than demeaning or eliminating them (Wajcman, 2006). The potential for a diversity of stakeholders to start their own ventures relatively easily is facilitated in part by the sociotechnical infrastructures of the network society (Castells, 2000).

For instance, Bailey had become disillusioned with the blockchain company she was working for. After a new CEO was hired, the company shifted away from projects like supporting microfinance for women-led startups in Africa, toward a focus on greater profitability, even if it involved using centralized databases marketed as decentralized databases. Bailey and others quit. A few months later, she met her current co-founder at a conference in Berlin. They discussed ways to start a small venture “to do the things we actually wanted to do." Ten days later, they were accepted into an accelerator program run by a larger blockchain organization and headed to San Francisco to develop their business model. On the more difficult days of dealing with discrimination in the blockchain space, she has often thought, "if I didn't have my own company, I'd be gone." Being self-employed, with a supportive co-founder, has kept her in the blockchain space.

In Dara’s case, learning about blockchain provided an inspiring path toward solving the problems she had observed during her time working in the food and beverage industry in Silicon Valley. She was interested in how blockchain could help to improve sourcing, traceability, supply chain, and fairer compensation for farmers:

> [The food and beverage industry] is totally profit-driven and exploitative, and it's not okay. I think there's an opportunity to bring ethics and morals back into technology. The decentralization ethos is so powerful. So [the

> organization I'm starting] is a platform for restaurant discovery and cryptocurrency exchange, that incentivizes better sourcing practices. We should really focus on what's going on locally first, when it comes to food. That's a big shift we need to help with, supporting circular local food systems and economies.

Echoing one of the themes above, Dara was specifically intrigued by blockchain's decentralized ethos, as both a mindset and a technical system, to help ameliorate the unethical issues she sees in the food industry. She identified a gap at the local level of food economies and left a Silicon Valley job to develop this idea in Vancouver, a location she saw as more amenable to the collaborative ideals that go hand-in-hand with decentralization. Although she is in a challenging position to get the initiative off the ground, and looking for funding, she has the financial and emotional support of her partner who also works in blockchain. They share a vision for the meaningful social changes blockchain might influence. Jasanoff & Kim (2015) explore how these 'sociotechnical imaginaries' are most clearly observed during stages of emergence, contestation, and stabilization of new technologies which we see here. These imaginaries are often fueled by visions of technological progress as facilitating better life quality for the common good.

As a final example of women starting their own blockchain initiatives, Amy described how she "collected the misfits and gave them a home" by starting a company that grew to 75 team members, operating under pseudonyms, located around the world:

> We were completely different. I was the only public person. And it was really a home for wayward hackers. Often people who didn't feel like they fit in the real world. They might have been transgender or a certain race. Some had mental health issues. You have to understand, programming has a lot of creativity to it, and it attracts a certain type of person. Someone that's very obsessive and focused. These people generally can not focus on 9-5 jobs. These were people that would just obsess at something for 48 hours straight, and then disappear for a few weeks. These are people that have no understanding of rules. No boundaries, no barriers. That's really how it started. They were all begging me to start a company. And finally I decided I would do that.

What strikes me about Amy's account of starting her own company, as well as the instances above, is how they challenge stereotypical, white, heteronormative notions of women-led companies. Participants in the examples above sought to earn a living doing meaningful work, with the freedom to be themselves, as women of colour, LGBTQ folks, or by employing those who had been discriminated against as 'misfits' based on gender

or race. This is significant to analyze in more contemporary forms of technofeminist analysis. We need to consider the implications of decentralizing gender just as much as we need to consider the implications of decentralized technologies. Scholars have long established and critiqued the fact that ‘institutionalized heterosexuality’ (Faulkner, 2001) plays a role in the co-production of gender and technology on a theoretical level. Yet technofeminist studies have often associated fixed ideas of masculinity with tech cultures, and fixed ideas of women’s identities as the basis for feminist critique of these cultures. Landström (2007) argues for a queer technofeminist approach that destabilizes gender identities, to better see how working conditions generate different assemblages and different belongings depending on social context. The examples above show that within this theme of self-employment and women-led companies in blockchain, “surface belongings and desiring identities refuse to stand still’ (Probyn, 1996, p. 35). The social conditions that influence our perceptions of gender, work, and blockchain, remain in flux. A more sophisticated technofeminism takes this into account, acknowledging a wider variety of women’s identities and agencies in emerging tech spaces.

Constraints in the ‘lean into blockchain’ frame

Just as there are uniquely enabling aspects of work cultures in the 'lean into blockchain' frame, there are several constraints that affect women disproportionately. Each of the constraints below are observable across each discursive frame. I include them in this frame because they are exacerbated for women who strive to pave their own paths in the space. They include the lack of value on women’s time and work, 'stay in your lane' limits to success, and the instability and precarity of work in the emerging space.

Lack of value on women's time and compensation

The lack of value placed on women’s time and compensation rates by the industry is exhibited materially in the gender pay gap, and discursively through the trend of ‘aspirational labour’ (Duffy, 2017). While some have critiqued work in participatory digital communities as a form of unpaid labour dependent on exploitative capitalist structures (Terranova, 2000; Fuchs, 2017), others have likened it to gift economies that build social capital (Zeitlyn, 2003). While each of the participants were compelled to work in blockchain for different reasons, just over half of them felt fairly compensated for their

work. As for the remaining participants, it was divided evenly among those who felt they were not fairly compensated, and those who were unsure, or found it hard to assess. Especially in scenarios where participants worked in blockchain advocacy, with other avenues of paid income outside of blockchain, it was hard for them to assess. As interviewee Anya expressed:

> At this point, to be honest, I don't do this for the money. I don't make money off of this. The way I see it, if you do things you enjoy, the money comes to you. I'll probably incorporate the organization soon and do more consulting.

Similarly, interviewee Taylor, with a PhD in public health, said she was "still waiting to see how it pans out" in terms of compensation, since the industry is heavily based on "creating your unique niche." This involves juggling various unpaid opportunities to exhibit thought leadership and entrepreneurship. The blockchain companies seeking these services "don't necessarily have the funding yet, or they're waiting on funding." These work dynamics create the conditions for "hope labour," which emphasizes the contingent relationship between present and future work in a way that shifts the investment and risk onto the individual performing the work in desired industries (Kuehn & Corrigan, 2013). I argue that in comparison to other tech spaces, venture labour in blockchain involves an increased level of speculation and risk. This is because workers in the space are expected to make significant investments of time and money. For example, they may juggle paid employment with unpaid meetups, conferences, and other events. In addition, there is often an expectation that they have acquired cryptocurrency as a litmus test of whether they've literally 'bought into' the technology.

While these dynamics certainly affect people of all genders in the space, women are disproportionately affected, as communication scholar Brooke Erin Duffy (2017) argues in her book *(Not) Getting Paid to Do What You Love*, which examines gender, social media based careers, and aspirational work. She notes "discourses of 'paying off' are central to the motivations of aspirational laborers; they expect that their investments of time, energy, and capital will yield a fulfilling, and perhaps lucrative, career" (Duffy, 2017, p. 6). Of course, the concept of 'making it' or 'paying off' is relative. A recent study concluded that the gender pay gap, which has hovered around 20% over the past two decades, is tied to women's lower expectations of compensation even in 'platform work' or the 'gig economy' (Manzi et. al., 2021). A related study of 22,271 Amazon Mechanical Turk workers completing tasks in an anonymous online labour market revealed that

women's hourly earnings were lower than men's, despite the absence of overt discrimination, labor segregation, and rigid work environments, even after experience and education were controlled for (Litman et. al., 2020). Nicola, who is involved with the non-profit Crypto Chicks, explained:

> Women tend to not get paid as much, even in terms of equity divisions in startups. I think women may not be as forceful in how they approach it, and if they are then they're considered difficult or bitchy or unreasonable. While if a man did similar, that would be considered absolutely normal. Sort of the business status quo, right? You know, it's a fine balance being a woman in emerging technologies. We're paving our way in new territory. For instance, we just ran a hackathon in Pakistan. Would women there get paid the same as men? I don't know, probably not. But on the other hand, they would get paid for doing something that's quite unique.

Nicola expresses the social complexities women face to negotiate equitable compensation in emerging technologies. Blockchain may challenge the status quo of how value is transferred and stored, while the gendered inequities of business conventions remain firmly intact. Alice Marwick (2013) has argued that the rise of the social media made similar claims of participatory technologies as revolutionary and democratic, even as it reinforced traditional social stratification marked by race, class, and gender.

The negotiated frame of 'lean into blockchain' work culture overlaps with that of the dominant frame's 'gender-blind meritocracy,' based on neoliberal economics and techno-solutionism imperatives. Among the participants who reported they currently felt fairly compensated for their work, many added the caveat that they have not felt this way until recently. The journey to get there required stepping stones of hard-won experience in the dominant work culture. UX researcher Aisha was satisfied with her compensation at a well-known blockchain company, after negotiating the terms with encouragement from her partner. But she has been undercompensated in the recent past:

> I took a pay cut to get into this blockchain startup. And I thought initially that the pay cut was because Vancouver's market is not as strong as Amsterdam's, where I was living before. But the recruiter sold it to me, and basically gave me a non-negotiable offer, saying "if you get into blockchain, it's a growing field and you'll have many options later on." Which, looking back, wasn't true. Because I took the job and became friends with people there. All these young guys, it was their first job after graduating, with non-technical backgrounds, so they were basically getting paid to learn how to

> be developers, and they were making way more than I was. And I was coming in with a lot of previous experience and more skill.

This story challenges the idea of blockchain culture as a progressive, gender-blind meritocracy, that rewards skilled women of colour like Aisha. Both she and her male colleagues were surprised by the difference in their pay rates, which reflects stereotypical gender and racial inequities. These lived realities expose the myth that regardless of social position or identity, talent and hard work will be rewarded with equal opportunity for success (Littler, 2017).

'Stay in your lane' limits to success

Another challenge, especially for self-employed women in blockchain, has to do with 'stay in your lane' limits to success. This theme focuses on the discursively produced relationship between gender representation and perceptions of expertise. Organizational scholars have extended what Foucault called ‘the enterprising self’ with studies on work, identity, and the reproduction of gender in an era of precious employment (Vallas & Christin, 2018). In this section, I critique the tendency for women’s expertise and contributions to remain invisible. Even if they are welcomed to the dominant board room tables and their work is pivotal in helping a project succeed, their identity and any related accolades often remain in the shadows. This perpetuates inaccurate gender stereotypes about what a blockchain expert looks and sounds like. When “technological systems implicitly place men’s experiences and men’s investments at the centre, the corollary is the simultaneous denial of other realities such as those of women” (Wajcman, 2007, p. 593). The routine omission of women’s knowledge and expertise from public discourse on blockchain is symptomatic of the gendered character of tech development. I found that these challenges of visibility and representation occur even in cases where women feel fairly compensated for their work. One of the clearest examples of this was shared by Sophia, who produces content and technical writing for various blockchain and cryptocurrency companies:

> What I'm ultimately really good at is explaining their technology. Why is it different, why does it matter, why should anybody care, why is it relating blockchain or crypto to the mainstream or to the real world? So that sort of takes the form of opinion editorials, whether it's for the company's own publication or for Coin Desk or NASDAQ. I do a lot of ghostwriting as well, so I’ll write under the CEO or the CTO’s names. So I've published in a lot of cool publications, but just not under my own name.

She laughed as she shared the last line of the quote above, conveying resignation that this is just part of the job. Sophia's experience exemplifies the concept of 'interest convergence' (Bell, 1980), in which the goals of a marginalized group are achieved for a brief period in which they align with the dominant group, without effecting long-term cultural change. Although Sophia has achieved relative success within the 'lean into blockchain' frame, and feels fairly compensated monetarily, her expertise is under the radar of public view by definition as a ghost writer. The 'lean into blockchain' work culture overlaps with, and relies upon, many of the same technological and economic imperatives as the dominant frame. In this context, those who advocate for social equity in their businesses must constantly navigate the 'ideology-viability' tension, to exhibit their values while acquiescing to some of the imperatives of the dominant market (D'Enbeau & Buzzanell, 2011). Gill (2002) has critiqued distributed digital labour as disadvantaging women by rendering them dependent on the whims of men in an 'old boys network' for consulting work.

This example of interest convergence in Sophia's work demonstrates one of the thorny implications at stake in toggling discursive frames, which women undertake in their everyday work. Haraway (1988) reminds us that the very idea of 'scientific objectivity' is an illusion, and all knowledge is local and situated. When skilled women write pieces on blockchain, which are published in major publications next to bylines and photos of male blockchain CEOs, this further entrenches the current perceptions of who is an expert in the space, as well as the myth that women simply 'aren't that skilled or interested in the technology' (Combs, 2020).

In addition, the quote above underscores that the role of producing clear, compelling communication in blockchain is a key component to shaping the technology. Yet internally in the industry, communication roles rank far lower in hierarchies of power and prestige than technical roles. This is also a common, gendered bias. Most of the participants in this study worked in business and communication roles, compared to smaller clusters of technical, advocacy, or law and governance roles. I noticed this bias in myself during the interview process. One of the interviewees in a technical role recommended that I speak to Sophia as another ideal interviewee, praising her deep knowledge of the technology, which I accepted as an accurate litmus test of her expertise, coming from someone with a technical background. This highlights the uneven distribution of value to various technical practices, in ways that overlook the

contributions of women and other marginalized communities to who engage with digital technologies in important ways other than traditional technical pursuits (Oldenziel, 1999). Technofeminism reminds us that gender is constantly reproduced in tandem with technology, and therefore gender relations in tech spaces are constituted not only by the agency of its stakeholders, but also by deeply embedded gendered logics of technoscientific infrastructure (Ford & Wajcman, 2017).

Instability & Precarious Work

Finally, the downside of blockchain's flexible, non-institutionalized state, is the instability that comes with less established infrastructure. This instability increases the precarity of work, which especially affects self-employed women and those working at startups. Many of the typical workplace policies that support and protect workers, such as Human Resources departments or medical benefits, do not exist at blockchain startups. As Sophia notes, self-employment in a niche role within a niche industry means "you've got to be a strong negotiator, that's for sure." Even for those who do negotiate pay rates they are happy with, the trends and needs of the industry can shift rapidly. Participants spoke of keeping their “finger on the pulse” of blockchain, to identify potential suitable partnerships, contracts, or gigs – an ongoing job in itself. A recent multigraph called *Technoprecarious* (Fisher et. al., 2020) analyzes how precarity unfolds across disparate geographical and cultural landscapes in the network society, increasing insecure conditions of work and life for racial, ethnic, and sexual minorities, indigenous people, migrants, and those in the Global South.

As mentioned above, people tend to shift projects or locations relatively frequently in blockchain. In an example of instability, Jessie expressed frustration at how rapidly blockchain teams form and dissolve:

> It’s an emerging space. So the instability is very, very challenging. To find new people where your values are aligned, who can give the same time commitment, and you want to spend time doing the same thing. Finding those three things is so difficult to do. Especially way back in the days of the last two years, when people just raised money in ICOs. The founders don't have a lot of skin in the game, and they can jump at the next shiny object, right? So there are many teams I met in the second half of 2017, and I’m like, "wait, you don’t live in New York, you live in China now? You’re no longer the co-founder of this company?" That’s less the case in the non-

> blockchain-startup world. People are way more committed. Teams definitely dismantle a lot quicker in blockchain.

Jessie refers to a brief time period in 2017 where ICOs, or initial coin offerings, flooded the market, bringing all sorts of diverse stakeholders into the cryptocurrency space. The fact that she contrasts organizational dynamics from "way back in the days of the last two years," shows just how quickly things shift in blockchain. She is not interested in jumping at just any opportunity that arise in the industry. Part of the challenge she outlines is identifying people with similar values who want to work on the same types of projects with the same time commitment. Workers “increasingly have to become their own micro-structures, they have to do the work of the structures by themselves, which in turn requires intensive practices of self-monitoring or ‘reflexivity’” (McRobbie, 2002, p. 518). In emerging spaces, social bonds can be fast and fleeting, and there is a sense of transience, impermanence, and loneliness.

In a final example that illustrates the financial precarity that comes with working in an emerging space, Bailey offered this reflection on whether she felt fairly compensated in the space:

> No. I would make about six times as much if I was not in this space, bizarrely. Bizarrely because the space is primarily about money right now. I don't think it always will be, but it is currently. If I went to work for even Consensys, I'd make more money. But then if I were to move to Facebook, I would be making literally six times what I make now.

Bailey’s choice to be self-employed in blockchain reveals the meaningfulness and imagined affordances (Nagy & Neff, 2015) associated with the work for her. The lens of imagined affordances explicitly connects the discursive and the material in more nuanced ways than communication scholars have historically used the idea of ‘affordances.’ Bailey is in a highly skilled technical role, which shows how this precarity affects people across a spectrum of roles, from those in entry level positions in the gig economy to the creative and technological class. In blockchain’s social context of networked individualism (Castells, 2010), flexible work scenarios seem to exemplify agency and choice. However, they more accurately point to increasingly contingent social relations that are made most visible at work, where broader social tensions, contradictions, and conflict are negotiated (McRobbie, 2002).

Zooming out to think about broader social change is an ideal point to pivot toward the final discursive frame of 'intersectional inclusion.' My analysis of women's work in blockchain across the first two discursive frames focused on factors that enabled or constrained women's experiences and participation in the space on individual and sometimes collective levels. In contrast to these, frame three uniquely takes a broader vision of intersectional social equity as its starting point, locating the projects of blockchain and gender inside. If the themes in frame one and two relate more to how emerging tech cultures shape gender, the third frame elevates gender as one of the most important factors shaping technology.

Intersectional inclusion: women & allies pulling up more chairs to the table

In this final section, I investigate the most important themes that emerged from blockchain work contexts that exemplify the 'intersectional inclusive' discursive frame. Stakeholders who view blockchain through this lens want the technology to be developed in atmospheres of greater diversity, not only of gender, but of race, ethnicity, class, professional role, age, sexuality, and physical ability. If members of the negotiated 'lean into blockchain' frame 'build their own tables,' members of this oppositional frame aim to diplomatically critique and rebuild the existing tables of the dominant space. The discourses and practices associated with this frame are rooted in the belief that social equity is required to cultivate a healthy society, and technologies make up an important of this larger ideological project. As interviewee Tara shared:

> [Blockchain] blows open the possibility of some pretty serious social justice issues, like poverty and inequality reconciliations around the world. Equity, empowerment, all the sort of fundamental things that drove me before I got to blockchain and crypto. And now I think, maybe this is one of the vehicles for it. But time will tell.

This quote demonstrates that people who see blockchain through this lens often have deep pre-existing commitments to social progress, long before hearing about blockchain. In several cases they were not working in the technology sector at all prior to learning about blockchain.

In contrast to the meritocratic ‘anyone is welcome’ assumptions underpinning the dominant frame, proponents of this oppositional frame take a proactive, invitational stance to foster atmospheres of genuine inclusion in blockchain. These proactive steps that focus on the collective, while benefiting individuals as a secondary priority, have their own particular enabling and constraining aspects. I found that the top enabling factors included: (1) micro-inclusions: proactive invitations to the table, (2) revisions to company policies and structures, and (3) allyship and mentorship. On the other hand, the most constraining factors included: (1) lack of critical mass, (2) burnout, and (3) backlash.

Micro-inclusions: proactive invitations to the table

While 'lean into blockchain' practices tend to focus on helping women navigate work cultures more effectively, 'intersectional inclusion' practices focus on making workplaces more suitable for women. One of the most prevalent enabling practices reported in spaces of 'intersectional inclusion' was how people of all genders proactively invite women and people of colour to attend meetings, seek out speaking opportunities and apply for job promotions. For instance, CEO Carrie in Berlin, says she knows through talking to her employees one-on-one that they have good ideas. She supports their personal and professional development, through "small suggestions, encouraging them to put themselves out there, maybe to be a speaker someplace, or to check out a meetup." These are important yet intangible practices that amplify a diversity of voices in the blockchain space.

"A gender-diversity strategy isn't just about hiring more women," says Jodi Kovitz (2019), founder of #movethedial, a global movement and organization to advance the participation and leadership of all women in tech. "It’s about creating the kind of organization that women will want to join and where they’ll want to remain because they know it will afford them the opportunity to grow and contribute and eventually lead and govern." In other words, genuine inclusion strategies can not be based on the idea of 'add women and stir.' There needs to be qualitative, not just quantitative, steps toward improving these workplaces to be spaces where women's voices are heard, and their contributions are valued. And these steps need to be proactive, as highlighted in the title of Kovitz's (2020) recent book, *Go Out of Your Way: How One Small Act Can Move the Dial in Business and Life*. In it, she highlights the expansive power of generosity –

extending small acts of invitation, encouragement, and support to help others, simultaneously improves one's own experiences and career.

Interviewee Ariana, a lawyer in Dubai, cited invitations to meetings and speaking engagements as the most valuable micro-inclusion that helped to launch her career. An "antidote to microaggressions," micro-inclusions are "a small step to include someone" (McDowell, 2016). They are humanizing gestures for those who are often be treated as nominal members of a community, signaling that their presence and perspective is valued. Ariana and I discussed the valuable dynamic of women helping women, as well as men advocating for women to join influential spaces:

> That's the one that stands out to me. Because particularly early on, when I didn't know a lot about the industry, and didn't have any track record, the biggest benefit was people making an effort to include me in places where I really shouldn't have been, because I had no knowledge or substantial contribution at the time, but I benefited from it mentally. Sometimes men have even told me, "I see potential in you because you're driven and you're a lawyer." Some say, "look, there are no women in these meetings, and I'd like to diversify the types of people we have there, because it brings a different perspective." So some people are really honest about why they bring you in. But that doesn't change the fact that you get to be present.

Ariana notes that she was brought into these meetings before she had expertise to contribute, a factor that often holds women back from putting themselves forward for opportunities (Mohr, 2014). She observes this as a gendered difference in younger associates at her company. Among the junior staff, men will simply ask to join her at meetings, but women do not. So she has made a concerted effort to proactively invite young women to meetings, in order to help shift these cultural conventions at work. She noted the need for greater inclusion in both business and blockchain culture, as she has experienced firsthand the lack of gender diversity 'at the top' among people with more influence, money, and decision-making power:

> When people say 'more women are coming into blockchain,' that's great, but they're coming in at different levels. So while I do see more women coming into blockchain, I am rarely at a table with women present. And I'm talking about tables relating to regulation, or meetings about projects with people who have a lot of money. There are no women. Ever. I'm usually the only woman in those types of meetings.

Ariana's experience echoes the findings of Alegria's (2019) intersectional study of how gender and race shape women's career paths in tech work. She found evidence that

some white women, but not women of colour, gain upward mobility into management roles, where interpersonal, feminine-typed social skills were valued over technical skill. Women of colour, like Ariana, did not benefit from the same invitations to pursue management, and only gained access with great effort and exceptional qualifications. Alegria (2019) concluded that "not all upward progress was blocked, but the highest glass ceilings were still in place" (2019, p. 739).

The invitational micro-inclusions outlined in this section highlight what Shelley Correll (2017) has called ‘small wins’ which can have a ‘contagion effect,’ where small improvements inspire leaders to see other potential wins toward gender equity at work. These acts may be discursive, as discussed in this section. But Correll also details a model of structural, policy-based adjustments leaders can make to reduce gender bias in their organizations. The next section focuses on precisely these material changes that can be made in workplaces to institutionalize social progress.

Revisions to company policies and structures

Another enabling factor for women in the ‘intersectional inclusion’ frame is the revision of hiring practices, salary structures, and various companies’ policies to promote social equity. As Barbara Whye (2021), VP of Inclusion and Diversity at Apple, put it, “inclusion just doesn't happen. You have to design for it. It takes specific actions and behaviors.” Scholars have found corporate diversity programs to be largely ineffective because they tend to focus on either individualistic or societal explanations for gender and racial inequalities (Kalev, Dobbin & Kelly, 2006; Wynn, 2019). These studies concluded that changes at the organizational level were the rarest and most effective. Correll’s (2017) ‘small wins’ model involves strategies for identifying and blocking gender bias in the workplace. They focus on areas like unconscious bias training, and instituting more specific, achievement-based criteria for hiring and evaluation processes. Correll acknowledges that steps taken toward gender equity are typically imperfect, incomplete, and ongoing, hence the goal of compounding ‘small wins’ over time.

Interviewee Darcy, VP of Communications at a blockchain-focused tech company, offered several prime examples of how she and the gender-balanced leadership team made changes to their hiring strategy and compensation plans to recruit a more diverse group of talent. Acknowledging the power of communication, they

realized that the language in their employment ads were implicitly geared toward "a culture of coders who live in their mom's basements and eat pizza and never come out, but that's changing." So they updated their job descriptions to appeal to a broader pool of individuals:

> [Our ads] used to say things like, “If you're a coding ninja, come and join us. We have beer o'clock on Thursdays and ping pong tables,” and all these traditional tech things, right? And now we want to say, "we have flexible working arrangements. We have unlimited paid time off to volunteer in your community, which could be reading to your kid's kindergarten class." And that appeals to both moms and dads. So I think that's important, even the wording of our job descriptions. We're not looking for a “crush the enemy” kind of vibe.

Darcy notes that they are re-envisioning the strategy of how to build their ideal team, based on the language they are using to attract potential candidates. They intentionally aim to appeal to those who are involved in the community, those who may care for their parents or children outside of work, and those who prefer a collaborative work culture over a hyper-competitive one. They realize that achieving this vision begins with the discursive choices in their job ads. Importantly, Darcy notes that flexible working arrangements appeal to moms and dads. They are not looking to feminize their ads to attract more women per se. They are trying to humanize their ads to attract like-minded people of all genders to a supportive work culture. This shows how blockchain can shape experiences and perceptions of both femininity and masculinity. This is a simple, powerful example of how words create worlds.

Discursive frames can shape material realities in the workplace. Darcy’s leadership team is equally concerned with the quality of each team member's experience at the company, as they are with recruiting for top professional skills. For example, when I visited and toured their office, I saw they had a "dream wall" with photos and profiles of team members who had achieved their goals. When each new hire joins the team, they write down a personal dream they would like to fulfill, and the company supports them in doing so. One woman wanted to travel the world while she worked, another wanting to take cooking lessons with her daughter, and several wanted to study for their pilot's license so a group from the company all did it together. Darcy went on to explain how the company’s commitment to inclusion extended to salary. When I asked about whether she felt fairly compensated, she replied:

> Absolutely, and there's a reason why. About a year and a half ago, we ditched our entire salary structure. So everyone who works here knows that they're paid between 50 and 75th percentile, based on statistics, for their job description compared to others in BC and across Canada. It's all very formulaic to ensure that there isn't any gender bias or cultural bias. It ensures that we're in line with industry averages. So it gives us a lot of confidence.

Darcy's company is a mid-sized tech company that is more institutionalized than many blockchain startups. Their business includes various arms, some of which focus on blockchain. She noted that they are paid slightly less than tech jobs in downtown Vancouver, since their company is based in a more affordable suburb outside the city. The team is nearly balanced in terms of gender diversity, thanks in part to the work of a committee made up of both men and women, that focuses on gender diversity:

> We know that diversity leads to success because you get that many different viewpoints and insights that you wouldn't get if you all have the same perspective. So we have a task force for attracting more women into technology - into our company, but into technology as the bigger picture - and it's a guy that heads it up. He's so passionate about inclusivity. His wife works here too, she's one of our very few female coders. Men have to be part of it.

One of the attributes of the blockchain community Darcy described earlier in our conversation, and echoed here, was the idea that diversifying the industry strengthens one's own company and society at large. That reflects the stance of the 'intentional inclusion' frame. Darcy observed that other companies across the blockchain space are also committed to this. Secondly, she notes the value of having a man lead the gender diversity task force, as insiders advocating for those who often feel like outsiders. This reinforces that gender equity is not a zero-sum game, where men lose out when women gain influence (Roy, Smith & Johnson, 2020). As diversity and inclusion initiatives are on the rise in the workplace (Hunt et. al., 2018), these gestures can quickly become examples of performative allyship if company leadership does not follow through with qualitative or cultural change. Finally, Darcy notes the personal relationship between the task force leader and his wife who is a coder at the same company. I observed this theme emerge as the interviewees cited examples of people who supported or advocated for them. They often had a meaningful personal relationship outside of work, whether friendship, dating, or marriage. In other words, they knew and appreciated each other as people, not just coworkers. This leads us to the role of allies and mentors.

Allyship and mentorship

Finally, allyship and mentorship were cited as some of the most enabling factors that promote the values of 'intersectional inclusion' work cultures across all types of work contexts. I think of mentorship as focusing inward to facilitate greater skill, confidence, and opportunity for individuals, and allyship as focusing outward to use one's privileged position to foster cultures of inclusion through intentional efforts that benefit marginalized individuals. Privilege itself is intersectional, so just as men can be important mentors or allies for women, women also do this for other women, and for men. Assuming mentorship and allyship look like ‘men helping women’ only deepens traditionally gendered assumption about how power works in professional spaces (Anderson, 2020). Those with more work experience can be allies for those with less, white women may be allies for people of colour, straight and cisgender people can be allies for the LGBTQ community, and the economically privileged can be allies for those who are not. Several interviewees cited the mentorship program provided by one non-profit advocacy group for diversity in blockchain called ‘she256.’ The program pairs “female-identifying and non-binary individuals new to crypto with professionals in the crypto space to learn from each other, serving as guides and allies” (she256, 2021). People of any gender can be mentors in this program. Mentors and mentees are matched for six months, with a commitment to communicate at least monthly. Over the past two years, the program has had over 900 participants from over 40 countries.

In addition to blockchain-specific mentorship, interviewees cited learning business conventions from their partners or mentors. Kacia, a woman in her mid-20s who works in operations for a blockchain mining company, was one of these. As a university student, she had worked part-time as a nanny, and got to know the family well. After graduating, she interviewed for a position at the blockchain company run by the father of the family:

> So I went in as a new grad. And he sat me down and said, “This is what we're going to offer you.” And I kind of just said, “OK.” Like, I knew him. I knew he had my best interests at heart. And he went on and said, “No. You need to come back to me and argue your case. You need to negotiate. This is what happens. And if I'm going to teach you one lesson, it's going to be how to negotiate.” So it really helped. It gave me confidence. Like, I actually thought that I deserved more, but I wasn't going to say it. And of course he was testing me. He did that on purpose. So I think having mentors, men or

> women, who have negotiated in the past and have that work experience, is completely necessary.

Kacia's story highlights the fact that mentorship is key for young women entering the workplace, to convey these unspoken professional norms of the business world. Often these mentors are not telling them what to do but instilling a sense of confidence in their own power and potential. Kacia went on to share a prime example of allyship she experienced at this company as well. When I asked about micro-aggressions, she cited a scenario she experienced while interviewing entrepreneurs for one of her company's projects:

> One thing that happened that always sticks with me, was this issue of 'mansplaining.' Most of the entrepreneurs I interviewed were male. There are very few female entrepreneurs in the space, and I loved it when I'd find them. So I had a guy come in. And it was a complete case of mansplaining. I knew exactly what he was referring to, and it just kept going on. So I reported that as something I saw as a red flag, but not necessarily something I would discount him for. And I think that was important, because when we went back to the second round of interviews with this guy, my bosses were very clear that this was an issue that happened, and that he should be aware of it. They were ready to take him out of the running when I told them this issue. But I thought it was important to go back and to explain to him what he was doing and how it made me feel.

The fact that the leadership at Kacia's company took this behaviour even more seriously than she did, is an example of how allies are willing to critique gendered micro-aggressions that commonly occur in the dominant space. These sorts of mentor and ally relationships, and the communities they foster, go beyond optimism or performativity. There is an action-oriented 'will to transform' associated with them. Although many of the interviewees mentor others in the space, formally and informally, this comes along with some of the constraints discussed in the final sections below. Interviewee Jessie said:

> I don't like the word mentor. Everyone wants to be helped. A lot of times they don't even know what they need from a mentor, it's just general guidance to find more meaningful work. But I don't have the bandwidth to do that for everyone who asks. So I tell people, be very specific in your ask. There needs to be so much more peer-support. We need a much bigger base.

Jessie's frustration with the immense need for mentoring, are a segue to the challenges outlined below. Her challenge of not having enough time to help everyone who asks her, exposes the lack of critical mass among those advocating for gender equity. This can

lead to burnout for the minority who do. In addition, women who advocate for gender equity in the dominant space also face backlash.

Constraints in the ‘intersectional inclusion’ frame

Lack of critical mass

The project of 'intersectional inclusion' in blockchain is powerful and inspiring. It re-envisions how the space could and should function with greater social equity, with ripple effects from the microcosm of blockchain influencing broader social relations. Yet there is a distinct lack of critical mass in terms of stakeholders who subscribe to this mindset. As sociologist Tressie McMillan Cottom points out, “a Professional Smart Person can be so without ever reading a black woman, ever interviewing a black woman, ever following a black woman, or ever thinking about a black woman's existence" (2018, p. 219). She captures the many blind spots associated with whiteness, in the dominant and negotiated frames in blockchain, tech culture in general, and society at large.

As Christina Dunbar-Hester (2020) notes, it is incredibly difficult to create a cultural sea-change of inclusivity when only a relatively few scattered groups and individuals are interested in undertaking the significant personal and professional work it requires. And although many participants say they would like to see social progress happen in blockchain, some noted that it feels impossible. For those who are involved in advocacy, it is exhausting to sustain these counter-cultural efforts. Among the 30 participants in my study, who already represent the extreme minority of five percent of the blockchain space as women, there were only a few participants whose mindset and practices reflected this third frame. It was a small but important signal to follow and investigate. I anticipated exploring the dominant discourses in contrast to the gender-focused discourses in blockchain. But I did not anticipate identifying a third, distinct discourse with an oppositional stance aimed at critiquing and correcting both the dominant and negotiated discourses through the efforts of women of colour and their allies. One interviewee adeptly toggled through discursive frames as she considered these issues. Ella, CEO of a blockchain marketing firm, reflected:

> Diversity is one thing I will always champion for, because everyone's going to have different experiences. It's very, very important to me. On my team, I'm black, one of my colleagues she's Filipino, another team member he's half-black half-Chinese, and I've got a white male on the team, you need one. [*Laughing*]. Look at Google and Apple, who've been through these points of contention for years. You can't just say, "Oh, we have Asians on the team so we're diverse." No, you need more, right? You need more women. And that's one of the reasons why I don't get too upset when they say "there's not enough women in blockchain." Because blockchain is a subset of tech, right? So if you don't have that many women in tech, you can't necessarily expect that there are going to be that many women in blockchain.

Here Ella critiques the dominant frame's tendency toward performative diversity tactics, which are more for optics than genuine inclusion of broader perspectives. Companies who feel they have filled their small quota for diversity hires are missing the point. Her comment illustrates how the definition of 'greater diversity' is contextual. It depends on the politics of representation within a particular cultural context. In the 'intersectional inclusion' frame, various women and people of colour are in positions to influence the male-dominated space with their expertise. Ella conveys that she is not surprised or bothered by the fact that there aren't many women in blockchain, based on the fact that gender parity is a problem for the tech sector at large. This sentiment reflects the stance of the dominant gender-blind frame, which explains the lack of women in the space as a broader issue that's outside the control of key stakeholders in blockchain. This demonstrates how women constantly consider the 'ideology-viability' tension, to promote their values while also speaking the language of dominant frame (D'Enbeau & Buzzanell, 2011). Ella values diversity on her team, yet she is somewhat resigned to the fact that she can not solve the more pervasive gender disparities of the industry or society. She is well-respected within the dominant frame, and she also reaps the benefits of 'by women, for women' networks of support in the space, as described in Chapter 5 on meetups. She is a good example of someone who is adept at switching between each of the discursive frames to successfully navigate blockchain.

Instead of focusing on the 'pipeline issue' of recruiting and equipping more women to enter the space, stakeholders who are committed to intersectional inclusion shift their focus further up the pipeline to question why the voices of women and minorities are not valued in the space. Interviewee Alice, a product manager, captured the challenges of gaining critical mass for the 'intersectional inclusion' frame with this quote:

> The problems [blockchain] attempts to solve are very real problems, so there's no mistake there. But I think that those problems have been hard to solve for a really long time and they have to do with social inequality. And it all comes into very emotionally and socially loaded territory. So we don't just need to have the tech for it, we also need to have the social kind of work put into it, and it is a lot of work. So I think that's what we still have to work on. Or else the same things will just be built, but with different technology.

Alice's understanding of gender and technology reflects one of the core theoretical concepts of STS: that social politics are baked into technologies by those who are afforded the chance to shape them. She notes that 'it is a lot of work' to make such significant shifts in how we view technology and society, but it is an area worth working on. It is personally taxing work, which leads us to the next constraint of burn-out.

As outlined above, the discourses and practices that promote genuinely inclusive workplaces are often rooted in personal relationships at the micro or meso levels. In other words, greater awareness within and between individuals creates positive change within organizations. In order for these efforts to be effective, greater momentum and participation within this discursive frame are necessary. Yet because advocates are few, and distributed across the space, this work is connected to burnout, a constraint discussed below.

Burnout

The risk of personal burnout is a heightened concern for those who promote the counter-cultural values of 'intersectional inclusion.' Scholars have shown that it requires additional 'emotional labour' for women to participate in open-source tech communities (Menking & Erickson, 2015). On top of the challenges for women in tech work, an immense amount of additional emotional labour goes into the education and advocacy involved in trying to dismantle large-scale social problems through technology. Utopian visions are exciting, but someone needs to build them. The few participants who were deeply committed to this cause, expend a great deal of energy in comparison to the type of mentoring mindset seen in the negotiated frame, which dovetails more seamlessly with dominant interests in the space. There is less friction to promote gender-conscious goals driven by the market as opposed to social justice. Jessie has experienced this in blockchain, due to the lack of critical mass and infrastructures of support for women in the space:

> More than anything I feel that there's a huge need. Because if a person seems approachable, that appears to have 'made it,' the amount of inbound requests is just… I mean it's fantastic that they are reaching out, but we need more peer-support, right? I was very conscious when I came into this space, not to reach out to a woman CEO, like, "Oh, can you meet me for coffee?" 'Cuz I had nothing to offer. Now it's different. I want to reciprocate. I'm very mindful of tugging on an individual. The trend that I see is that women do this to each other, but I don't think we talk about it enough.

She goes on to describe that how successful women are expected to give endlessly of their time and resources. And if they do not respond to the influx of requests, they can easily gain a reputation of being unfriendly or unhelpful to fellow women in the space. "Now I think back to when I was on Wall Street," she says. "There were handfuls of women in director roles, and I was like, 'Why don't they care about me? Why are they just ignoring me?' But I'm sure they were fighting for their survival in whatever way they could." We discussed a potential solution she and a friend had developed, designating certain blocks of time per week to respond to 'asks,' to keep their schedules manageable while still giving back, which they wanted to do. Even if this solves the issue of personal burnout, the problem of women being critical toward one another if they do not immediately offer helps remains. Advocate burnout in the tech industry has not been adequately researched. In a recent Twitter post, disabled scholar and union organizer Maggie Levantovskaya (2021) reframed the term: "Why I prefer using the term exploitation over burnout: Burnout makes it about worker feelings. Exploitation draws our attention to… practices and policies which require structural solutions." This speaks to the fact that burnout for women advocating for intersectional inclusion is a symptom that happens within gendered social contexts that require progress.

Backlash

Challenging any dominant power structure is going to involve backlash. This is another constraint, and source of burnout, related to engaging in the intersectional inclusion discourse. AI ethics researcher Timnit Gebru, a well-respected pioneer and one of the few Black women leaders in this field, said in an internal email before she was unceremoniously fired from Google, "your life starts to get worse when you start advocating for underrepresented people" (Ghaffary, 2020). She published a report calling out potentially harmful biases in their AI model, which the company dismissed as not meeting the company's standards for publishing, sparking renewed public discourse

about the equitable tech movement (Schwab, 2021). Interviewee Dara expresses a similar sentiment based on her experience as a young woman of colour in the predominantly white industry of the natural products space in Silicon Valley. Her job description was directly related to ensuring that the company was following through on its values in terms of resourcing and supply chain ethics, but the management did not receive her critiques well:

> They're like “why are we not diverse?” We were having a discussion, me and the management team. And I said, “Well, I have a thought on that. These are the same colonial trade models, right? We're still buying ingredients from poor Brown and Black farmers and not paying them enough, and turning them into these really expensive natural food products and selling them to middle and upper class mostly white people. So maybe on some subconscious level, people of colour are like ‘I’m not going to be a part of that, cuz that’s the same shit that we’ve had for hundreds of years.’” I literally said that one of my last months working there, and they were like “Oh… Oh my God.” They were kind of intrigued, but it was a totally foreign idea to them, right? But I got to the point where I was like, it's not my job to educate you out of your white ignorance. And being the one to kind of destabilize things, I was just not in a good position. They told me, “you're being very challenging.”

Both Timnit’s and Dara’s stories expose the challenges women of colour face when they are simply excelling in the very jobs they were hired to do. If it involves challenging the foundations of the dominant discourse, it is not often accepted. In both cases, the companies did not want to hear the critique, and the women ending up leaving the organizations.

Another challenge in dealing with this backlash is that developing intersectional inclusion advocacy depends on people of all genders to change dominant work cultures. Men are important allies in this work. Yet despite greater awareness of the importance of diversity within organizations, a recent study found that white and male executives are not rewarded in the workplace for engaging in diversity-valuing practices, while non-white and female executives are actively punished for it (Johnson & Hekman, 2016). These tendencies are demotivating for anyone who considers giving their time, effort, and voice to intersectional concerns. Meyerson (2001) calls those who do engage in this work, while remaining successful in the workplace, ‘tempered radicals.’ These are people who have a deep personal commitment to advancing diversity and inclusion, but unlike employee activists, they work primarily within the system to advance these goals. Their strategy is to “rock the boat without falling out of it” (Meyerson, 2001, p. 92). This is

an ongoing challenge for stakeholders who view blockchain through the lens of intersectional inclusion.

Conclusion

Feminist scholarship aims to both understand and change the world (Ahmed, 2017). Communication scholarship reminds us that words create worlds (Gill, 2018). And STS scholarship, with historical roots in the sociology of work, reminds us that 'things could be otherwise' in terms of how technologies are developed (Bijker & Law, 1992). With these perspectives used together in this chapter, I have shown how new technologies emerge as a result of choices influenced by social and political factors, through cyclical patterns of creation and use (Wajcman, 2006). This chapter documented how women shape some of those patterns of technology creation in blockchain. It also exposed the challenges and constraints they experience in their attempts to do so.

The title of this chapter, 'doing the work,' refers to the multiple layers of emotional and socio-technical work women undertake to participate in the space. The second part of the title, 'from "a seat at the table" to building tables' refers to the fact that women aspire to more than a tokenized position in the dominant space where their gender is more visible than their expertise. They are building their own tables, as self-employed blockchain experts or leaders of companies. In other cases, they are actively working toward transforming the dominant space through 'intersectional inclusion' which puts a greater emphasis on issues of race, social justice, and the support of men as allies to see improvements in blockchain. Analyzing blockchain work culture through each of the discursive frames exposed the mutual shaping relationship between discourse and materiality. It also exposed the co-construction of gender and blockchain, as two social phenomena constantly 'in the making.'

Chapter 7. Conclusion

On an empirical level, this dissertation examines how a stratified sample of women experience and shape the emerging domain of blockchain as tech workers. I have shown how blockchain is a space of both social and technical innovation through multi-sited ethnography (Marcus, 1995) and a technofeminist discourse analysis (Gill, 2000; Wajcman, 2004) of 30 interviews and 17 participant observations at blockchain events. On a theoretical level, this dissertation makes an original contribution to the literature by adding dimension to our understanding of how words create worlds in the process of the gendered shaping of technology. It illustrates the dynamic, recursive relationship between discourse and materiality through examples of how women's work in blockchain is both enabled and constrained in this male-dominated tech space. In doing so, this study expands the communication, STS, and technofeminist literature. It connects macro-level discourses of the network society (Castells, 2000), meso-level discourses of social shaping of technology theories (McKenzie & Wajcman, 1999; Pinch & Bijker, 1987) and micro-level discourses of technofeminism (Wajcman, 2004). These scholarly fields formed a productive theoretical foundation for my analysis of structure and agency, discourse and material, and social and technological considerations.

I have analyzed how the discursive tensions at stake in emerging tech cultures represent moments of instability that open the possibility for material social change, with regards to gender equity and other social equities. This study offers a unique vantage point from which to investigate blockchain in its earliest stages of development, through the lived experience of women developing hardware, software, research, communication, business strategy, and legislation in blockchain. By placing gender at the centre of scholarship on emerging technologies, and elevating the voices of women as minoritized stakeholders, this study deepens our understanding of how gender and technology shape one another (Wajcman, 2004) in the contemporary context of networked individualism (Castells, 2001).

The project of technofeminism is twofold: "it offers a different way of understanding the nature of agency and change in a post-industrial world, as well as the means of making a difference" (Wajcman, 2004, p. 130). This technofeminist study contributes towards both of these aims, and thus to the wider project of feminism. I

identified three discursive frames that emerged from the data to answer my research question, *'what are the most salient discourses about gender and technology currently shaping the blockchain space?'* These include: (1) the dominant "gender-blind meritocracy," based on meritocracy, libertarian values, and postfeminism; (2) the negotiated "lean into blockchain" frame, associated with liberal, popular, and cyberfeminisms; and (3) the oppositional "intersectional inclusion" frame, associated with third wave feminism and technofeminism. I found that these complex and contradictory frames within blockchain rise and fall on communication, with material consequences in the culture of technology development work. The very process of articulating these discursive contours within the blockchain space is a contribution toward exposing and dismantling widespread assumptions about tech spaces as meritocratic and postfeminist in nature. Acknowledging gender inequity is a crucial first step to addressing it. Yet to do so is a risky move that goes against the dominant discourse of the space, which diminishes one's chances for success. This discursive double-bind makes it all the more difficult to address gender inequities in the space. In this study, even those participants who could clearly articulate gender inequities, could also leverage the meritocratic language of the dominant discourse in social contexts that called for it. I identified this process as strategically 'toggling' between discursive frames, to successfully navigate the space. Women, more than men, require the skill of negotiating blockchain through the dominant frame, as well as gender-conscious frames at particular moments - not because they want to highlight their gender, but because masculinity is coded as natural, and women are often ostracized in technology development cultures (Brooke, 2020). This study confirms that to successfully navigate the space one must be able to competently speak the language of the dominant frame.

Following the aims of technofeminism, my analytical approach is two-fold. I have critiqued the meritocratic, postfeminist assumptions of the dominant space through the participants' accounts of constraints. I have also shown the compelling, inspirational value it offers many participants as well. These dynamics exist together and do not cancel one another out. The hopes and possibilities attached to new technologies are not to be dismissed as false promises. This study shows a variety of productive ways the participants progress in and through blockchain's dominant space, personally and collectively. With that said, workplaces and events within the 'gender-blind meritocracy' were associated with most of the sexism, discrimination, and micro-aggressions reported

by participants. If the dominant discursive frame characterizes most of the professional blockchain space, then the negotiated frame is situated as a sub-group inside these boundaries, and the oppositional frame is situated both inside and outside of these boundaries.

The 'lean into blockchain' frame is a response to the 'gender-blind meritocracy,' and the 'intersectional inclusion' frame offers a corrective to both of these frames. Instead of elevating either one of the gender-conscious discursive frames as a superior path forward for gender equity in the space, I argue that the mindsets and interventions associated with each are necessary in complementary ways. For example, the discourses of the 'lean into blockchain' frame highlight that increased gender representation is an important component for both enabling women and improving technologies. The data in this study support this. 'By women, for women' events and workspaces offer vital infrastructures of support (Ahmed, 2017) and skill-building for many participants, where women's voices are elevated as experts. Perez (2019) cites various recent studies to show that as women move into positions of influence, they are more likely to employ other women, centre their stories, and take their experiences into account in research, design, and production (2019). And yet, recent research shows that even in professional domains where women *have* become well-represented, gender bias persists - perpetuated most often by those who think it is not happening (Begeny et. al., 2020). Based on this understanding, the discourse of the 'intersectional inclusion' frame exposes sexism as a cultural process of tech workspaces that needs to be solved on a qualitative, structural level.

Parsing out gender power relations through the discursive frames highlights some important comparisons and contrasts. As I examined the enabling and constraining factors that characterize each of these frames across event spaces (Chapter 5) and workspaces (Chapter 6) I observed a complementary dynamic. Gender-conscious initiatives such as 'by women, for women' meetups, conferences and hackathons represent bottom-up, grassroots efforts. They are examples of improvisational 'everyday transformations within situated constraints' that promote reflexivity, equity, and care (Yang et. al., 2019). In contrast, gender-conscious initiatives in the context of workplaces, such as inviting women to meetings, revising the language used in job advertisements, and embracing so-called feminine values in leadership and communication, represent top-down, structural efforts. Progress in each of these

directions - top-down and bottom-up - is necessary and complementary. They are insufficient on their own. And they are all currently limited by the small ratio of blockchain stakeholders who view the space through these gender-conscious discourses. This study argues that we can only begin to understand these issues, let alone try to continue solving them, by acknowledging the deep linkages between discourse and practice. Observing social conditions that ought to change in blockchain, and enacting one's agency in discursive or material ways, is an example of how 'theorizing is worlding' (Thiele, 2015). These top-down and bottom-up initiatives are small yet significant signals that point the way forward for more equitable tech cultures.

As Ahmed (2017) underscores, the first step toward building a fairer and more equitable world, is critiquing the problematic dwellings that have been built, and then envisioning and building new ones. Although participants in this study experienced benefits and challenges related to each of these discursive frames, in unique and individual ways, one way to view these frames at a higher level is through this idea of problematic dwellings, and initiatives to build new ones. I return to my metaphor from the conclusion of Chapter 5, in which I compared the dominant discursive frame of blockchain to a fortress. Gender-conscious discursive frames can act as drawbridges and scaffolding around this fortress. Throughout this study I have shown how these discourses can both enable and constrain women who work in blockchain in complex, uneven ways, depending on the individual's situated knowledge and their shifting social contexts. For instance, 'by women, for women' blockchain events can serve as important bridges that provide access and support to enter the fortress. Yet similar-sounding gender-conscious initiatives situated in different social contexts, such as 'women in blockchain' panels at male-dominated events, are more like drawbridges that are drawn back up toward the fortress. Since they highlight gender-based differences more than women's expertise, they are not the welcoming gesture toward the fortress that they purport to be. Meanwhile 'by women, for everyone' initiatives, as seen through events and in the workplace, act as scaffolding to improve the quality of experience for everyone who enters the fortress. These types of discursive complexities surrounding the acknowledgement of gender in blockchain make it thorny terrain for women to navigate - whether they are interested in ameliorating this issue or wish to disregard it altogether.

Some participants, however, would vote to burn these bridges. Participants who fully embrace the values of the dominant frame were quick to express the equivalent of, 'there's really no need for bridges to enter this fortress - I just walked right through the door myself. We should really burn those bridges. They are actually discriminatory to women.' This attitude is rewarded in the dominant space. Yet based on this study's documentation of constraints for women in blockchain, I would be more apt to agree with this sentiment if it were exhibited through less of a gender gap in the material realm. This study shows that women are interested and capable in contributing to the technology, yet they face persistent cultural barriers, both subtle and overt. In addition, my technofeminist discourse analysis, which took both micro-aggressions and micro-inclusions into account, showed that even for those who would vote to burn the bridges, they had swam across moats and scaled walls to achieve their place in the space. Even if they had not, the perspective of 'burning the bridges' disregards the lived experiences of many women who do face additional gender-based constraints in participating in the space. I am not saying the 'burn the bridges' perspective is wrong. Rather it is based on their own experience, and a meritocratic vision for how they believe the space should, and currently does, work. This type of welcoming dwelling is exactly what gender-conscious advocates in the 'lean into blockchain' and 'intersectional inclusion' frames are trying to design and build. They too would like to 'burn the bridges,' and relinquish the additional social labour involved in constructing and maintaining the bridges, because the fortress itself is welcoming. But their continued work signals that the fortress is not yet as accessible as it could or should be. This analogy helps to explain the complexities and contradictions involved in how discourses about gender and technology both enable and constrain women's work in blockchain, let alone the broader issue of improving gender equity in the space.

Contributions to the literature

This study makes an original contribution to the literature by adding dimension to our understanding of how discourse and materiality, and gender and technology, shape one another in the context of emerging technologies. It addresses gaps in the literature, including the need for more attention to be directed at cases where women are active designers of ICTs (Lie, 2006), a return to production and work as research sites for

gender and ICTs (Wyatt, 2008), and a focus on gender inequalities within organizational structures (Kelan, 2020; Wynn, 2020). In addition, it addresses Correll's (2017) call for more research on how to bring about effective, positive change to reduce gender inequities in the workplace, through each of the enabling factors highlighted in Chapters 5 and 6. It also makes contributions to the theories of networked individualism, the social shaping of technology and technofeminism, as outlined below.

Post-industrial scholars of globalization like Castells tend to focus on the extensity and speed of interactions through networks, and how this affects hierarchies of class rather than gender. This study broadens the theory of networked individualism (Castells, 2001; Wellman, 2001) by incorporating considerations of gender and work. Networked individualism has been theorized as our current modality for negotiating power, time, and space in contemporary life. Networked ICTs play an important role in sustaining weak-tie social bonds, of multiple, overlapping relationships across the globalized, decentralized blockchain space. But scholars have not adequately addressed how practices and processes to do with gendered, raced, and classed power flow through these networks. This study further contextualizes the benefits and challenges of these ‘me-centered networks’ that represent the privatization of sociability (Wellman et. al., 2003). Participants were able to connect with another, learn about blockchain, organize events, and resist toxic behaviour with one another's support through digital networks. Yet as they did so, they were more prone as women to endure sexism, harassment, trolling, a trend supported by recent research (Ortiz, 2020). This demonstrates the uneven gendered affordances (Schwartz & Neff, 2019) of networked individualism.

Women and people of colour navigate networked individualism in different ways than others. The network is not made up of many, equal, individual nodes. More accurately, it is made up of sub-networks of affinity groups that relate to dominant networks in particular ways. The concept of ‘gatekeeper’ and ‘gated’ network members (Nahon, 2011) has been productive in this study. I used it to expose various interlocking hierarchies in terms of whose voice is heard and whose knowledge counts in the gendered, raced, classed model of networked individualism. The related, enabling concept of 'networked solidarity' (Brophy et. al., 2015) highlights the recomposition of a distributed, flexible, digitally adept workforce. This accurately characterized the participants' successful startups and self-employment. At the same time, the data

reflected the downsides of this social modality, including loneliness or disconnectedness. For example, participants in this study conveyed how social bonds in emerging spaces can be fast and fleeting, in association with the overall precarity and instability of the field itself. My analysis of gender and work in blockchain contextualizes some of the promises and problems to do with networked individualism. These considerations warrant further study and theorization.

In addition, my re-imagining of Hall's encoding/decoding model, comprised of the three discursive frames about gender and technology in blockchain, contributes to both the social shaping of technology (Pinch & Bijker, 1987) and the technofeminism (Wajcman, 2004) literature. Both co-construction models emphasize how technological features and societal forces shape one another in an interdependent, ongoing manner. The concept of interpretive flexibility has been useful in this study, for understanding not only "the symbolic meaning of technologies, but importantly... the variation in criteria for judging whether a technology 'works'" (Wajcman, 2004, p. 37). But exactly how does this process work? As my research questions ask, *'whose voice is heard, in what social contexts?'* and *'whose knowledge counts?'* Wajcman has raised gender as an essential lens through which to view technology. Following this, I paid special attention to the role of communication as a pivotal mechanism in the gendered social shaping of technologies. Both STS and technofeminist models consider the entanglement of social processes, material resources, and technological artefacts that make society possible. But a greater focus on the role of discourse, as demonstrated in this study, allows us to pinpoint exactly how words create worlds. This is a key contribution to understanding the social shaping of technology from the field of communication.

By using technofeminism to analyze emerging digital technologies like blockchain, I identified three important ways that it might continue to be refined. Wajcman developed the concept in the early 2000s before the rise of social media. Since then, our understanding of both gender and technology has continued to evolve. So the theory must also continue to be updated and clarified. First, Wajcman, among other feminist scholars, reinforces the notion that tech skills are embedded within "a culture of masculinity that is largely coterminous with the culture of technology," and therefore, "to enter this world, to learn its language, women have first to forsake their femininity" (2004, p. 15). The findings of this study problematize some of these assumptions. Wajcman helps us to see technology as social. And 'social' has historically

been equated with masculinity in scholarship on technology. But as this study has shown, the ‘social’ in technology is also distinctly feminine in some cases. Although the blockchain space is overwhelmingly male-dominated, women were constrained specifically in patriarchal and misogynist environments. By viewing gender in a non-binary way, we can identify the important ways that even some male-dominated environments embrace feminist values that humanize people of all genders. This is not necessarily yet the norm, but it is a useful way to de-couple masculinity from the problem of gender equity in the space.

Second, the data in this study, as well as popular messaging from the 'women in tech' movement, display resistance to the requirement for women to deny their femininity to succeed in tech. This was one of the themes discussed in Chapter 6. Social media posts, newsletters, and events by Girls in Tech often feature lines such as "tech needs you, just as you are" paired with natural, casual photos of all sorts of women - often women of colour, and often wearing minimal makeup. This advocacy messaging pushes back on the fact that women are still often not free to be fully themselves at work in tech, but they should be. It signals solidarity in gender equity efforts. Technofeminism highlights the need for increased gender representation in tech, and assumes that these gendered minorities will have to endure the cultural norms of masculinity in tech. While that is often the case, today we can see a greater awareness and advocacy for changing cultures of tech. With the rise of the equity, diversity and inclusion movement, more stakeholders are beginning to understand that a gender-diversity strategy is not simply about hiring more women, but creating workplaces where women know they can belong and progress in their careers (Kovitz, 2019). As participants in this study reinforced, it is a radical and necessary intervention in the space for women to simply be themselves at work.

Third, another way this study expands the technofeminism literature is by adding to the call for increased intersectionality in any and all considerations of gender. This is an awareness I became more sensitized to over the course of this research project. When I collected the data in 2019, several of the participants clearly articulated intersectional concerns any time gender came up in the conversation, which led me to identify the small but significant discursive frame of 'intersectional inclusion.' Then as I wrote this dissertation in 2020, against the backdrop of the pandemic and the most recent wave of racial reckoning in the United States as exemplified by the

#BlackLivesMatter movement, it became even more glaringly obvious. To focus on gender inadvertently omits other interlocking concerns such as race, class, sexuality, or (dis)ability. Acknowledging the importance of intersectionality is not a way of saying we ought to focus on these social structures *as well as* gender - it is to admit that we do not properly understand how *gender* operates unless we meaningfully engage with these other social axes. Catharina Landström (2007) articulates this in her paper on queering feminist technology studies. She critiques the habitual reproduction of heteronormativity in the tech communities studied as counterproductive to the feminist aims of this theoretical approach. Her work influenced my study, and I hope that it accurately reflects an updated form of technofeminism that transcends the idea of gender as a deterministic binary. Other scholars have underscored the importance of acknowledging race in technofeminism in the contexts of girls' tech camps and community-driven tech innovation (Almjeld, 2019; Shivers-McNair et.al., 2019). Again, understanding intersectional issues of race, class, sexuality and (dis)ability, help us to understand how gender works. In our so-called postfeminist, post-racial society, these issues require more understanding than ever. With that in mind, I now turn to my recommendations for future research and practice.

Recommendations for future research and practice

As I conducted this study, I found my research questions and interviews prompted more research questions and avenues for practice. In terms of future research, my findings point to the need for various further studies. For example, we need more studies focused on the experiences of women in technical roles, women of colour, non-binary and trans stakeholders, and men who are allies for inclusion in tech spaces. Since they represent minoritized groups within emerging tech spaces, it is important to elevate their varied individual experiences. For instance, in this study, women in technical roles reflected some of the most unique and challenging experiences in comparison to participants in other roles in blockchain. As such, many of the factors cited as enabling for most participants in this study were not as useful for them. Since their work and well-being in the space is vital, understanding the factors that enable and constrain their situated knowledges is necessary for promoting genuine inclusivity.

We need more longitudinal studies to better understand the rapidly evolving sociotechnical dynamics of blockchain. Re-interviewing the participants of this study would be one example of this. Their everyday, gendered experiences and blockchain's development are both continually evolving. As I mentioned in my analysis, more than half of participants had switched jobs between my data collection and the writing of this dissertation. And several had gone on maternity leaves from their work. In one example of the transience of the space and the precarity of gender equity efforts, the founder of a 'women in blockchain' meetup I had attended went on maternity leave from her blockchain job. She passed the coordinating role on to another member, but the group did not continue to meet. These experiences highlight the dynamism of women's experiences and blockchain as a 'space of flows' (Castells, 2000).

I went out of my way to recruit women in technical roles in blockchain, women of colour, and women with caregiving responsibilities outside of formal work to acknowledge these situated knowledges. Yet I found that among this group of early adopters, the prominence of speaking the language of the gender-blind meritocracy was even stronger than I anticipated it would be. I went into my data collection cognizant of how race, gender, and caring responsibilities can affect women's work in tech. So at first I was surprised to hear how the participants downplayed or dismissed these elements of their experience, even as they cited examples of how the space constrained them. After parsing out the discursive frames, I realized how the participants were toggling between them. I also realize that the demographic I interviewed could confidently speak the language of the gender-blind meritocracy precisely because they are examples of those who are actively, meaningfully contributing to blockchain. And as I have shown in this study, speaking the dominant discourse is a requirement for success in the field. Longitudinal research such as re-interviewing the participants of this study may also reveal why some may have shifted their professional efforts away from blockchain or chosen not to return to certain workplaces after maternity leaves. During my data collection, I was interested in speaking with women who had left work in blockchain or tried unsuccessfully to find work in the space. But due to the emerging nature of the field, it was difficult enough to find ideal candidates actively working in the space at the time that I started my in-person interviews in Vancouver.

In addition, blockchain is a global phenomenon, but this study focused on blockchain stakeholders in western contexts. We need more empirical studies from non-

western contexts such as Africa and South America, where blockchain holds different sociocultural significance. Over two billion people in developing economies have limited or no access to traditional banking services, and blockchain is framed as an important new solution for these problems (Larios-Hernández, 2017). Beyond conceptual or theoretical work, more empirical studies on blockchain's role in financial inclusion as a complex multidimensional phenomenon are required. Kshetri (2017) has examined some of the benefits and challenges associated with blockchain as a tool for breaking the poverty chain in the Global South. He presents early evidence for how blockchain can promote transparency, trust, and efficiency for value transactions in developing countries, as well as obstacles likely to be encountered. After my data collection was complete, I discussed some of these issues on a phone call with a graduate of SFU's School of Communication who had just moved to Mexico City to begin a job with Bitso, the largest cryptocurrency platform in Latin America. Another SFU scholar contributing to global perspectives in blockchain is my lab colleague Betty Ackah. She researched blockchain's cultural and gendered role in Ghana. We developed and conducted each of our interview-based studies around the same time. Unsurprisingly, our studies yielded different results from different sociocultural contexts. We plan to publish a paper comparing and contrasting our results later this year.

Another point for future research and practice is based on my model of the three discursive frames. I believe it has the potential to impact future scholarship on the tech equity movement. I also hope that it might have a positive effect on the interviewees and on the blockchain space at large. In terms of research, empirical, qualitative studies like this one are not designed to develop generalizable data, but *transferable* insights that might help to illuminate various sites of investigation for fellow scholars. The discursive framework developed in Chapter 4 could be amended and applied to study social relations of any type through discourse in other tech workspaces, or innovation spaces outside of technology. Furthermore, the point of illuminating these discursive contours in the discursive framework is not simply to point out how they contribute to inequalities, but to help envision productive paths forward for ameliorating those inequalities in practice. Again, the value of the technofeminist approach is that it is invested in identifying both the gendered affordances and constraints of technologies. This enables us to critique problematic factors in tech spaces, and then to amplify the productive, progressive factors as reported by interviewees. Politically engaged scholars conduct

research to advocate for the interests of the group, like a traveler who joins the interview subject on part of a journey (Kvale, 2007). Blockchain is associated with powerful, progressive ideas of inclusivity and equity. If more stakeholders in the space are familiarized and sensitized to the discursive frames used in this study, perhaps blockchain might begin to move closer to the social ideals it claims to embody already. As I mentioned previously, many of the participants of this study were eager to hear more about my results. Some have sent me messages on social media asking when my findings would be available for them to see. This underscores the need for progress. Greater gender equity in blockchain would enable them to focus their contributions on their primary work in the space, instead of the secondary work of being a woman in the space. For those working in advocacy positions, the data will offer them additional insights to publicize at their events.

While participating in meetups during data collection, I had the idea of hosting my own meetup to share some of the findings of my research with participants as a practical, useful way of giving back to the community that supported this research. One of the interviewees offered meeting space for this event at Dapper Labs where she worked, for people to join in-person or by video chat. However, several factors complicated this intent, so it remains on my list of future practices. I found myself writing this dissertation while parenting through a pandemic. This limited not only my capacity to complete this scholarly task in a timely manner, but also the opportunity or energy to gather for additional events. Secondly, as I researched best practices on how to return research findings to participants, the literature reinforced that ideally study findings are returned via rich communicative channels such as face-to-face or videoconferencing, which allows the researcher to contextualize findings and answer questions (Hintz & Dean, 2020; Purvis et. al., 2017). Another recommendation for returning results relates more to quantitative studies but is still valid here. Beyond informally discussing research results with select participants during data analysis, which I have done, formal results should not be circulated widely to participants until the study has undergone peer review (Fernandez et. al., 2003). Next steps for developing and disseminating my findings involve publishing a book and hosting a post-pandemic meetup to share my results with the interviewees. As we emerge from the pandemic, I plan to use some of the insights learned during isolation in order to connect with my interviewees. I hope to support them

with any data or conceptual information from this study that might be useful in their daily work, whether in-person or via Zoom.

How can blockchain stakeholders promote more of the enabling discourses in work and event spaces? This is another important yet challenging avenue for future research. One of the key findings of this study is that organizational leaders, whether in small grassroots communities or large corporations, are highly influential. They set the tone in terms of which discourse frames their particular blockchain sub-community. Participants in this study demonstrated their power as gatekeepers blocking bad actors, and their constraints as gated members of patriarchal communities. They toggled between these positions in different social contexts. Leaders of any gender who viewed the space through the gender-conscious frames were more likely to cultivate enabling work or event environments for women. While participants in this study enacted and experienced these progressive organizational dynamics, more research is necessary on how to promote and institutionalize the benefits of these approaches. The 'constraints' in my findings chapters explain why it is difficult to scale these types of efforts. They are often rooted in people's beliefs, mindsets, and individual efforts, which may then influence effective policy and practice. Shelley Correll's (2017) research aims to find ways to institutionalize gender equity in organizations, through training and policy. She has also documented the challenges with making such progress 'stick' in a long-lasting way. Since my research shows how positive change is often sparked by individuals who improvise solutions, I am hopeful that activities such as the meetup I would like to host for the participants mentioned above, might be part of their infrastructures of support. Their feedback on my research findings would also be helpful in forming future research directions.

Finally, while the focus of this study was how discourses about gender and technology shape women's work in blockchain, the participants raised many important issues to be researched in future, which fell outside of the scope of this project. So many fascinating lines of inquiry were raised, that I had to further narrow my research question in order to prioritize the data to present in this study. But I coded these topics for future analysis. For example, I asked participants if they foresaw any risks to do with blockchain. Ethereum programmer Bailey raised some critical issues to do with privacy, gender, sexual orientation, and blockchain's immutability. Blockchain's permanent records have often been framed as a beneficial feature that promotes transparency and

fraud reduction. But what about cases where incorrect or sensitive personal information is irretrievably logged on public blockchains? Bailey described the following scenario. After the US census removed questions to do with LGBTQ representation, a blockchain project was proposed to collect this information based on how people self-identify in their social media profiles, including name, location, gender, and sexual orientation. "It is literally dangerous," she said. "This space is so new, and people don't understand the trade-offs well enough, that this idea won a diversity award and got funding." Bailey and her colleagues raised their voices against this project. She said it was unclear whether it ever went ahead as proposed. This is a concrete example of how the lack of intersectional inclusion in blockchain development can create not only blind spots in terms of who is best served by the technology, but outright harm. This future line of research problematizes the assumption of technology as neutral, and subject to possible misuse. When we believe that to be the case, "we will be blinded to the consequences of artefacts being designed and developed in particular ways that embody gendered power relations" (Wajcman, 2004, p. 23).

Conclusion

This technofeminist study has demonstrated how discourses about gender and technology both enable and constrain women's work in blockchain. What this research made clear to me is that remedying social inequities in emerging tech spaces goes beyond the level of individual identity or representation. It requires an understanding of how gendered power circulates in discursive, structural ways that privilege the voices and knowledges of certain types of people over others. A cultural approach to the knot of gender and emerging technologies emphasizes that both are dynamic, ongoing processes. Although we are prone to see gender or technology as more stable than the other, depending on social context, the gendered social shaping of technology highlights the fact that each has the potential to evolve into different forms than we currently perceive them to be. This process opens up space for social contracts to be rewritten through shifts in gendered power. Gender is a cultural distinction that is "activated to literally 'give' meaning to technical artefacts and practices related to them (and vice versa)" (Lie, 2006, p. 168). It is a powerful mechanism for mediating the cultural process of defining a new technology, how it should be used, and what 'counts' as valuable

knowledge and skills. Although we typically associate those privileged processes with masculinity, this study has shown women's agency in shaping emerging technologies and the discourses that give them meaning.

Through this study's examination of enabling paths forward for women in blockchain, I observed the meaningfulness of a technofeminist, decentralized concept of power in action. This type of power does not seek to take power from, or gain power over, any oppositional people or groups. Rather, it seeks to shield others from harm, and proliferate power to others through non-hierarchical collaboration and listening, as radical forms of communication. Blockchain enthusiasts participate in the space fueled by a diversity of socio-political discourses in tension with one another. As the gender-conscious discourses in the space have emphasized, blockchain is not a panacea for the larger social, economic, or political problems to be solved globally. But one of the most powerful functions of the space, as analyzed in this study, is a space of convergence for stakeholders to negotiate new patterns of social connection, value transfer, and meaning-making. As Haraway (1985) argued decades ago, and Wajcman (2004) further developed, technologies are already fully part of our gendered identities - not in ways that dominate or threaten us, but to be used as tools that can transform existing power relations. Discourses about gender and technology in blockchain offer us a clearer picture of the tensions between different expressions of gendered power in the postfeminist context of contemporary society, including pervasively gendered constraints as well as hopeful paths forward.

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Appendix Participants Codebook

#	Pseudonym	Role	Interview Date	Mode of Communication	Interviewee Location
001	Anna	Business Operations	Feb. 21, 2019	In-Person	SFU Vancouver
002	Gabrielle	CEO, Engineer	Feb. 27, 2019	In-Person	Co-working location, Vancouver
003	Shivani	Business Development	Feb. 27, 2019	In-Person	Co-working location, Vancouver
004	Rebecca	Operations Manager	Feb. 27, 2019	In-Person	Her workplace, Vancouver
005	Dara	Business Founder & CEO	Mar. 6, 2019	In-Person	SFU Vancouver
006	Lisa	Business Founder & Chief Marketing Officer	Mar. 6, 2019	In-Person	SFU Vancouver
007	April	Founder & CEO	Mar. 11, 2019	In-Person	Hotel lobby, Vancouver
008	Kacia	Manager, Special Projects	Mar. 20, 2019	In-Person	Her workplace, Vancouver
009	Bailey	Business Co-Founder, Programmer	Mar. 20, 2019	In-Person	SFU Vancouver
010	Emily	Director of Sales	Mar. 20, 2019	In-Person	SFU Vancouver
011	Aisha	UX Researcher	Mar. 29, 2019	Zoom	Co-working space, Vancouver
012	Alice	Associate Product Manager, Organizer	Apr. 3, 2019	In-Person	Hotel cafe, Vancouver

013	Ella	Business Founder & CEO	Apr. 6, 2019	Zoom	Her home, Toronto
014	Caterina	Front End Developer	Apr. 8, 2019	In-Person	Her workplace, Vancouver
015	Kate	Co-Founder, Chief Strategy Officer	Apr. 8, 2019	In-Person	SFU Vancouver
016	Miranda	Tech Associate	Apr. 10, 2019	Zoom	Her home, Seattle
017	Darcy	Chief Communications Officer	Apr. 10, 2019	In-Person	Her workplace, Greater Vancouver
018	Elizabeth	Researcher, Professor	Apr. 12, 2019	Zoom	Her home, Vancouver
019	Amy	Chief Technology Officer	Apr. 14, 2019	Zoom	Her home, Seattle
020	Tara	CEO, Researcher, Economist	Apr. 16, 2019	In-Person	SFU Vancouver
021	Elise	Non-Profit Co-Founder, Organizer	Apr. 17, 2019	Zoom	Walking outdoors, Toronto
022	Nicola	Non-Profit Co-Founder, Organizer	Apr. 22, 2019	Zoom	Her home, Toronto
023	Sophia	Self-employed Communications Strategist	Apr. 24, 2019	Zoom	Her home, Vancouver
024	Sam	Podcast Host	Apr. 29, 2019	Zoom	Her home, Toronto
025	Anya	Non-profit Founder, Organizer	Apr. 29, 2019	Zoom	Her home, Ottawa
026	Carrie	CEO & Managing Director	May 2, 2019	Zoom	Her workplace, Berlin

027	Jessie	Founder, investment advisory	May 29, 2019	Zoom	Her home, New York City
028	Simran	Business Founder & CEO	July 2, 2019	In-Person	Colleague's workplace, Vancouver
029	Taylor	Public Health Advisor	July 12, 2019	Zoom	Her home, Washington DC
030	Ariana	Lawyer	July 16, 2019	Zoom	Her workplace, Dubai