From sites to vibes: Technology and the spatial production of coworking spaces

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Abstract

Mobile and network technologies enable new ways of working (NWW) that disrupt spatial relations and move work to spaces outside formal organizational boundaries. This article addresses this shift by examining how everyday practices of technology and space come together in the constitution of coworking spaces (CWS) as pronounced example of where NWW take place. Conceptually, the article links research on technology as sociomaterial practice with literature on the production of space. Empirically, it draws from a qualitative study of 25 CWS and offers a theorization of the co-constitutive processes with relevant insights for both technology and organization studies. First, the article adds to research on the relational and dialectic nature of technology by documenting its implication in the constitution of CWS as *site*, *contestation*, and *atmosphere*. Second, it contributes to existing knowledge on space by shifting the focus from physical *sites* to spatial atmospheres and *vibes* that are produced through technology use and the co-presence of bodies. It problematizes engagement with NWW by highlighting how the flexibility to work anytime, anywhere is tied to new responsibilities including *spacing work* (the creation of productive and social spaces of work) and *spatial self-management,* which requires workers to aptly navigate different sites and vibes in their quest to achieve personal productivity and affective sociality.

Keywords: new ways of working; technology; space; atmosphere; coworking space, self-management

1 Introduction

In the past decade, mobile and network information technologies (IT) (e.g., internet, smartphones, cloud computing) have fundamentally altered the understanding of spatiotemporal work arrangements, giving way to more flexible, virtual, and mobile forms of work that are broadly defined as new ways of working (NWW) (e.g., Aroles et al., 2019; Kingma, 2019). NWW appear to offer workers greater autonomy in where, when, and how to conduct their work (e.g., Aroles et al., 2019). However, paradoxically, while new technologies make it possible for work to be conducted basically anytime, anywhere, work continues to be carried out and placed, materially, in specific spatial arrangements that are often linked to new forms of sociality, as witnessed, for example, in the rapid rise of maker or coworking spaces (CWS) (e.g., Aroles et al., 2019; De Vaujany & Aroles, 2019). In a context in which practices of technology enable work liquefaction (Bauman, 2000), virtualization, personalization, and individualization (e.g., Hislop et al., 2015), the re-spatialization (Halford, 2005) of work in new spatial arrangements and their relationship to technology as practices that dismantle but also re-materialize organizations (Arnold, 2003) are particularly intriguing. Yet, while information systems (IS) scholarship has contributed significantly to the understanding of how practices of technology constitute organizational structures (e.g., Leonardi & Barley, 2008; Orlikowski, 2000; Orlikowski & Scott, 2008) little is known about how practices of technology are intertwined in the production of space (but see Hultin, 2019; Orlikowski, 2007). Organization studies (OS), on the other hand, has a keen interest in the constitution of organizational space (e.g., Beyes & Holt, 2020Dale & Burell, 2008; Taylor & Spicer, 2007;) but has left practices of technology as constituents of space largely unexplored. The few studies that do exist emphasize the dialectic and often contradictory effects of technology use for spatial relations (e.g., Kingma, 2019; Koslowski et al., 2019; Sewell & Taskin, 2015), calling for a closer examination of how technology and space come together in the context of NWW.

To address this call, we draw from a qualitative study of 25 CWS. CWS lend themselves particularly well to such an analysis because they host mobile and remote workers who engage in

NWW. CWS offer to co-workers a reconstituted physical workplace (Gandini, 2015) but also social elements of work and organizational life (e.g., Blagoev et al., 2019; Garrett et al., 2017; Petriglieri et al., 2019). At the same time, understanding of the material production of those spaces, especially their entanglement with practices of technology, is limited (e.g., Fabbri, 2016), providing fertile ground for further investigation (e.g., Blagoev et al., 2019). Conceptually, we bridge IS scholarship interested in sociomateriality with research on organizational space in OS through a relational ontology, according to which space is sociomaterially produced, embodied, and sensed (Beyes & Holt, 2020; see also Dale, 2005; Dale & Burrell, 2008; Lefebvre, 1974/1991; Massey, 2005). Empirically, we explore how NWW and CWS are co-constitutive by addressing the following research question: *How do practices of technology produce space in the realm of NWW?* Based on our empirical findings we identify three bundles of practices that involve *putting technology center stage* versus *relegating it to the backstage*, *voicing* versus *silencing technology*, and *connecting with* versus *disconnecting from technology*. Together, these practices foreground the centrality of technology in the production of work spaces (e.g., Fabbri, 2016; Kingma, 2016, 2019) and offer a theorization of the co-constitutive processes, contributing to IS and OS literature as well as more critical studies on CWS and NWW. First, our findings add to research on the relational and dialectic nature of technology (e.g., Arnold, 2003; Hultin, 2019; Mazmanian et al., 2013; Orlikowski, 2007, 2010) by illustrating their relevance for the constitution of CWS as *site*, *contestation*, and *atmosphere*. Second, we add to the existing knowledge on space by shifting the focus from physical *sites* to spatial atmospheres and *vibes* (Beyes & Holt, 2020; Beyes & Steyaert, 2012; Dale & Burrell, 2008) that are produced through technology practices and the co-presence of sensing (human) bodies. We problematize the ephemeral and precarious nature of CWS (e.g., De Peuter et al., 2017; Gandini, 2015; Waters-Lynch & Duff, 2019) and illustrate how engagement with NWW requires the spacing of work – in place and time – by constituting workspaces for both personal productivity (e.g., Brown & O'Hara, 2003; Hislop & Axtell, 2009; Kingma, 2016) and sociality (e.g., Gregg, 2018; Petriglieri et al., 2019). We conclude by putting forth the notion of spatial self-

management to emphasize that the flexibility to work anytime, anywhere requires workers not only to co-produce but also to aptly navigate space when engaging in NWW.

2 NWW, Technology, and Space

2.1. NWW and the dialectics of technology

To explore how practices of technology might be implicated in the constitution of new workspaces, we apply a sociomateriality view of technology according to which the technical and social are "ontologically inseparable from the start" (Introna, 2014, p. 31). Sociomateriality accounts for the mutual interplay between the material properties of technologies, its meaning, and social context to help to explain how structures are brought into being and stabilized through ongoing, everyday practices of technology use (Orlikowski, 2000, 2010). Importantly, sociomateriality holds that technology use is not deterministic but entangled in different movements, constellations, and dialects, also known as the Janus-faces of technology (Arnold, 2003). That is, although technology is designed in a particular way, it can give rise to multiple implications and performances. Seen from this perspective, the dialectics that might arise around the use of technology are not negative per se but illustrative of a co-dependent and relational view of technology as an inherent feature of organizational life (Sivunen & Putnam, 2020).

The recent work transformations that are broadly summarized under the label NWW (Aroles et al., 2019) are made possible by network, digital, and mobile technologies and comprise a wide range of practices "from work flexibilization and diversification, from remote work to collaborative entrepreneurship and digital nomadism" (Aroles et al., 2019, p. 286). As they reflect complex entanglements of social practices and technical artefacts (Wajcman & Rose, 2011), new ways of working imply positive changes by blurring spatiotemporal boundaries and allowing individuals increased flexibility in where, when, and how they work (Aroles et al., 2019; Hislop & Axtell, 2009), but also give rise to a problematization of spatial relations and new responsibilities. For example, the "autonomy paradox" (Mazmanian et al., 2013) is a well-documented case of how the

use of IT, rather than just offering knowledge workers more flexibility and control over interactions, can trigger shared behavioral regularities and the progressive constitution of new demands in the form of constant "connectivity and accessibility" norms (Mazmanian et al., 2013, p. 1337; see also Wajcman & Rose, 2011), as well as a general increase in instant communication and expected response time (e.g., Steelman et al., 2012). This builds on Arnold's (2003) characterization of the mobile phone as Janus-faced: while mobile phones free workers from a physical presence in the office, they also act as an "electronic leash" binding workers to a virtual but "fixed individualized" point of contact (Arnold, 2003, p. 243), configuring users who are "always available, but not present" (Arnold, 2003, p. 245). The possibility of "reaching out" also implies a potential "reaching in" (Arnold, 2003, p. 246), calling on workers (quite literally) to be reachable *at any time*, thereby extending the requirement of availability far beyond the conventional spatiotemporal boundaries of traditional work settings. From a historical perspective, technology has inverted the relationship between space, time and work (Taskin, 2006). During the Industrial Revolution, technology organized workers in one central space at a particular time, while the network technology of today inverts this logic through its ability to bring work via networks and mobile devices directly to the workers, independent of space and time (Hislop, Axtell, Collins, Daniels, Glover, and Niven, 2015; Cousins and Robey, 2005). However, and quite paradoxically, this inversion makes the question of space not obsolete but more pressing, shifting the responsibility to identify (and potentially create) the right time and place for productivity to the workers (e.g., Brown & O'Hara, 2003; Hislop & Axtell, 2009). Far from working in an "asynchronous" hyperspace (Brown & O'Hara, 2003), mobile workers need to explicitly manage where and when they work on their specific work tasks.

In a similar vein, Halford (2005) notes the entanglement of space and technology in the context of NWW. Whereas scholars such as Brown and O'Hara (2003) emphasize that workers are now responsible for finding the right space to be productive, Halford (2005) brings attention to the fact that virtual work continues to be placed materially in a particular space. She introduces the notion of re-spatialization of work and organization to express that "where work is done makes a

difference to working practices and to organisational and personal relationships" (p. 20). The dissolution of stable organizational structures not only dismantles spatial certainty for mobile workers but also reduces opportunities for community and sociality (Howells, 2012; Petriglieri et al., 2019; Sewell & Taskin, 2015), which can lead to experiences of social and professional isolation (Hislop et al., 2015). Working "on your own" anytime, anywhere can increase workers' productivity and efficiency (e.g., Aroles et al., 2019; Gregg, 2018; Wajcman, 2019; for earlier discussions of tele- or remote work, see Baruch, 2000; Golden, 2009; Tremblay & Thomsin, 2012), but it also tends to make work more atomized and less social (Gregg, 2018)—an experience that workers working from home during the Covid-19 lockdown might relate to. To compensate for the missing social aspect of organizational life and to reconstitute forms of sociality and cooperation, some remote workers seek new spaces of sociality and belonging (e.g., Petriglieri et al., 2019) and community-based new spaces of work, including CWS (e.g., De Vaujany & Aroles, 2019; Garrett et al., 2017; Petriglieri et al., 2019). This creates the perplexing conundrum that while work and organizations get virtualized, new spaces of work materialize as "physical" sites for workers to remain not only productive (e.g., Brown & O'Hara, 2003; Hislop & Axtell, 2009) but also "social," as a social space can produce new forms of community (e.g., Gregg, 2018; Petriglieri et al., 2019). The rise of CWS is thus seen by some as a re-spatialization of work in response to the competing demands that define NWW, including spatial flexibility as constraint and the dialectics between productivity and community, individualization and collaboration (e.g., Gregg, 2018; Sivunen & Putnam, 2020; Waters-Lynch & Duff, 2019). Before we present CWS as research context for our empirical study in greater detail, we provide a short review of how space is defined in OS literature.

2.2. NWW and the production of space

Traditionally, organizational and work spaces have been viewed as a fixed, physical sites, as "container to be filled" (Clegg & Kornberger, 2006, p. 12) - an understanding that can also be found among IS scholars who tend to view organizations as container for sociotechnical systems (e.g.,

Winter et al., 2014). However, with the advent of the so-called spatial turn in OS, scholarship has broadened the narrow conceptions of space to include social, symbolic, and political aspects (e.g., Beyes & Holt, 2020; Beyes & Steyaert, 2012; Clegg & Kornberger, 2006; Dale & Burrell, 2008; Taylor & Spicer, 2007). For example, the blurring spatiotemporal boundaries that are made possible by digital and network technologies not only change the material setting in the form of new office designs and "workscapes" (e.g., Felstead et al., 2005) but also affect the social spaces of work, reducing the possibility for collective action and solidarity (e.g., Gregg, 2018) and reflecting new values that mark a sociopolitical and cultural shift from stability to greater agility and transparency (e.g., Hancock & Spicer, 2011, Kingma, 2019). At the same time, space does not only produce and shape material, social, and symbolic elements of organizational life but also is shaped by them (Dale & Burrell, 2008). Owing much insight to the seminal work by Lefebvre (1974/1991) on the production of space, OS scholars tend to employ a dialectical understanding of space as both a social product and a generative force (e.g., Beyes & Holt, 2020; Beyes & Steyaert, 2012; Dale & Burrell, 2008; Taylor & Spicer, 2007). The work by Lefebvre (1974/1991) is particularly suitable for critical inquiries of space due to its commitment to unveil and problematize hegemonic structures. His framework has been employed to explore how space constraints and enables certain practices and how practices, in turn, confirm or contest designed spaces in the realm of NWW. For example, Hirst (2011) shows how employees adopt spatial practices such as hot-desking to comply with new office spaces but might also choose to resist the new design by "sticking" with preferred places, or "territorializing" (Kingma, 2019, p. 399) work spaces by placing personal artifacts on the walls so as to to (re)claim the space as personal (Wasserman & Frenkel, 2011). Other practices of contestation involve being noisy in areas designated for concentration while remaining silent in new work spaces designed for collaboration (Sivunen & Putnam, 2020).

While critical studies of space are needed indeed, other frameworks and ways of exploring space exist (e.g., Beyes & Holt, 2020; Dale & Burrell, 2008; Taylor & Spicer, 2007). In a recent review, Beyes and Holt (2020) summarize the OS literature on space along four lines: space as a

site links to the traditional view of equating space with physical environments, including elements of architecture and material artifacts but also symbolic elements, norms and habits that stabilize or alter the material constitution of space over time. The second set of studies emphasizes space as *contestation*, taking a particular interest in the *deviations* and *tensions* that can arise in the everyday practices through which space is reproduced or altered, opening up possibilities for emancipation and transformation as spatial politics (e.g., Dale & Burrell, 2008; Lefebvre, 1974/1991).The third reading takes inspiration from the work of human geographer Massey (2005), describing space as *multiplicity*. It extends the dialectic understanding of space towards even greater plurality conceiving of space as *indeterminate* and *multiple* encompassing atmospheric aspects and affects that are embodied and sensed and therefore difficult to represent (Beyes & Holt, 2020; Beyes & Steyaert, 2012; 2013; Lefebvre, 2004; Massey, 2005). The fourth reading, space as *poetics*, further problematizes space as non-representational, emphasizing instead the processual emergence of space and the potential to "open up" space for (aesthetic) experience and (artistic) performances that blur the boundaries of conventional organizational spaces (e.g., Michels & Steyaert, 2017; Skoglund & Holt, 2020). Taken together, Beyes and Holt's (2020) review suggests a growing interest in questions of space as experience (Taylor & Spicer, 2007) and a shift from matters of space to practices of spacing (Beyes & Steyaert, 2012, 2013) through a more processual and performative focus on space as material, embodied, and affective. The notion of spacing seems particularly fruitful for the purpose of our study as it aligns with the sociomateriality view of technology as situated practice (Orlikowski, 2007). Putting the empirical focus on practices of technology use, we wish to explore how space is produced, thereby striking a balance between studies that employ an objective "container" model of space on the one hand and purely subjective studies that focus on experiential or imagined spaces on the other (Reckwitz, 2012). As Reckwitz (2012) notes practices 'spatialize' – "that is, they produce their respective spaces as three-dimensional arrangements comprising artefacts and bodies" (Reckwitz, 2012, p. 252). To better

understand such spatializing, we study how practices of technology are implicated in the production of CWS – the research context of our empirical study to which we turn to next.

3 Methodology

3.1 Research context: CWS

CWS were difficult to find a decade ago but are widespread today (Salovaara, 2015). With annual growth rates of up to 250% in the past few years, they are often portrayed as an ideal future work model (Salovaara, 2015). At the beginning of 2020, roughly 2.2 million people were working in approximately 22,000 CWS worldwide (Deskmag, 2019; Coworking Resources, 2020). Their popularity should be viewed in the broader socioeconomic context of work changes brought about by NWW, marked by increased flexibility with respect to work practices and employment contracts and platform-based work, which often lead to insecure and precarious employment situations (Aroles et al., 2019). The emphasis on community and the desire to provide a home for independent workers are two reasons CWS have become so popular (e.g., De Peuter et al., 2017; Gandini, 2015). The origins of CWS were community-based and emphasized values such as collaboration and openness that stood in contrast to traditional corporate values, giving coworking the appearance of a movement and even philosophy (e.g., Gandini, 2015; Salovaara, 2015; Spinuzzi, 2012). Today, many CWS are more opportunistic and instrumental, providing affordable office spaces and the possibility to "work alone together" (Spinuzzi, 2012), catering not only to gig workers and freelancers but also to corporate home office and remote workers (e.g., Aroles et al., 2019; De Vaujany & Aroles, 2019; Kingma, 2016). CWS are also increasingly used by corporations for branding purposes (e.g., Moriset, 2014; Vidaillet & Bousalham, 2020), clearly departing from CWS's original sociopolitical basis such that a clear definition of CWS has become difficult (e.g., Brown, 2017; Gandini, 2015; Merkel, 2015). Although CWS have suffered from the COVID-19 pandemic, they are likely to become even more relevant in the near future (Stangler, 2020), as companies encourage their workers to embrace tele- and remote work (Florida & Pedigo, 2020).

A 2019 study found that while CWS might vary with respect to their membership benefits, the main reasons for members to join a CWS are an expected increase in productivity, enhanced business networks, and access to a community (Deskmag, 2019). CWS seem to balance the challenge of fragmented work experiences and also provide room for encounters and collaboration (e.g., Brown, 2017; Gandini, 2015; Jakonen et al. 2017; Merkel, 2015). Empirical research has tried to provide a more nuanced account of the often "celebratory" framing found in popular media (e.g., Brown, 2017; De Peuter et al., 2017; Gandini, 2015), paying close attention to questions of community and sociality (e.g., Garrett et al., 2017; Gregg, 2018), and opportunities for learning and collaboration (e.g., Butcher, 2018; Jakonen et al., 2017). These studies show that such opportunities do not arise automatically and seldom translate into actual work collaboration or wider economic transformations (Brown, 2017), raising concerns about whether "paying to work" (De Peuter et al., 2017, p. 689) actually "pays off" for co-workers. Recently, research has examined how CWS reconstitute and "reterritorialise the physical organizational structure" previously offered by organizations (Gandini, 2015, p. 198) emphasizing the role of social practices such as rituals and routines (Blagoev et al., 2019), and calling for a closer examination of the material and spatial practices to better understand how NWW and practices of technology might constitute CWS.

3.2 Data collection

We conducted qualitative fieldwork in 25 CWS in France, Belgium, Switzerland, and Liechtenstein (see Table 1). All spaces identified and presented themselves as CWS and followed Gandini's (2015) broad definition of a shared workplace in which peers work side by side.

The fieldwork consisted of (non-)participant observations and semi-structured interviews with CWS providers and co-workers. In addition, both authors worked in different CWS for extended periods to collect more informal data and to gain a deeper appreciation of co-working practices from a participant's perspective, similar to ethnographic approaches (e.g., Van Maanen, 2011; Watson, 2011). Data collection also included the screening of anecdotal examples and

documents (e.g., co-working manifestos) to contextualize the larger trend of co-working. During the visits, we paid close attention to the local context in which the sociomaterial practices are embedded, including the physical environment and material arrangements of the CWS, their artifacts, and architecture. We noted, for example, how co-workers use technology (i.e., mobile devices, including laptops and smartphones), interact with each other, and seem to perceive other co-workers' uses of technology. We also paid attention to our associations and reactions when visiting and working in CWS. We documented all observations in written field notes and through digital photographs that helped us remember the material settings and recognize, upon reflection, similarities and differences across the sites. The interviews took place in the CWS in direct "presence" of the materiality under study (e.g., Hultin, 2019). They were recorded electronically and transcribed verbatim. We entered the field with a broad interest in how CWS were set up and why co-workers chose to work there, narrowing the focus to the material constitution and practices of technology as we progressed with the fieldwork. While the CWS vary in ownership structure, location, membership, and spatial setting (architecture and design), the aim of our study was not to conduct a comparative case analysis but to identify overarching themes and reoccurring practices *across* contexts (e.g., Patton, 1990).

<insert Table 1 about here>

3.3 Data interpretation

To identify practices of technology and develop a conceptual understanding of the organizational dynamics we observed, we followed an iterative abductive approach (e.g., Alvesson & Kärreman, 2007; Locke et al., 2008; Vaast & Walsham, 2005). We problematized the use of technologies in CWS by *inductively* exploring the practices of technology and their intertwinement in the constitution of those spaces, while borrowing from Beyes and Holt (2020) *deductively* the different readings of space to help make sense of our initial findings. While scholars of sociomateriality have cautioned against the use of categories, advocating instead to engage with data "relationally" (Hultin, 2019, p. 100), such an approach is complex and risks obscuring the

practical and theoretical implications (e.g., Mutch, 2013; Winter et al., 2014). By loosely following Beyes and Holt's (2020) different perspectives on space, we attempted to balance an immersive sociomaterial approach with an analytical order to facilitate the articulation of relationships for theorizing. Overall, our approach unfolded iteratively, moving back and forth between empirical data and theoretical concepts (e.g., technology as sociomateriality and space as site, contestation, and multiplicity) to provide theorizing around how practices of technology spatialize and constitute CWS. For reasons of clarity, we detail our approach as a linear three-stage process:

First, we reviewed our field notes and photos, searching for similarities across CWS, especially with regard to their material infrastructure, setting, and spatial dimensions (architecture and design); the presence of technology (e.g., IT uses, equipment and technological infrastructure); and sociomaterial practices (e.g., entanglement of material arrangement with social use and shaping). Comparing our notes and photographs, we uncovered different types of spaces that seemed to invite the use of mobile devices to varying degrees. Similarly, the branding material, logos, and mottos also mobilized technology to different degrees, leading to a first list of practices that reflected different uses of technology similar to the way Arnold (2003) has done for the use of mobile phones.

Second, upon reflection we noticed that the practices we had identified were linked to different data sources and also differed with respect to their consequences in what they produced spatially. For example, the practices *voicing* versus *silencing* technology were grounded in official presentations, logos, and mottos, whereas the practices *connecting with* versus *disconnecting from technology* were linked to data including field observations and interviews. And while practices such as, *putting technology center stage* versus *relegating it to backstage* produced a rather stable material (physical) setting, *connecting with* versus *disconnecting from technology* created ephemeral constellations of technology and (human) bodies defined as presence and often referred to in the interviews as vibe or atmosphere. Moreover, with respect to the latter practices we observed technology not only to be sociomaterial but also to be affective in that its practice

produced spaces that were "sensed" and navigated, giving rise to the definition of two spatial practices (*embodying and sensing space, navigating space*) in addition to the three bundles of technology practices (*putting technology center stage* versus *relegating it to the backstage*; *voicing* versus *silencing technology; connecting with* versus *disconnecting from technology*).

Third, to clarify our findings with respect to what those practices achieved spatially, we complemented our emerging, inductive interpretation of practices with a deductive reading through the lens of spatial concepts drawn loosely from Beyes and Holt (2020). Engaging with their work during data interpretation enabled us to further specify and emphasize the dynamic and interrelated readings of CWS as *site*, as *contestation*, and as *atmosphere.* Below we provide a detailed description of each (see Table 2 for summary).

4 Practices of technology and space in the constitution of CWS

4.1. CWS as site

Technology constitutes the basic infrastructure of coworking spaces and is placed, materially, either center stage or relegated to the back stage, while the narratives around the co-working spaces either actively *voice technology* or *silence technology*. Together, these practices constitute CWS as a sociomaterial site for NWW.

4.1.1. Putting technology center stage versus relegating it to the backstage

Network technologies constitute the grounds for CWS across all sites. Fast, reliable internet connections and private log-ins provide the entry point for co-workers to use CWS as a site for their virtual work. Mobile technologies, most notably laptops and smartphones, are brought along by co-workers and become part of the material setting during their stay at CWS. Cloud-based systems or hard discs tend to be organized individually, but some CWS offer those as an add-on to the basic membership service. Internal communication channels, including Slack or virtual platforms for networking, are also offered by some CWS, as is the use of fixed screens and on-demand use of printers, beamers, or large displays in team rooms or meeting areas. While the infrastructure is universal, the CWS differ in their design and spatial setup. Some spaces emphasize

a workspace or space of productivity by putting work zones for individual work center stage. Hardware technology (laptops, beamers, and fixed computer screens) is clearly visible and constitutes the material environment or "physical structure" designed for individualized optimization, helping co-workers be productive and get things done. As one co-worker of an urban CWS noted: "Working in this co-working space is really useful for me, as it gives me a means to restructure my work and be less distracted than at home" (4-B-2, user). The comparison with the material setting at home was often mentioned, highlighting how for many co-workers, a more professional and serious setting other than their home was important for them (e.g., 19-CH-2, user), mirroring the aim of many CWS providers who declared that the setup of their space was to "keep you productive!" (15-CH, provider).

In other spaces, technological artifacts and individual work areas are *relegated to the backstage* so that the emphasis, materially, is put on social and community areas that provide opportunities for encounters and social exchange. These spaces' design is similar to lounges or living rooms, often with colorful or eclectic elements such as picture frames and soft lightning, blackboards with handwritten messages, or comfortable chairs and sofas that invite co-workers to sit down and linger. Laptops are relegated to the sides of the space, such as the back of the open space (sometimes separated by a glass wall or other barrier) or other floors of the buildings, producing a nearly "technology-free" zone in the large welcome area. When we mentioned these observations to the interviewees, they often responded that technology (mobile and network) was a basic infrastructure they relied on but that the presence of other technological artifacts was intentionally kept to a minimum, to enable opportunities for movement and encounters. As one CWS provider, who was going through a large-scale renovation of her space, explained:

> *I do not want any technology, except for maybe a beamer in the large room. Instead I want to have wooden material and the possibility to flexibly use the room as we need it for different purposes.* (11-CH, provider)

Putting technology center stage or relegating it to the backstage is a material practice that constitutes the CWS as either workspace for productivity or social space for a community that, in turn, invites the use of technology to varying degrees. Fig. 1 provides visual impressions of the range of material settings constituting CWS as site.

<Insert Fig. 1 about here>

4.1.2. Voicing versus silencing technology

According to the narratives in our interviews and the meanings that logos, mottos, and names convey, technology is either *actively voiced* or *silenced*. For example, many co-workers explained that network and mobile technologies have radically changed their jobs, providing greater flexibility and the reason they have become co-workers or digital nomads (e.g., 23-CH, user). Likewise, providers of CWS often employ logos or names that feature technology, linking them to themes such as innovation, technology, or hub creation. Beyond the name, the address of some of the spaces (e.g., TechnnoPark, Innopark) is an element that constitutes the CWS as a site by drawing on the symbolic meaning of technology as part of a broader "technological ecosystem" of start-ups, innovative companies, incubators, or accelerators. The technological infrastructure of CWS is presented as a great advantage and main justification for their existence. For example, a provider of a Belgian CWS network with hubs across the country for mobile workers and digital nomads noted that "these spaces are all organized in the same way, with the same technologies, secured internet connection, Wi-Fi identifiers and logins for users, which is particularly useful for them" (2-B-1, provider). Here, technology is constitutive of the space as a modern, accessible, and productive site for NWW.

In other CWS, technology was mentioned less during the official presentations. Rather than positioning the space as a hot spot for innovation and technology, the branding elements, logos, and mottos emphasize values such as creativity, optimism, and humanity (e.g., 8-F). In the narratives that justify the founding of those spaces, the search for alternatives (to corporate settings) was given precedence over technological concerns. The co-workers and providers of these spaces

clearly rely on network technologies to do their job, but these are taken for granted and not voiced, sometimes even silenced when founders promote ideas such as "slow working" (3-F-1, provider). This motto was chosen as an explicit antidote to the acceleration of work often associated with technology and emphasized the founder's attempt to create a space in which more sustainable and community-based ways of working were possible. In summary, while network technologies are the infrastructure for all CWS, the sociomaterial practices constitute CWS in a way that either embraces the active use of technology for personal productivity or invites more community-based forms of interactions as two cornerstones of both NWW and CWS.

4.2. CWS as contestation

While space as a site can shape organizational conduct, for example, by ordering activities and the flow of communication and by placing bodies in a particular constellation of an office design, it is also shaped by recursive practices that stabilize or alter the material constitution of the space over time (Beyes & Holt, 2020; Dale & Burrell, 2008; Kornberger & Clegg, 2004; Lefebvre, 1974/1991). As such, practices of technology can confirm or contest CWS. At the same time, the practices themselves materialize contradictions (including *productivity vs. sociality*, *absence vs. presence*) that complicate and multiply space, highlighting how space as site and contestation are closely intertwined.

4.2.1. Connecting with versus disconnecting from technology: contesting space, contesting technology

The spatial and material settings that constitute CWS as site (subsection 4.1) depend on the validation or (re)production through sociomaterial practices. As one provider critically reflected, a space does not come to life by adding nice furniture.

> *If you just set up a space with great furniture and think they [the spaces] will run just like that, you are mistaken.* (10-CH, provider)

However, a space's design does not always trigger the desired activities. As the sociomaterial view of technology suggests, technology constitutes organizational life through recursive stabilized

patterns that shape structures (Orlikowski, 2010) but also gives rise to change and alterations when sociomaterial practices deviate from what is expected, For example, many CWS feature signs that ask users to mute their mobile phones when entering the space. “You are entering an open space. Thank you for respecting our calm” (1-B, provider). Muting the phone is a practice that ensures co-workers’ concentration and productivity and confirms the CWS as a workspace. At the same time, the use of a mobile phone is essential for NWW, and many co-workers rely on its use to indicate availability and connection with clients, employers, or remote colleagues throughout the day. While everyone needs to use the phone at some point, *someone else’s phone* tends to be regarded as a nuisance. For example, one co-worker explained how guests often disrespect their internal house rule.

> *We have a rule here that says that we do not use our mobile phones in the open space because it disturbs everyone else. But then we always have those people who come from companies for offsite meetings or workshop to our space and they don’t respect that rule. When they receive phone calls during their meeting, they leave the meeting room and come in here [the open space] not realizing they are disturbing us instead.* (22-CH-1, user)

To be able to reduce the conflictual use, many CWS have installed phone booths so that co-workers can take or make calls without disturbing the space (see photos in top row middle and bottom left of Fig. 1).

Technology use can also alter social spaces. In a CWS explicitly designed to foster community building, the large open space with a coffee bar has not been used as expected by the providers. Co-workers seem too busy to engage in interactions or to help each other. They are attached to their devices, giving others the impression that they “hide behind their devices to signal that they are not available for chit-chat” (14-CH, provider). Despite the favorable material setup, a sense of community was therefore difficult to build.

You really need a reason to talk to them, you know. Because everyone is always so busy. So I try it now by organizing special events … because this is really the only way to meet and exchange with them. (14-CH, provider)

Like the mobile phone, laptops are central to NWW, but they create tensions in the constitution of the spaces. Connection with the device makes contact with other co-workers more difficult. At the same time, providing the opportunity for encounters is the raison d'être of many CWS and one of the central reasons co-workers join a CWS (e.g., Brown, 2017; Deskmag, 2019; Jakonen et al., 2017). To be able to ensure networking, several CWS have set up virtual platforms. While some members embrace this technology, others do not. To them, getting to know other co-workers virtually does not produce much value, as it does not create "surprising," "cool," or "unexpected" insights that "open up the horizon" (22-CH-1, user; 7-F, user). Co-workers make use of virtual platforms, such as LinkedIn or Facebook, to *follow up* on an encounter or to stay connected after co-workers move to a different space, but they clearly prefer the first contact to be personal. As other co-workers added, community can only emerge "among humans, not among machines" (24-CH, user). "It is not in front of our laptops that we can exchange and progress together and develop new things – it's in the human bonds that are created (1-B-1, provider). Many CWS have thus introduced community managers who refer to themselves as bridge-builders, matchmakers, or "tumbler" and whose job is to connect co-workers, not through technology but through a "human link." As one provider who acts in the role of community manager explained:

My role is to know each person, each co-worker personally … I spend a lot of time with each of them. In that way, I am able to put each of them in contact with others who could help them on their projects, for example a graphic designer with a translator, a startupper with a specialist in communication or an editor of websites…. I am the link, the bridge between all co-workers. (5-B, provider)

While human links are often appreciated, especially in CWS that are explicitly designed to build community-based workspaces, too much sociality can create tensions, because everyone, even the co-workers in more alternative spaces, needs to get their work done.

> *At the same time, if the ties are too tight, it gets difficult to concentrate on work. Too close ties reduce the productivity because you spend your day drinking coffee only.* (9-CH-1, provider).

This statement illustrates the tension inherent in inspiring community exchanges and the competing demand to be productive and get work done. The tension increases in moments of high workloads or pressing deadlines. Building community and engaging with others takes time, and not all self-employed workers can allocate that time and still get their work done.

> *It [the time taken to engage with others] all depends on the workload I have. I cannot just go and say, "Today I am going to hang out with this or this person, or today I am going to bother [joking] that person." I am already very, very occupied. (*18-CH, user)

The practice of *connecting with technology* or *disconnecting from technology* can lead to tensions by producing either too productive/un-social or too social/un-productive workspaces. This observation suggests that, rather than co-existing harmoniously side by side, productivity and sociality are competing demands of co-working.

4.2.2. Connecting with versus disconnecting from technology: absence and presence of bodies

The practice of connecting with technology or disconnecting from technology not only confirms or contests spaces as a site but also produces spaces that are indeterminate and sensed rather than physically manifest (Beyes & Holt, 2020). For example, in spaces in which co-workers purposefully *connect with technology* to do their work, their bodies are attuned to their devices, avoiding, or at least not actively seeking, connections with co-workers around them. This involves keeping their eyes on the screen and signaling (un)availability to others around them, which is, according to one provider who also works as a co-worker, understood "instantly" by everyone in the room and does not require "further explication" (12-CH, provider). Some users put on

headphones to signal that they "do not wish to be disturbed" (6-F, provider). When asked about this practice, one provider explained: "Yes, it's a common practice that people employ, and it is accepted, out of respect for the professional setting and for each other and our work" (6-F, provider). The observations and discussions around those practices reveal how users employ technology to express their unavailability but also their seriousness about work (1-B-1, provider). Practices of technology thus seems to create effective barriers and put co-workers in a (body) position that signals to others the desire to "get work done" (1-B-1, provider; 6-F, provider). It produces the paradoxical situation of a space full of co-workers present, but also absent, as they are not responsive to the people around them. For some, such a focus on productivity is experienced as disciplining and motivating, but it can be frustrating for others, as it reproduces the hypermodern and alienating workspaces they had tried to avoid (e.g., 3-F-1, provider). The practice of keeping technology to a minimum and *relegating it to the backstage* seem better suited to produce those alternative, more relaxing and interactive spaces, as one co-worker mentioned:

> *I think it creates a particular atmosphere. I have the feeling that, if there were a lot of technology, it would give it a too modern touch. It is kind of difficult to express … technology simply does not fit here. We want to create an easygoing atmosphere that fosters exchange. And in a hyper modern world [of technology] everyone would work on their own, encapsulated, in their own bubble, so to say.* (22-CH-1, user)

The sociomaterial practice of *disconnecting from technology* as observed, for example, in voluntarily abstaining from using a laptop or mobile phone to join a group discussion or to participate in one of the social rituals, such as weekly breakfasts or communal lunches, signals co-workers' presence and interest in engaging with others, creating spaces of community (see photo of lunch table in bottom right of Fig. 1). But the differentiation among the spatial achievements is complex rather than clear-cut. The practice of disconnecting from technology, for example, not only leads to sociality but also helps some co-workers be productive. As one provider who also works as co-worker explained, the presence and exchange with others really energize her—a crucial

effect that she misses at home where it is rather "dull." While she agrees that technology can also help her be productive, she insists that it is really the social exchange and co-location of other bodies that are affective and essential for her creative work:

> *We have to be creative, and we are creative thanks to others. We cannot be creative alone in our own little corner…. In any case, I don't have such a strength. I need to be with others.* (12-CH, provider)

As body-technology entanglements, the (non-)use of technology shapes different spaces of productivity. Connecting the body with technology produces seemingly absent bodies attuned to their devices, producing a space of productivity that is orderly, while disconnecting the body from technology enables bodies to move and encounter each other, creating an unruly space of productivity. The sociomaterial practices thus confirm, contest, and complicate spaces designed as sites for productivity or sociality, collapsing the differentiation between workspaces and social spaces and multiplying them through the presence (or absence) of technology and bodies.

4.3 CWS as atmospheres

This multiplicity of space (Beyes & Holt, 2020), which is produced through body-technology entanglements, is at the heart of CWS as atmospheres. It accounts for the experience of space and its affective force to (dis)engage with technology, detailing how bodies not only materially constitute space through their engagement with technology but also are central for sensing and navigating space in their search for spaces with the "right vibe" and atmosphere.

4.3.1 Embodying and sensing space

Co-workers use technology as a way to signal the presence or absence of their bodies, exemplifying the entanglement of the technological, material, and *embodied* aspects in the constitution of space (e.g., De Vaujany et al., 2019). Unlike technology, the human body has the capacity to sense (e.g., Dale, 2005; Dale & Latham, 2015), giving the notion of space another twist by enabling exploration of its affective dimension, which in the literature is often referred to as "atmosphere" (e.g., Beyes & Holt, 2020; Beyes & Steyaert, 2012; Böhme, 1993; De Vaujany &

Aroles, 2019). Atmosphere is what "hits us" when entering a room (Brennan, 2004, p. 1); it is an intensity that passes between (human and non-human) bodies, working through "flows of imitation" (Thrift, 2008, p. 237). While our interview partners regularly made use of the term "atmosphere" or "vibe," they had difficulty putting into words what it was exactly about space that moved, transformed, or pulled them. As such, rather than a direct observable phenomenon, atmospheres revealed themselves implicitly and "between the lines" of our data as "productive buzz" or "good groove". At the same time, those affective experiences of space seemed decisive for the co-workers' decision of *where* they will decide to work. One provider of a rural CWS told a story of one of her co-workers who willingly drove to her space even though other CWS were much closer to his house. He preferred coming to her space because he appreciated her dedication to build a community as "bringing the space alive" and giving it "a soul" compared with the other CWS, which he experienced as "lacking energy" and "dead" (10-CH, provider).

Spatial atmospheres seem to develop their agency in resonance with other (human and non-human) bodies. For example, co-workers reported that co-presence create demonstrative, "tribe-like" experiences (e.g., 1-B-2, user) also palpable at events such as "I love co-working" parties (8-F-1, provider), in which experiences of community and belonging are particularly pronounced. The co-presence of resonant bodies seems to give way to an atmosphere of support in which co-workers connect with one another (rather than with their devices) and produce collective experiences that build on communal achievements. Such experiences can produce an infectious sense of flow that prompts people to show further initiative, for example, by working voluntarily for common interests (9-CH-1, provider). Indeed, an atmosphere of recognition among co-workers who show a genuine interest in each other is experienced as affective, setting people in motion, providing inspiration, or giving them strength and a sense of belonging that enable them to "go on" and to balance the stress and uncertainties of self-employment. Through co-location and active support, the atmosphere created works as a safety net (9-CH-1, provider). Like physical spaces, atmospheres not only are produced by sociomaterial practices but also produce them, leading to particular

expectations and practices, which in turn stabilize connections and affection, for example, to engage in community luncheons or after-work parties. At the same time, atmospheres do not translate into stable material settings like space as a site. They are fluid, ephemeral, and dependent on continuous (re-)production. For example, when favorite co-workers leave the space or new—and maybe less favorable—co-workers join the space, the atmosphere changes. In addition, atmospheres not only are experienced as enticing or uplifting but also can be felt as "negative energy" that drags the body down (12-CH, provider) and thus are best avoided by moving to a different space or working from home.

4.3.2 Navigating space (in search of the right vibe)

> *Actually I am testing another [CWS] to see if the vibe is better, but in principle this one [the current CWS] is one that I like, because you have the coffee shop, you have the community feeling, it's pretty…. It is very important for me, you know, I'm not interested in having my own desk. For me it's not, I need to move…. Even when I was a student, I would go around the library like for 10 minutes until I felt that I had found the perfect spot for me.* (23-CH)

Moving to find the "perfect spot" or "right atmosphere" is a comment that many co-workers make when describing their use and choice of space. For some, moving between spaces is a natural tendency, a habit, and often a privilege. Enabled by mobile technologies those co-workers seem to flexibly transition between different spaces including working at faraway places such as Bali or the Canary Islands. For others, moving between spaces is more of a necessity, a new responsibility, and a form of *spatial self-management* to navigate the multiplicity of space to find the "right vibe" that will make them productive. One co-worker explained how working at home had been a negative experience, with physical consequences such as unrest, stress, and insomnia (4-B, user), which was relieved after he began working in a CWS. Even if a home office is technically better equipped or more comfortable (e.g., larger screens than in CWS, more powerful processor, more privacy), it does not come with the right atmosphere for everyone (e.g., 22-CH-1, user). Yet, what

defines the "right vibe" is situational and can differ depending on shifting workloads or approaching deadlines, tasks at hand, or individual needs and moods. One co-worker noted that the social bonds in her CWS sometimes make concentrating difficult. While she chose to become a co-worker to benefit from the lively network activities of the CWS, the atmosphere is often too jumbled to concentrate on work tasks that require calm. She has thus developed a practice that allows her to transition flexibly among different sites (home, CWS, and coffee shops) to take advantage of the different atmospheres that help her get the task at hand done (22-CH-2, user). In doing so, she benefits from the spatial flexibility that technology affords and that the different spatio-material settings of CWS make possible (see above, 4.1 and 4.2).

While most co-workers refer to atmospheres as pertaining to different physical sites, the concept of atmospheres implies an understanding of space as indeterminate, fluid, and flexible. Atmospheres evolve and merge into each other, extend into new spaces, or change within the same site. Atmospheres themselves are "on the move" and not separated by boundaries (as "either-or" spaces) but co-constitutive, as one French co-worker suggests. Noting how she enjoys "coming to the [co-working] space to see other people like herself" and benefit "from a specific atmosphere, conviviality with other young startuppers, share moments of fun and inspiration," she also "enjoys going back home in the evening" and working on her laptop in a more concentrated way to finish up tasks (25-F). Though physically separate, she added that "the two spaces are complementary," such that she cannot "work and live without the other as they are really like two sides of the same coin" (25-F). To her, this is a positive setup and experience. The affective engagement in the CWS sets her in motion and enables her to focus on her tasks at home. On a more critical note, this example illustrates how the constitution of different spaces through the use of technology extends into personal and private spaces and increasingly turns them into workspaces.

In summary, our findings illustrate how sociomaterial practices of technology shape spaces that materialize to varying degrees, offering co-workers not only physical, material sites of work but also sensed atmospheres and vibes of personal productivity or affective sociality. CWS as *site*

manifest as material settings and physical structures that put the use of technology center stage or in the backstage, setting the scene for practices of technology that either confirm or contest the spaces. CWS as *contestation* manifest as stabilized (habitualized) patterns of interactions and interpretations of technology (connecting with technology vs. disconnecting from technology) that are visible to others, making experiences of co-presence and resonance possible. CWS as *atmosphere* are sensed and experienced, linking back to and confirming, contradicting or contesting space as site or contestation, thereby illustrating how the three readings on space overlap and mutually constitute one another (Lefebvre, 1974/1991; Dale & Burrell, 2008; Spicer & Taylor, 2007). Rather than constituting analytically separate categories, CWS as site, contestation and atmosphere can be read as three layers of space produced through practices of technology and their intertwinement with materiality, bodies and affect (Reckwitz, 2012). Table 2 summarizes our data structure and findings and provides a theorization of the co-constitutive process. In the following subsections, we discuss the implications of our findings and outline the contribution offered to the different bodies of research.

<Insert Table 2 about here >

5 Discussion

5.1. "Hiding behind laptops" or "building a community"? NWW and the production of CWS

The opportunity to work anytime, anywhere comes with new responsibilities. Prior research on mobile and teleworkers (e.g., Brown & O'Hara, 2003; Hirst, 2011; Hislop & Axtell, 2009) focused primarily on work arrangements in which workers were still affiliated with an organization that provided a professional community and sense of belonging. However, with the increasing dissolution of formal organizations, those social aspects of work are lost, and, as such, remote and mobile workers can no longer rely on stable associations as a backdrop, making it necessary to identify and co-produce social spaces to compensate for this lack (e.g., Petriglieri et al., 2019). Our study thus adds to this body of research by highlighting that NWW requires workers to co-produce

work spaces for productivity *and* for sociality (e.g., Blagoev et al., 2019; Gregg, 2018; Petriglieri et al., 2019). While the literature on CWS positions co-working as a way to balance the tensions inherent in NWW, most notably isolation and lack of community versus productivity and efficiency (e.g., Garrett et al., 2017; Gregg & Lodato, 2018; Petriglieri et al., 2019), our findings complicate this argument, suggesting instead that such tensions, though minor for some co-workers, tend to perpetuate and materialize as competing demands that shape the CWS. On the one hand, practices such as "hiding behind laptops" or "not looking up from the screen when someone enters the room", help co-workers to get things done but at the same time, those practices produce a space in which physical and social proximity are disconnected, making co-workers simultaneously present and absent (Gergen, 2002). On the other hand, practices such as "building a community" connect presence and proximity to produce spaces for sociality but with ambivalent consequences for personal productivity.

Highlighting these dynamics, our findings make a strong case for how practices of technology, their relational and dialectic nature bring things into being (e.g., Arnold, 2003; Hultin, 2019; Mazmanian et al., 2013; Orlikowski, 2007; Orlikowski & Scott, 2008; Wajcman & Rose, 2011) and extend prior research in this domain by providing a vivid illustration of technologies' consequences for the production of space. Accordingly, technology is not just involved in untethering work from traditional sites of production (e.g., Aroles et al. 2019; Castells, 2000; Messenger & Gschwind, 2016), but also implicated in re-materializing and re-constituting work in new spatial arrangements (e.g., Arnold, 2003; Halford, 2005), calling on scholars of IS to pay closer attention to questions of space. Such a focus seems like a timely project as the ubiquity of technology creates a situation in which people not only interact but also "live" in technological structures (De Vaujany & Mitev, 2017; Kember & Zylinska, 2012), raising questions as to how those structures are built and how they blur spatial boundaries by pervading and often "appropriating" public and private spaces, turning them into spaces of work (Koslowski et al., 2019). Given this caveat, our theorization of how practices of technology produce space provides

insights that are of relevance beyond the context of CWS. For example, the practice of *disconnecting from technology* to engage in community activities can engender a specific relational sociality that creates spaces of co-presence and resonance (Rosa, 2019). The French movement *Lève les yeux*[1] (literally, "raise/open your eyes"; figuratively, "look up from your screens") attempts to instigates such resonant and attentive moments of encounter. Discouraging the use of smartphones and laptops in places such as coffee shops or restaurants, the movement tries to reconstitute spaces of leisure and relaxation vis-à-vis the presence of mobile technologies in everyday spaces of life. Like some providers of CWS in our empirical study who wish to create alternative work spaces, *Lève les yeux* illuminates how technology use can mobilize a countermovement by confirming, contesting, or re-creating spaces of encounters through practices of *disconnection from technology*, as we observed among our co-workers.

At the same time, we remain critical in our analysis of CWS as alternative social spaces (e.g., Gandini, 2015; De Peuter et al., 2017; Waters-Lynch & Duff, 2019). Rather than coming as ready-made offering (e.g., Brown, 2017), co-workers must actively invest some of their time in community activities to produce CWS as social spaces. But engaging in social community rituals and routines (e.g., communal breakfasts or lunches) takes time and competes with the demand to be productive and get things done, so that striving for productivity and sociality in the same space is likely to create tensions (e.g., De Peuter et al., 2017; Gandini, 2015; Koslowski et al., 2019) rather than a harmonious co-existence (Blagoev et al. 2019). Our findings further suggest that, unlike historical versions of a community such as a cooperative (e.g., Vidaillet & Bousalham, 2018), the notion of community in CWS is less stable and organized because co-workers are united not by a common mission or employer but by a group of loose individuals who seek ways to optimize their situation. As such, CWS and the sociality it produces might get trapped in an individualist logic rather than constituting a social alternative (Aroles et al., 2019; Gandini, 2015).

[1] https://www.levelesyeux.com/label/.

Compared to past forms of community, the sense of community offered by CWS is inherently diverse and continuously evolving. In contrast to Gandini (2015, p. 198) then, who claims that CWS "reterritorialise the physical organisational structure previously offered by firms," our findings suggest that, far from translating into stable and secure structures, CWS as spaces of contestation and atmosphere remain precarious accomplishments that co-workers cannot rely on. Moreover, the co-creation of CWS requires co-workers to put their bodies to work (through co-location and presence) and create those spaces "for free," while having "to pay" (both financially and time-wise) to become a member to work in those spaces, adding to the growing body of literature that takes a critical view on the promises of CWS (e.g., Brown, 2017, De Peuter et al. 2017; Gandini, 2015; Waters-Lynch & Duff, 2019).

5.2.From sites to vibes: Novel spatiality and spatial self-management

By providing empirical illustrations of the technological and spatial practices involved in the production of CWS, we contribute to studies that are interested in how practices of technology constitute work spaces (e.g., Kingma, 2016, 2019; Koslowski et al., 2019), as well as studies examining the material constitution of CWS (e.g., Blagoev et al. 2019; Fabbri, 2016). We add to these streams of research by un-siting the notion of space from physical sites to atmospheres and vibes that "flow forth spatially" (e.g., Böhme, 1993, p. 117; see also Beyes & Steyaert, 2012, 2013; De Vaujany & Aroles, 2019; De Vaujany et al., 2019). Such a shift broadens the sociomaterially "grounded" analysis to explorations of how spaces develop "not just materially, but in affect" (Beyes & Holt, 2020, p. 13). As our findings suggest, atmospheres attune co-workers to what is happening around them, inducing a form of contagion and affective resonance (Thrift, 2008). Immaterial and sensed through the body, atmospheres have an effect and are affective, enabling co-workers to be productive or to experience moments of sociality and belonging as co-constitutive atmospheres of "affect" and "effect." As illustrated in the empirical material, some co-workers are productive in spaces that convey a "buzzing productivity," with everyone wearing headphones and being attuned to their personal devices, while others are energized by moments of community and

interaction, triggering a spark of creativity. While both atmospheres are affective, the emphasis on what they produce and enable differs, focusing either on personal productivity (atmospheres of effect) or on sociality and community (atmospheres of affect).

Our empirical material further highlights the entanglement of technology, the (human) body and space (e.g., Dale, 2005; Dale & Burrell, 2008; Dale & Latham, 2015) and confirms the centrality of co-location to the constitution of CWS (e.g., Blagoev et al., 2019), as documented, for example, in the performative effects and gradual production of a sense of community and togetherness (Butler, 2015). Rather than being shaped by individual workers as a personal accomplishment, space is co-produced and sensed through embodied practices that are corporeal and social (Dale, 2005) and inextricably linked to practices of technology. For IS scholars, the exploration of atmospheres would imply a shift from "representing to *sensing*" (Hultin, 2019, p. 94, emphasis added) sociotechnical arrangements and their intertwinement with the production of human presence and space (Gergen, 2002. Such a focus would allow IS scholars to better understand how sociotechnical arrangements can affect adding to the growing interest in technically mediated atmospheres and sensory ways of control and order (e.g., Jorgensen & Holt, 2019). Given the centrality that co-workers in our study attribute to the "good vibe" for choosing a CWS, we argue that novel spatialities in which "the spatial and the technological are organizationally wrought" (Kingma, 2019, p. 402) do not just become meaningful because of co-workers' practical, subjective and bodily involvement in the everyday (re)production of these spaces but also because of their ability to affect co-workers as "right vibe" and atmosphere in their quest to achieve personal productivity or sociality.

Such a reading warrants a critical discussion. Existing research on affective spaces cautions against the way they can exercise power by shaping structures of feeling (Waters-Lynch & Duff, 2019) and enticing bodies beyond rationality (Jakonen et al., 2017; Karppi et al., 2016; Katila et al., 2019). Our empirical material suggests that atmospheres can indeed support particular activities and offer ways to deal with the adversaries of freelancing. Co-presence experiences can ignite

creativity and productivity, providing affective sociality that co-workers who engage in digital work often seem to "need" as a quasi-resource for their work (e.g., Karppi et al., 2016). At the same time, attempts to actively manage atmospheres have been mixed. Atmospheres are unruly and affective encounters not easy to stage (e.g., Jakonen et al., 2017; Michels & Steyaert, 2017), as their production is situational, depending on moods, demands, and the co-presence of other (human and non-human) bodies. Like space, atmospheres are not deterministic. Thus, rather than being "under the spell" of an atmosphere, the co-workers in our study actively search for the "right vibe," navigating and leaving a space when it does not feel good to them. Viewed as an expression of emancipated self-determination or read critically as a neoliberal form of self-governance (e.g., De Peuter et al., 2017), the practice of navigating space exemplifies how NWW does not only involve the responsibility to spatialize work by shaping and creating productive and social spaces of work, but also to flexibly transition between spaces. We term this new practice, which is both enabled and required by the increasing presence of mobile and network technology, "spatial self-management" to highlight the need for workers to identify the right sites and vibes for their task at hand. Prior research on new office designs and telework has noted how NWW involves repeated selection of the right workplace (Brown & O'Hara, 2003; Hirst, 2011; Hislop & Axtell, 2011; Kingma, 2016; Sivunen & Putnam, 2020), requiring spatial reflexivity (Kingma, 2019). We add to these studies by stressing the relevance of an atmospheric and affective sensing of space as underlying practice to achieve such spatial awareness and reflexivity.

6 Conclusion

Our empirical investigation of the co-constitutive process of technology and the production of space shows how co-workers continually shape space through their practices of technology and navigate space to identify the right sites and vibes that support them in achieving personal productivity and affective sociality. While NWW and CWS tend to be presented as a worker-developed response to changing work conditions that offer greater flexibility and increase worker

self-determination, our study illustrates the flip side of this autonomy of choice by highlighting how engagement with NWW requires new responsibilities including spacing work, to create the spaces where we can work, and spatial self-management. The ability to identify and sense the advantages of differences spaces seems increasingly important as technology continues to dissolve boundaries, causing stable constellations to give way to a multiplicity of flexible arrangements in the form of a "liquid architecture" that is evolving and diverse (Kornberger & Clegg, 2004, p. 1107). As one CWS provider (F-6) suggested, CWS as part of a "growing availability of unbundled workspace offerings" are likely to become a "service to go," just like "cloud computing." This comparison might foreshadow technology's continued implication in processes of dismantling and re-materalizing spaces of work as co-constitutive movements typical of NWW.

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Fig1. Photographs of CWS as site
(top row*:* spaces that invite the practice of *connecting to technology;* bottom row: spaces that invite the practice of disconnecting from technology)

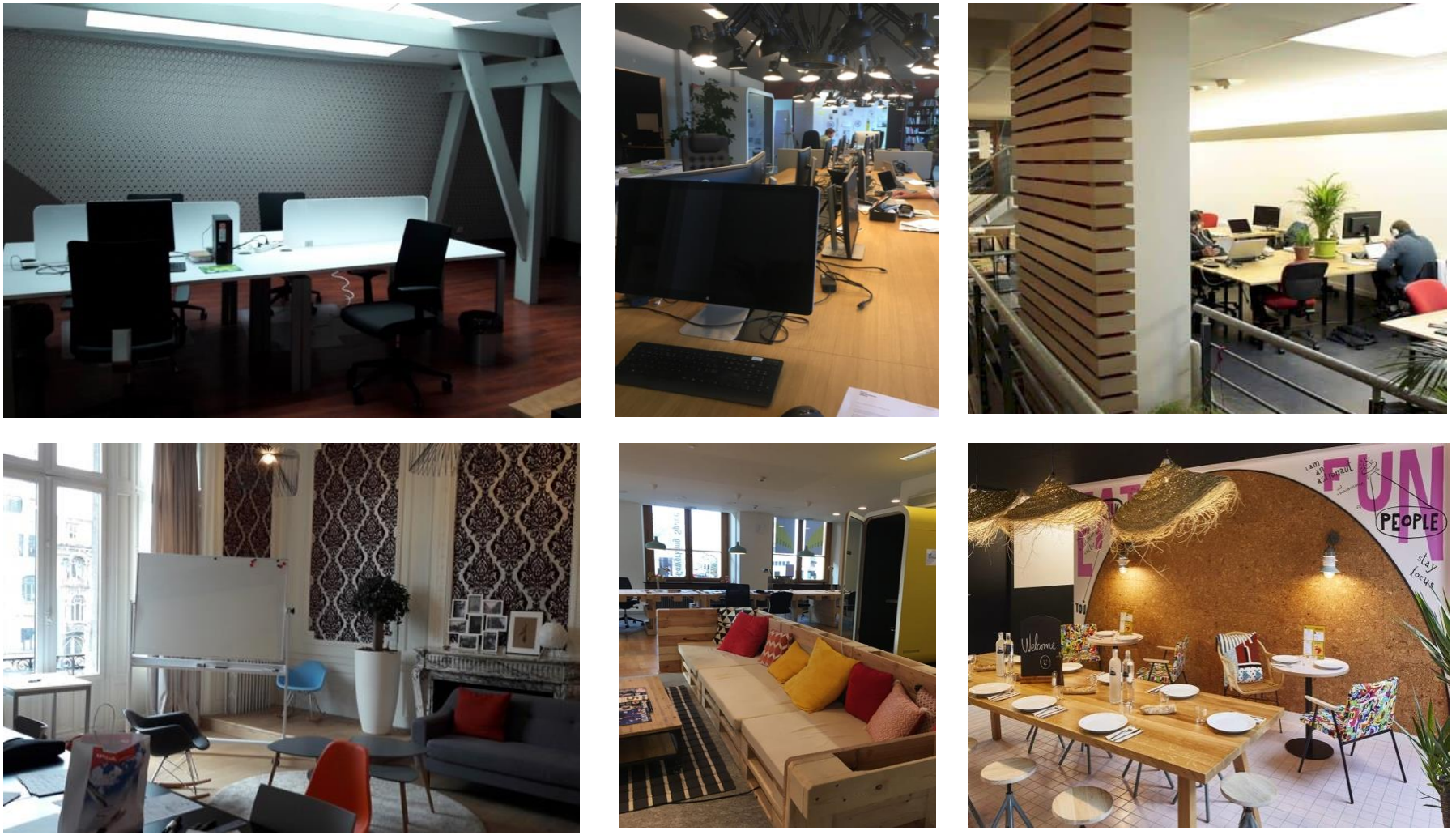

Table 1. Overview of CWS and collected data

* The pseudonym includes the number of the CWS (1-25), reference to the country (B=Belgium, F=France, CH=Switzerland, FL=Liechtenstein), and indication of number of interview partners (-1, -2, -3). If no number is indicated, we only conducted one interview (with either the provider or the co-worker). For example, 2-B represents a Belgian CWS in which we conducted non-participant observations and an interview with the provider.
** Non Part Observ= non-participant observations; Part Observ=participant observation (spending several days as co-worker in CWS)

CWS*	Non** Part Observ	Part Observ	Interview Provider	Interview Co-worker	Ownership structure	Membership	Location	Spatial setting
1B-1 1B-2	x	x	x	x	Part of a Belgian network of CWS, State supported	Open to everyone, flexible, but tends to organize its activity around a small number of regular co-workers.	Urban, city center	Emphasis on the convivial co-working area; small offices at periphery of space, allowing for concentrated, individual work.
2-B	x		x		Part of a Belgian network of CWS, State supported	Open to everyone, flexible	Urban city center (small city)	Emphasis on a professional office design. The space is organized around meeting rooms and individual desks, separated with walls and glass; co-workers tend to work in an individual and personalized way on their laptops.
3-F-1 3-F-2	x	x	x	x	Co-op, shared ownership, independent	Open to everyone, flexible, housing self-employed co-workers who share responsibility for space	Urban, city center	Mix of old furniture, sofas, wooden tables; emphasis on shared spaces of conviviality (kitchen, lounge, equipped with sofas, library, and old books).
4-B-1 4-B-2	x		x	x	Part of a Belgian network of CWS, State supported	Open to everyone, flexible, tries to organize its activity around a small number of regular co-workers	Urban, city center	Co-working and relaxing areas and individual professional offices and desks are considered complementary. The CWS itself plays with these two aspects to create its identity as a "co-working factory."
5-B	x		x		Part of a Belgian network of CWS, State supported	Open to everyone, flexible	Urban city center (small city)	Building made of glass, white walls, strict demarcations between offices and desks, design of a shared office space.
6-F	x		x		State supported, independent	Specialized in artistic and creative industries	Urban, city periphery	Emphasis on 1st floor: large CWS equipped with long tables and chairs, a large kitchen, a relaxing area, enabling physical encounters; individual closed desks are located downstairs.
7-F	x		x		Co-op, shared ownership, independent	Open to everyone, flexible	Urban, city center	Presented as an "alternative workplace," organized around a large welcoming CWS, and café –emphasis put on collaborative spaces of working/living together (kitchen, relaxing area).
8-F-1 8-F-2	x		x	x	Privately owned, independent	Open to everyone, flexible, tries to organize its activity around a small number of regular co-workers	City periphery, residential area	A traditional family house transformed into a community-based working and living environment: the whole house is equipped with furniture traditionally found in a house (e.g., sofa, long table, armchairs, cupboards, bookcase, plants, well-equipped kitchen).
9-CH-1 9-CH-2		x	x x		Co-op, shared ownership, independent	Open to everyone, flexible, core group of co-workers who share responsibility for space	Urban, city center	Comprises an open space on ground floor that also hosts a coffee shop open to the public, wood and plants throughout the space, individual work spaces behind glass, long tables for individual work on first floor, also includes a craft atelier to invite other professional groups.
10-CH	x		x		Privately owned, independent	Open to everyone, flexible	Rural	Emphasis on large social space with open kitchen in entrance area (taking up half the space), individual work spaces in back of the space, colorful.
11-CH	x		x		Co-op, shared ownership, independent	Emerging focus on new media and lifestyle industries, flexible	Urban, city periphery	Mix of pop-up space, improvised, old Fordist office space, individual work desks, old furniture decorated with colorful post-its and personal messages throughout space.
12-CH	x		x		Shared ownership independent	Open to everyone, flexible	Urban city center (small city)	Mix of old furniture, sofas, wooden tables, and more modern style workplaces, with large table in the center and individual work desks on the side, large meeting area, colorful with unique images and pictures, "personal touch," co-working café.

13-CH	x	x		Franchise (part of large real estate group)	Open to everyone, but with an emerging trend toward blockchain community	Urban city center (small city)	Emphasis on open space, comfortable sofa lounge in the middle of the room, telephone booth on the side, long wooden table on the left side of the open space accommodates individual workers with their laptops, professionally designed, colorful, wood and plants.
14-CH	x	x		Co-op, shared ownership, independent	Open to everyone, flexible, but with a preference for monthly/yearly membership	Urban city center	Stylish, highly professional, and new material (wood, glass, dark grey, black colors), with two areas: one clearly designed for individual work and a large space with a coffee bar (and barista), professional but with a strong emphasis on community.
15-CH	x	x		Privately owned, independent	Open to everyone, flexible	Rural mountain region	A large space divided in different work zones: individual desks or large table; a relaxing zone with comfortable chairs is located in a corner; classic office colors, furniture is a mixture of professional office equipment and Ikea shelves.
16-CH	x	x		Shared ownership, independent	Open to everyone, flexible	Rural	An entrance with welcome desk, individual work stations separated like cubicles, stylish and professional. All new materials, discreet colors.
17-CH-1 17-CH-2	x	x	 x	Co-op, State supported	Regional focus, flexible	Rural	Hosted in old post office building, half business center, half community/marketplace, improvised/pragmatic interior, emphasis on individual work spaces.
18-CH	x		x	Limited company, shared ownership, independent	Open to everyone, flexible	Urban, city center, (small city)	Hosted in an apartment with separate rooms, emphasis on individual work spaces, three categories: nomad, gold, and premium offices, with the latter two resembling a shared office with fixed screens and individual workspaces. Large printer in the hall.
19-CH-1 19-CH-2	x	x	 x	Shared ownership, independent	Open to everyone, flexible	Rural	Situated in industrial park between two villages; large open space with open kitchen and comfortable sofas, table tennis, guitar; desks for individual workplaces behind plants in the back of the open space; some fixed desks. Plants, wood; not ad hoc but designed.
20-FL-1 20-FL-2	x	x	 x	Privately owned, independent	Open to everyone, flexible	Periphery, residential area	Situated in an apartment with separate rooms, emphasis is on individual work spaces. However, the interior produces a homely, private atmosphere, with wooden furniture, and no fixed screens or other technology visible.
21-CH	x		x	Co-op, shared ownership, independent	Hub for professionals with similar backgrounds; monthly commitment as minimum	Urban, city center	Situated in closed utility company, the open space still holds many original artefacts such as signs or typewriter; large space with sofas, books, high table with chairs next to kitchen, blackboard with notes; center of room one large wooden table on which co-workers work; on the side are some individual workplaces. Telephone booth at the side; stylish, bright colors, many details to account for history of the building.
22-CH-1 22-CH-2 22-CH-3	x	 x	x x 	Shared ownership; franchise	Open to everyone, flexible	Urban, city center	Large open space with long tables at which individual workers are seated; large kitchen area with sofas and comfortable chairs; lounge areas throughout spaces (upper floors).
23-CH	x		x	Shared ownership, franchise	Open to everyone, flexible	Urban, city center	Individual work spaces are relegated to backstage and on the first floor, behind a glass wall, emphasis on open space/community space, which is also a coffee shop open to the public.
24-CH	x		x	Owned by large real estate group	Open to everyone, flexible	Rural, industrial park	Welcome desk, emphasis on individual workspaces; some with fixed screens and computers; meeting rooms with professional infrastructure, large television screens, beamer. Stylish, professional office furniture.
25-F	x		x	Shared ownership, independent	Open to everyone, flexible	Urban, city center	A former cover market organized around a large CWS, a coffee shop, a maker space, meeting rooms in recycled containers, and individual desks with a professional office design and high-quality material.

Table 2. Overview of data interpretation and theorization

Empirical material and focus	Practices of technology and space	Example	The co-constitution of technology and space	Materialization of space
Fieldnotes and photos • Material infrastructure, setting, architectural design (open space, cubicles) • Artifacts, including technology (beamer, screens, displays, printer) and furniture Interviews, fieldnotes, photos, branding material • Material and narrative presentation of space and technology • Motto/logos/names/brochures	• Putting technology center stage vs. relegating it to the backstage • Voicing technology vs. silencing technology	"These spaces provide people with a more productive setting than their home or cafés." (5-B).	• Network technology makes possible and constitutes space as infrastructure. • Personal devices (technology) become part of the material setting of the space. • The narrative around technology constitutes the space as site for digital and social connection. • Technology constitutes space as site for productivity and as site for community. • The material and spatial design invite the use of technology to different degrees.	Space as *site* materializes as narrative and spatio-material setting in need of continuous sociomaterial (re)production and thus subject to change. Space as site sets the stage for tensions and contestation
Fieldnotes, interviews, photos • Use of technology • Expected/unexpected use • Differences in use among co-workers • Tensions and contestation • Experience of space	• Connecting with technology vs disconnecting from technology	"People who are not working hard on their laptop cannot seem serious to the rest of the group." (1-B-1)	• Technology use confirms spaces. • Technology use contests space and gives rise to changes. • Technology use is contested (mobile phone, virtual networks) with impact on space. • Technology use creates spaces that enable different forms of productivity. • Technology use produces tension between presence and absence of bodies.	Space as *contestation* materializes as stabilized (habitualized) patterns of interactions and interpretations that are visible, open to change and contestation. Space as contestation complicates and multiplies space.
Fieldnotes, interviews • Use of technology • Bodies and movement in space • Experience of space	• Embodying and sensing space (body-technology) • Navigating space (body-technology)	"Sometimes I am too sensitive and I don't manage to protect myself and build a wall not to be taken … from the negative energy." (12-CH)	• Co-presence of (human and non-human) bodies and technology create atmospheres that are sensed (rather than visible or physically manifest). • Atmospheres are affective, they influence the use of technology. • Human (and non-human) bodies (mobile devices) move through material spaces and atmospheres. • The body senses which space is "right" to be productive or find sociality.	Space as *atmosphere* is sensed, fluid and ephemeral; in constant need of (re)production. Space as atmosphere does not draw boundaries but embraces tensions that need to be navigated.