







When Technology is Taken for Granted: The Paradox of Co-working

Maria Laura Toraldo¹ , Lia Tirabeni² , and Maddalena Sorrentino¹  

¹ University of Milano, Milan, Italy

{marialaura.toraldo,maddalena.sorrentino}@unimi.it

² University of Milano-Bicocca, Milan, Italy

lia.tirabeni@unimib.it

Abstract. Co-working is an exemplary case for exploring the organisation and significance of work. Two main thrusts prompt co-working arrangements: the idea of exploiting information and communication technology (ICT) to share experiences and knowledge, and the idea of joining forces to survive economically. Drawing upon a scoping review, this qualitative paper argues that the role of ICT artefacts in studies on co-working takes a back seat. Invoking technology ‘in name only’ prevents research from connecting the social to the technological. We claim it is crucial to bring technology into the analysis to better understand how co-working ‘works’. We could do that by considering co-working as a ‘work-oriented infrastructure’ and recognising its dynamic complexity.

Keywords: Co-working · Information technology · Workspace · Technology artefacts

1 Introduction

Recently, we have been observing significant changes in the way, and larger context, in which work is carried out [1]. The conventional understanding of work, as something individuals perform at an office site with workload and schedules marked by office hours is gradually being replaced by the idea that productivity is decoupled from physical location and set hours [2]. A blurring of traditional boundaries between life and work, production and consumption, and paid and free work is altering work practices and redefining frames of workplace interaction [3]. Unlike ‘traditional work’, new work configurations are frequently implemented outside the well-established and institutionalised practices ways of employment [4] leading to a variety of work configurations with respect to where and how work is performed [5].

The freedom to work anywhere is a dominant trait of the contemporary gig economy and this is supported by discourses that celebrate the entrepreneurialism of independent workers and the idea of ‘being their own boss’ [6]. It is in this context that we observe the global emergence and growing popularity of ‘co-working spaces’ [7], spaces that reinterpret the open office plans by crafting work experiences for mobile and self-employed workers [8].

The emergence of work settings such as co-working spaces are enabled in no small measure by the affordances of information and communication technology (ICT). The ubiquity of mobile technologies and real-time information—always available once a smart device or a laptop is plugged in—have created a window of opportunity for alternative work arrangements [7–9].

In this paper, we are interested in the role of technology and how it is positioned and addressed across academic debates (discourses) around co-working.

Much research on co-working has emphasised the opportunities heralded by digital technologies in reconfiguring the temporal as well as the spatial dimension of work. For example Van Dijk [10: 470] defines co-working spaces as workplaces shared by different individuals and businesses or organisations, with digital technologies facilitating this ‘working apart together’. As this definition seems to suggest, the very existence of such spaces is made possible thanks to the current power of ICT applications and platforms. Richardson [9] observes that “co-working offices are workspaces enabled by digital technologies and sometimes producing ‘born digital’ businesses” and, as she continues, “this work is thus ‘digital’ in that it occurs through software, hardware and connectivity affording the possibilities of smaller, self-organised producer units” [9: 2].

Digital technologies, and more generally, digitalisation processes, are so widespread and part of an ongoing debate that some scholars have noted that the consequences that introducing such technologies may have on organisations tend to be divided into two polarised positions: an alarmist and an optimistic one [11]. In this debate, techno-deterministic narratives alternate with a triumphalist spirit. Both views propose technology as either an enemy to be fought and beaten, or the messiah to be glorified and encouraged. In both cases, the protagonist is always the same: technology, with the human as the subordinated subject.

However, and quite interestingly, in our opinion, technology has become so ubiquitous that, at least in some cases, it tends to disappear—it is now so taken for granted as to be, in effect, invisible. While in many cases, we may see the use of the word ‘technology’ as a buzzword without any specific meaning, in few other accounts it never enters the discourse. As recently stated by Beverungen, Beyes and Conrad [12: 621]:

While the hype around digital technologies and ‘digitalization’ continues unabated in both its main variants of uncritical affirmation and dystopian diagnoses, digital media themselves have become pervasive, ubiquitous and so utterly mundane that we barely take note of them.

1.1 Research Aim and Contribution

Here we use co-working as a ‘revelatory case’, being a paradigmatic example of novel way of working in the digital economy, to investigate whether and to what extent technology appears as an issue in academic studies.

As an umbrella term, co-working refers to the activity of different professionals (including freelancers, startupper and self-employed individuals) hosted in a *neutral* office-related environment where they can telecommute and/or work by themselves. Taking such an understanding as our point of departure, our two-step research question can be formulated as follows:

What are the main debates around co-working (RQa), and how is technology situated within those debates (RQb)?

The present paper is a first step towards building better conceptualization with regard to ICT artifacts in co-working studies. Our aim is, thus, twofold: first, we summarise and interpret the research related to technology and co-working. Here, the reframing of the relevant literature is aimed at identifying the boundaries of co-working, its temporal and spatial expressions, and defining the main themes. Second, we assess the role of technology and the extent to which the majority of studies frequently evoke it, but rarely provide deep explanations on how technology informs organisational design and practices. Thus the paper raises awareness on the vague use of the notion of ICT in the debate on co-working. It also makes an effort to place the interplay of ICT and co-working within the wider context of the relationship between technology and organisations.

In the next pages, we outline our research path (Sect. 2) and then identify and summarise the major themes emerging from a selective review of co-working studies (Sect. 3). Section 4 gives a preliminary answer to our questions. The discussion that follows (Sect. 5) highlights the analytical gains that a conception of co-working as ‘work-oriented infrastructure’ yields. Finally, the paper identifies interlinked areas worthy of further attention.

2 Method

Given the multifaceted and unstable character of co-working, the research approach must necessarily be interdisciplinary. It must draw on insights from different lenses to capture the ambiguities, dilemmas, and contradictions that emerge in the field of co-working. Accordingly, we performed a scoping literature review with the aim of mapping research streams and identifying areas worth further investigation.

By definition, a literature review is based on a rigorous and transparent methodology [13] and can be adopted for different reasons and with different approaches depending on the aim of the review and the topic under study. As with any empirical research, a review process generally consists of at least three phases: data collection, data analysis, and synthesis. However, according to Wolfswinkel et al. [14: 1] “compared with the vast and deep breadth of literature on empirical research methods and philosophical approaches to science, there are in contrast very few instructional texts for conducting a solid literature review”. Among them, we can mention the well-established PRISMA model that has been employed primarily in medical settings [15]; the method developed by Denyer and Tranfield [16] encompassing five steps in producing a systematic review; other scholars proposed the ‘scoping’ study as an alternative review method that comprises a further type of literature review [17, 18].

In general, a scoping review represents a special technique to ‘map’ relevant literature in a given field of interest. Different reasons underpin the adoption of a scoping review [18]: it can be seen as a first step within an ongoing process of reviewing with the ultimate aim to produce a full systematic review. The scoping approach might be also conceived as a method in its own right able to identify knowledge gaps. In this latter case, it may or may not lead ultimately to a full systematic review. However, in comparison with other review methods, a scoping review is distinguished by its ability to rapidly map the field under study and quickly identify the emergent gaps.

After formulating the research question(s) to be addressed (stage 1) - i.e., *What are the main debates around co-working (RQa), and How is technology placed within those debates (discourses) (RQb)?* - we identified the relevant studies (stage 2). Our mapping of the contributions started with an initial exploratory review of academic papers on the topic. First, fundamental keywords have been identified. To avoid issues concerning, for example, plural forms, wildcards have been used; the ultimate keywords adopted in our research are: ‘future of work’, ‘co-working’, ‘technology’. Keywords were searched for throughout the whole manuscript. The type of article searched has been limited to published or in press articles with an English version available. Conference papers were not included in the search because conference papers usually have tight constraints on length, which limit authors’ contribution. Last, the databases to be consulted were chosen; to include as many results as possible, the same search was performed on Scopus, Web of Science, Proquest and JSTOR.

Then, a list of contributions fitting the criteria was downloaded from each of the selected sources. We restricted the search to articles published between 2005 and 2020. Preliminary data cleaning has been performed to merge papers from multiple sources into a single entry. This step generated a list of about 100 articles. We then performed a second check on the bibliographies of studies found through the database searches to identify further references to be included. A further step consisted in the study selection (stage 3). We reviewed 62 relevant papers from different disciplines, including economic geography, urban planning, cultural and communication studies, management and organisation studies. This enabled us to achieve an initial understanding of the phenomenon, identifying the key themes and discussions associated with co-working. We performed the open coding phase: each author separately assigned one or more conceptual labels to each paper of the sample basket. Through the axial coding, the main concepts were grouped into coherent conceptual categories. Again, this was made by each author separately. Then, we discussed together the defined categories and reconciled them. Finally, the conceptual categories were connected one to the other in a coherent scheme. We proceeded to chart the data (stage 4) and, finally, collect, summarise and report the results (stage 5), which we present in the following section where the main debates around the co-working paradigm are grouped into thematic areas.

3 Results

3.1 Definitions and Foundations of Co-working

The notion of co-working has recently gained increasing attention amongst scholars from different disciplines, including economic geography, urban planning, business studies (e.g. [8, 19–21]) which have offered accounts of how co-working emerged and what its distinguishing features are.

It is generally recognised that the first co-working space was opened up in San Francisco in 2005. Brad Neuberg – a member of the open-source movement [22] - laid the groundwork for what it would spread out to later in most of the major cities: a space in-between a formal office and a private home, mixing professional activities with collaborative leisure-like activities in an informal space ([19, 21, 23, 24]).

A broad strand of studies on co-working from a diverse set of disciplines (including information systems, urban planning, management, cultural studies, sociology) is primarily concerned with the reconstruction of the phenomenon and consequently with its illustration and definition ([8, 25–28]).

For example, in their account on novel work arrangements, Spreitzer et al. [29] define co-working as “membership-based workplaces composed of a diverse group of people who do not necessarily work for the same company” (p. 491). As such, one of the defining features of co-working is that here different professionals get together to work on individual projects [8] and that such a diversified group of professionals often belong to different fields. The authors observe that co-working contexts respond to the need for working from alternative and more informal spaces, yet they provide a sense of connection to individuals. Professional affiliation and identity markers are, therefore, key aspects offered by co-working.

As further outlined by Merkel [23], the very structure of these spaces—conceived as informal, flexible and open—underpins a “normative cultural model that promotes a set of values such as community, collaboration, openness, diversity, and sustainability” [23:124]. In sum, co-working is “not just about working ‘alone together’ or ‘alongside each other’ in a flexible and mostly affordable office space” (p. 124). It is, rather, a social practice that needs to be situated within the structural changes in the general labour market and in the organisation of work [23: 125]. Overall, ideas about work that circulate in coworking discourse tend to focus on individual experience [30].

3.2 The Collaborative Dimension: Community, Collaboration and Knowledge Exchange

A growing body of literature on co-working addresses the issues of social community and relationality by illustrating how community feelings emerge in these spaces [19, 24–26, 31]. For example, Robelski, et al. [32] observe that interacting remains a primary reason for choosing to work in a co-working facility. Interestingly and paradoxically, how and how often interaction takes place seem to follow an opposing dynamic if compared to more traditional working settings. For example, if on the one hand, the co-working ‘amplifies the relationality among members’ also through emotional connections [33]—in the hope that users share knowledge or cooperate across their respective projects [34]—on the other hand, the openness of co-working does not necessarily mean open communication [35: 248, 36].

A further connection is also made between interaction and knowledge exchange in these spaces. Butcher [37:339] highlights how the temporary spatial proximity between coworkers provides opportunities to combine and disseminate knowledge from different domains at particular times. However, Parrino [38] notes, social proximity alone is not sufficient to create the interactions and knowledge flows that can lead to innovation.

Much of the appeal of co-working lies in its capacity to foster social relations. [39] look at how a feeling of community emerges within shared locations when people establish bonds and a sense of common purpose. Along these lines, scholars [40] have focused their attention on the affective quality of social atmospheres, investigating the aesthetic dimensions of co-working spaces.

As reported by Foertsch [41] in the 2019 Global Coworking *Survey*, for 56% of the members, interaction with other members and a strong community are still the most important deciding factors for co-working. In a recent article published by *Organization Studies*, Garrett et al. [19] observe that co-working fosters community relationships. Such ways of working act as an antidote to the sense of loneliness which sometimes affects independent workers. As emerged from interviews conducted with co-working individuals, in these contexts the community is actively co-constructed through daily interaction and the creation of a sense of purpose.

Along similar lines, Spinuzzi [26] and Capdevila [21] found that feelings of isolation, inability to build trust and relations experienced in home offices are among the reasons that lead people to co-working. The authors take a step further by investigating the connection between community and collaboration. Collaboration is seen as the engine that enables the feeling of community to emerge. This point is reiterated in many studies that have looked at the benefits coming from cooperation ([21, 24, 42]).

Research has argued that collaboration increases the chance of knowledge exchange, which ultimately fosters creativity, innovation and value creation [10, 31, 42]. Much of this literature implicitly suggests that the very coexistence of freelancers and microbusinesses with complementary skills fosters knowledge sharing. The knowledge that is shared by coworkers is a “crucial way to provide the diversification and collaboration required for innovation” [31: 7]. And, by the same token, Moriset [43] and Kopplin [44] observe that serendipitous encounters and the probability of meeting with people from diverse backgrounds is the rationale behind bringing different professionals together.

3.3 The Aesthetic Dimension: Workspace Design, Creativity and Innovation

Co-working is often set against traditional work arrangements. To a certain extent, co-working challenges but does not replace standard facilities. According to Turkle [36: 122], ‘the spaces themselves become liminal, not entirely public, not entirely private’. Therefore, spaces in these, what one might call ‘technologically dense environments’ [45] are continually reconfigured by the multiple meanings of practices, giving rise to hybrid organisational forms in which the boundaries between the individual sphere and the context become mobile and cannot be predetermined. For instance, Bandinelli and Gandini [46] use the term ‘collaborative individualism’ to capture the ambivalence of co-working and coworkers’ sociality, and the coexistence of entrepreneurialised and individualised conduct with an ethical framework of sharing and collaborating.

Furthermore, it is suggested that aspects of physical structure, i.e. location, layout and proximity to others, shape patterns of work coordination, and can be correlated with organisational outcomes such as efficiency and performance. Accordingly, physical spaces can be instrumentally designed to serve organisational purposes [35: 240]. For instance, co-working is meant as logistic support and reference point to knowledge workers becoming independent contractors and freelancers as a consequence of organisational downsizing and outsourcing processes [22: 111]. In turn, the outsourcing of physical structures offers built spaces that can be tailored to individual needs and budgets. Also, locating co-working spaces near influential stakeholders, such as funding institutions or universities engaged in research, can be a strategy to manage organisational dependency on scarce and critical resources. Overall, the above streams of research

assume a relation between organising and how the physical layout and spatial dimension are orchestrated [34].

Overall, coworking is more than just a third space [47]. Research argues that effective collaboration, among other things, requires arranging for appropriate configurations of the workspace (e.g. [20]). As observed by de Vaujany et al. [48], aesthetic codes, atmosphere, and spatial configurations shape the constitution of people's experiences and work activities. Gregg and Lodato [49] refer to ambience management as the activity of setting the stage for work and arranging the conditions that enable people to casually interact, connect and avoid sources of friction.

The design of the available space itself is attractive for specific users, such as freelancers. A good number of studies on co-working have argued that co-working is designed to enable independence, autonomy and free collaboration (e.g. [50]). Such values point to an entrepreneurial dimension that seems to be central in these novel workplaces. The entrepreneurial spirit is facilitated by infrastructure as well as an absence of hierarchy [51] which provides opportunities for the development of personal networks. Several studies have observed that innovation (e.g. [52]) can also be triggered through careful workspace design ([43, 51]). According to Capdevila [31], managers should orchestrate the conditions to enable innovation: social innovation, user-based innovation and open innovation are just some of the forms of innovation that can be triggered within these spaces.

Besides the rhetoric of workers' autonomy, innovation and self-fulfilment, a further connection is made between co-working and its effect on urban renewal. The fact that in many cities such spaces are appearing either as corporate spaces or as part of public initiatives can be explained as broader interventions in urban contexts. As noted by Merkel [23: 124], co-working can be assimilated to phenomena such as 'community gardens, neighborhoods councils, and artistic interventions', all initiatives emerged as forms of re-appropriation of underused city spaces. As such, co-working is deemed to contribute to creative districts and creative cities, more generally.

3.4 The *Place of Technology Within the Debate on Co-working*

What exactly is the place of technology within those discussions and debates on co-working? To address this question, here we draw from the five broad clusters (or 'views of technology') illustrated by Orlikowski and Iacono [53] in their highly influential article: *Desperately seeking the "IT" in IT research. A call to theorizing the IT artifact*, i.e. Tool view; Proxy view; Ensemble view; Computational view; Nominal view. We adapted and applied this classification to our set of codified publications (Table 1).

A first glance at the most-cited studies on co-working leads to the general observation that ICTs are deemed critical variables (or enabling resources) for the diffusion of more flexible forms of work, outside of traditional workspaces [19]. The latest technologies are seen to be an integral part (a 'strong presence') of co-working [54]. However, recent research on the emergence of 'liquid consumption' [56] patterns seems to challenge the rational *tool view* of technology. According to Bardhi and Eckhardt [56], for example, in social and economic conditions characterised by professional precarity, people tend to access rather than own consumption resources and rely on high-tech, portable technologies and digital communication tools. From this perspective, ICTs are seen as tools

Table 1. Conceptualization of ICT in co-working literature (based on [53])

Cluster	Conceptualization of technology	Examples from the paper analysis
<i>Tool view</i>	Artefacts are expected to do what its designers intend them to do	[19, 54]
<i>Proxy view</i>	Key aspects of technology may be captured through surrogate measures	[55]
<i>Ensemble view</i>	ICT is analysed in association with organizational context of use	[19, 40]
<i>Computational view</i>	The focus is on technical features (e.g. modelling capabilities) of artefacts	[7, 44]
<i>Nominal view</i>	References to technology are either incidental or used as background information	[9, 33]

with which coworkers (as *liquid consumers*) manage to reconcile their jobs and social relationships.

Second, consistent with a *proxy view*, co-working exemplifies the convergence of macro-trends that characterise post-industrialism and the information society. Simply put, technological advances are the engine of nonstandard configurations of working. In this view ICT artefacts are usually regarded as devices that enable independent workers and teleworkers, teams and groups, and organisations to realise business opportunities and performance benefits (*computational view*). A recent quantitative study [55] has delineated inputs, outputs and outcomes of co-working in UK. In both the proxy and computational views ‘technology’ is largely taken to be physical artefact or collection of attributes which have direct and readable effects on behaviour [57: 15].

Third, the increasing dependence on the internet and mobile technologies not only to enable communication but also to facilitate the sharing of data and ICT tools across time, space and platforms is underlined in studies that highlight the social content of co-working. For instance, spatial, social and digital elements [40] co-shape creative processes. Studies typically compare the effects of ICTs with those of face-to-face communication. Turkle’s original point of view, summarised in the phrase [36: 122]: “The connectedness that ‘matters’ is determined by our distance from available communications technology”, offers two further points for reflection. First, it allows us to observe that what people want out of public spaces is that they offer a place to be private with tethering technologies. Second, and interestingly, it highlights that participation in the technologies of everyday practices as well as social relations, production processes and activities [58] are necessary to become a full member of a community of practice [37: 331]. The common wisdom, ICTs help build a sense of community [19]. However, more skeptical commentators argue that it is nothing beyond the mediated performance [33: 9]. Also, technology has given rise to networked individualism [59]. To better support the task of setting up a new company or a freelancing project, members are required to

co-develop local digital architectures. Working across multiple platforms and channels has been labelled *digital bricolage* [40]. It denotes an *ensemble view* of technology.

The *nominal view* of technology, on the other hand, refers to all those contributions (the majority) where technology is absent or undertheorised. Generic terms – including: digital technology, technological change, ‘digital technologies for connectivity’ [9], ICT, digital platforms – are used as mere background information. Furthermore, in many studies that engage with technology minimally, the main focus is elsewhere, e.g.,: on entrepreneurialism, socioeconomic change, sharing economy [55], business innovation [52]. The space for the conceptualization of artefacts is therefore limited. It should be noted that there are also contributions – e.g. [40] – that interpret the role of technology in a critical way, that is, with the aim of capturing the ambiguities, tensions, and contradictions that lie under the surface of co-working practices [33]. Studies connect pervasive digitalization of work with rising job insecurity [29] and precarisation [30]. Questions of power and control have somehow been left aside in mainstream approaches to the study of technologies and new forms of work [27].

4 Discussion

Information and communication technologies are an integral aspect of the global phenomenon of co-working. However, judging from our review, the conceptualization of ICT is underestimated. This is consistent with the original study by Orlikowski and Iacono [53]. Simply put, little has been done so far to explore how ICT artefacts play out in practice in these settings. Extant research that engages with co-working has explored ICT only in a cursory ‘nominal’ way [53], so technology takes a back seat.

Commentators rarely go beyond a metaphorical (rather than analytical) use of technology. The high level of abstraction means that, paradoxically, technology disappears from the analytical attention. Even where ICT is mentioned, the primary emphasis of the authors is elsewhere. The upshot is a conceptualisation in which the space for ‘technological choice’ is very limited. Invoking technology ‘in name only, but not in fact’ [14: 128], in turn, prevents analysis from connecting the social to the technological. Consequently, the understanding of the key issues that co-working raises on organizing is narrow and misleading. First, the analytical separation between the technological sphere and the social sphere leads us to consider – erroneously – technology no longer as a choice, but as a ‘contextual’ element with respect to organizational choices. Second, this delimitation reduces the perception of the relevance and interest of the IT/IS scientific community in co-working studies. It is not coincidence that only a small number of the papers selected for scoping review have been published in journals included in the AISEL Library. Third and finally, considering technology as a reified element and also an external constraint prevents a reliable account of the exceptions, ambivalences and ‘hybrid’ situations that are encountered in practice (see examples in Sect. 3).

The predominant ‘nominal’ view of technology is really surprising if we consider that numerous theoretical perspectives that have sought to illuminate the organisation-technology interactions actually date back to the past century. Neglect of ICT artefacts and platforms in research on co-working is difficult to explain in light of the current spread of digital technologies in workplaces and all domains of life. As nicely written by Orlikowski and Scott [60: 88]:

Work today always entails the digital; even where the work itself doesn't directly involve a computing device, most contemporary work relates to digital phenomenon. What we mean by this is that most work practices involve digital technology to a greater or lesser extent — whether through digital networks that transfer email, cellular communications, and webpages or the computers that process financial transactions [...], and handle logistics so parcels can be delivered on time. [...] all work is today being reconfigured in relation to digital technologies [...].

Let us take a step back to better understand this point.

Early on Star and Ruhleder [61] emphasised the importance of approaching IT artefacts as complex infrastructural formations. According to Tilson et al. [62: 756–758], the infrastructure-turn calls us to critically review the categories that have so far helped us make sense of the sociotechnical reality we study. Indeed, while research on organisations has mainly focused on organisational structures, a growing body of literature, particularly within the field of science and technology studies [63, 64], places ‘universal service infrastructures’, including water systems, electricity or information systems, at the centre of the analysis.

Here, we do not consider infrastructure as “some kind of purified technology, but rather, in a perspective where the technology cannot be separated from social and other non-technological elements” [65: 349]. Actually, in our scoping review, we found only scant discussion about complex infrastructural formations supporting the new working practice in shared spaces. Thus, while we recognise that several studies on co-working highlight the essential role of both human and social elements, along with other non-technological factors (e.g., physical spaces), not the same attention has been given to the technological elements.

One more question then arises: how can conceiving co-working as ‘work-oriented infrastructure’ [65] help a fuller appreciation of what is currently at stake? Due to space limitations, only sketchy considerations will be outlined here.

To begin with, we can say that technology becomes transparent when its use and functioning can be taken for granted, namely when social and technical relationships are firmly established [66]. Put simply, we may say that technology is invisible because it is *consolidated* and opaque. The former property is rooted in a process of “deep ecological penetration” [65: 359] by which the interdependencies of artefacts and technologies become embedded into the practices of the infrastructure and vice versa. The opaqueness originates from the ubiquitous nature of technologies that support specific and highly complex work tasks. Deep penetration implies that *even* the co-workers are ‘unconscious about the properties’ [65: 365] of the infrastructures they use. Following Kornberger and Clegg [67: 1095] co-working spaces can be thought of as “material, spatial ensembles” that organise in unanticipated ways the flows of communication, knowledge, and movement between heterogeneous groups of users.

The above arguments appear as an optimistic and comfortable understanding of the technology’s absence from the mainstream debate on co-working.

However, we could also—and certainly more critically—observe that by seeming innocuous, co-working spaces and related technologies “normalize power relations by fixing them in undeniable material reality” [68: 262]. Based on this observation, we claim

that consolidation and opaqueness are not neutral; rather they entail a potential imbalance in power between those who provide the (work-oriented) infrastructure and those who use it. The former actors dictate the rules of the game and will try to use technologies to govern and control organisational processes in a non-coercive way, however little they are subject to claims and conflicts. The latter come into contact with digital artefacts and facilities, and, where possible, appropriate them through subjective knowledge and purposive action. In other cases, the constraints conveyed by the artefacts will shape co-workers' choices.

All of which suggests that thinking about co-working as being infrastructurally mediated means putting the link between technology and social regulation processes at the centre of reflection. Conceptually, an interpretation informed by such a view offers an analytical tool to untangle the invisible work [69] performed by the users of co-working spaces, as well as the invisible work made by the providers and designers of the infrastructure (of which technology is one element) to incorporate users' needs.

5 Concluding Remarks

In the words of Orlikowski and Iacono [53], here, we were desperately seeking technology in the co-working literature. Drawing on a preliminary scoping review we discovered that mainstream research on co-working tends to engage with technologies only minimally. We also noticed that this 'nominal view', paradoxically, has reduced the weight of ICT as an issue of specific reflection, pertinent to the organisational study field. Therefore, we argued that a fuller appreciation of the relationship between technology and co-working requires a reflection on social regulation processes which take place in a broader context where "no single actor can design and govern the structure" [70: 156].

The predominance of the nominal view of technology in co-working research suggests that there are opportunities for considering more elaborated views and conceptualizations. In particular, the infrastructural lens brings our attention to actors' divergences, and to the presence of a variety of regulative regimes that produce new constraints, alignments, and new opportunities for the different categories of actors. This alternative perspective also offers a way to recognize the complex dimensions of co-working, thus acknowledging the multiplicity (along with invisibility) of practices, and rejecting unidimensional visions of technology, virtual organizing and distributed work configurations.

Starting from these preliminary results, further research should consider together the points of view of employers, co-workers and providers of co-working facilities. Future efforts should adopt mixed methodologies, i.e. qualitative and quantitative analysis at a micro, individual level. We acknowledge several limitations related to the chosen study design. For example, as we said at the outset, the review of co-working scholarship is not meant to be exhaustive or even necessarily representative. We also point out that the tags used by the different studies do not always have the same meaning. Moreover, the inclusion and classification criteria are the personal choices of the authors of this paper.

Our discussion can only remain open and must necessarily be enriched with contributions from other scholars who share its assumptions. The challenge has just begun, yet promises to be highly rewarding.

References

1. Halford, S.: Hybrid workspace: re-spatialisations of work, organisation and management. *New Technol. Work. Employ.* **20**(1), 19–33 (2005)
2. Gregg, M., Kneese, T.: Clock. In: Beyes, T., Holt, R., Pias, C. (eds.) *The Oxford Handbook of Media, Technology, and Organization Studies*, pp. 95–105. OUP, Oxford (2020)
3. Fineman, S.: *Work: A Very Short Introduction*. OUP, Oxford (2012)
4. OECD: *Embracing Innovation in Government*. OECD, Paris (2018)
5. Ropo, A., et al.: Why does space need to be taken seriously in leadership and organization studies and practice? In: Ropo, A., et al. (eds.) *Leadership in Spaces and Places*, pp. 1–24. Edward Elgar, Cheltenham (2015)
6. Luckman, S., Andrew, J.: Online selling and the growth of home-based craft micro-enterprise: the ‘new normal’ of women’s self-(under) employment. In: Taylor, S., Luckman, S. (eds.) *The New Normal of Working Lives*, pp. 19–39. Palgrave Macmillan, Cham (2018)
7. Waters-Lynch, J., et al.: Coworking: a transdisciplinary overview, pp. 1–58. SSRN (2016)
8. Gandini, A.: The rise of coworking spaces: a literature review. *Ephemera* **15**(1), 193 (2015)
9. Richardson, L.: Sharing as a postwork style: digital work and the co-working office. *Camb. J. Reg. Econ. Soc.* **10**(2), 297–310 (2017)
10. van Dijk, S.: At home in the workplace: the value of materiality for immaterial labor in Amsterdam. *Eur. J. Cult. Stud.* **22**(4), 468–483 (2019)
11. Meyer, U., Schaupp, S., Seibt, D.: *Digitalization in Industry*. Palgrave, Cham (2019)
12. Beverungen, A., Beyes, T., Conrad, L.: The organizational powers of (digital) media. *Organization* **26**(5), 621–635 (2019)
13. Greenhalgh, T., et al.: Diffusion of innovations in service organizations: systematic review and recommendations. *Milbank Q.* **82**(4), 581–629 (2004)
14. Wolfswinkel, J.F., Furtmueller, E., Wilderom, C.P.: Using grounded theory as a method for rigorously reviewing literature. *Eur. J. Inf. Syst.* **22**(1), 45–55 (2013)
15. Harris, J.D., et al.: How to write a systematic review. *Am. J. Sports Med.* **42**(11), 2761–2768 (2014)
16. Denyer, D., Tranfield, D.: Producing a systematic review. In: Buchanan, D.A., Bryman, A. (eds.) *The SAGE Handbook of Organizational Research Methods*, pp. 671–689. Sage, London (2009)
17. Pham, M.T., et al.: A scoping review of scoping reviews: advancing the approach and enhancing the consistency. *Res. Synth. Methods* **5**(4), 371–385 (2014)
18. Arksey, H., O’Malley, L.: Scoping studies: towards a methodological framework. *Int. J. Soc. Res. Methodol.* **8**(1), 19–32 (2005)
19. Garrett, L.E., Spreitzer, G.M., Bacevice, P.A.: Co-constructing a sense of community at work: the emergence of community in coworking spaces. *Organ. Stud.* **38**(6), 821–842 (2017)
20. Salovaara, P.: What can the coworking movement tell us about the future of workplaces? In: Ropo, A., et al. (eds.) *Leadership in Spaces and Places*, pp. 27–48. Edward Elgar Publishing, Cheltenham (2015)
21. Spinuzzi, C., et al.: “Coworking is about community”: but what is “community” in coworking? *J. Bus. Tech. Commun.* **33**(2), 112–140 (2019)
22. Bodrožić, Z., Adler, P.S.: The evolution of management models: a neo-Schumpeterian theory. *Adm. Sci. Q.* **63**(1), 85–129 (2018)
23. Merkel, J.: Coworking in the city. *Ephemera* **15**(2), 121–139 (2015)
24. Rus, A., Orel, M.: Coworking: a community of work. *Teorija in Praksa* **52**(6), 1017–1038 (2015)
25. Brown, J.: Curating the “Third Place”? Coworking and the mediation of creativity. *Geoforum* **82**, 112–126 (2017)

26. Spinuzzi, C.: Working alone together: coworking as emergent collaborative activity. *J. Bus. Tech. Commun.* **26**(4), 399–441 (2012)
27. Aroles, J., Mitev, N., de Vaujany, F.X.: Mapping themes in the study of new work practices. *New Technol. Work. Employ.* **34**(3), 285–299 (2019)
28. Blagoev, B., Costas, J., Kärreman, D.: ‘We are all herd animals’: community and organizationality in coworking spaces. *Organization* **26**(6), 894–916 (2019)
29. Spreitzer, G.M., Cameron, L., Garrett, L.: Alternative work arrangements: two images of the new world of work. *Ann. Rev. Organ. Psych. Organ. Behav.* **4**(1), 473–499 (2017)
30. de Peuter, G., Cohen, N.S., Saraco, F.: The ambivalence of coworking: on the politics of an emerging work practice. *Eur. J. Cult. Stud.* **20**(6), 687–706 (2017)
31. Capdevila, I.: Joining a collaborative space: is it really a better place to work? *J. Bus. Strateg.* **40**(2), 14–21 (2019)
32. Robelski, S., et al.: Coworking spaces: the better home office? A Psychosoc. Health-Related Perspect. *Emerg. Work Environ.* **16**(13), 2379 (2019)
33. De Vaujany, F.-X., Leclercq-Vandelannoitte, A., Holt, R.: Communities versus platforms: the paradox in the body of the collaborative economy. *J. Manag. Inq.* **29**(4), 450–467 (2019)
34. Cnossen, B., Bencherki, N.: The role of space in the emergence and endurance of organizing: how independent workers and material assemblages constitute organizations. *Human Relations* **72**(6), 1057–1080 (2019)
35. Hatch, M.J.: *Organization Theory*, 2nd edn. OUP, Oxford (2006)
36. Turkle, S.: Always-on/always-on-you: the tethered self. In: Katz, J. (ed.) *Handbook of Mobile Communication Studies and Social Change*, pp. 120–137. The MIT Press, Cambridge (2008)
37. Butcher, T.: Learning everyday entrepreneurial practices through coworking. *Manage. Learn.* **49**(3), 327–345 (2018)
38. Parrino, L.: Coworking: assessing the role of proximity in knowledge exchange. *Knowl. Manag. Res. Pract.* **13**(3), 261–271 (2015)
39. Waters-Lynch, J., Duff, C.: The affective commons of Coworking. *Human Relations*, 1–22 (2019). (in press)
40. Toivonen, T., Sorensen, C.: *The Creative Process in Coworking & Collaborative Work: Insights for Executives, Managers & Designers* (2018)
41. Foertsch, C.: 2019 State of Coworking: Over 2 Million Coworking Space Members Expected. *Deskma* (2019)
42. Cabral, V., Van Winden, W.: Coworking: an analysis of coworking strategies for interaction and innovation. *Int. J. Knowl. Based Dev.* **7**(4), 357 (2016)
43. Moriset, B.: Building new places of the creative economy. The rise of co-working spaces. In: *2nd Geography of Innovation International Conference 2014, Utrecht January 23–25* (2014)
44. Kopplin, C.S.: Two heads are better than one: matchmaking tools in coworking spaces. *Rev. Manage. Sci.* 1–25 (2020). (in press)
45. Bruni, A., Pinch, T., Schubert, C.: Technologically dense environments: what for? What next? *Tecnoscienza* **4**(2), 51–72 (2013)
46. Bandinelli, C., Gandini, A.: Hubs vs networks in the creative economy: towards a ‘collaborative individualism.’ In: Gill, R., Pratt, A.C., Virani, T.E. (eds.) *Creative Hubs in Question*. DVW, pp. 89–110. Springer, Cham (2019). <https://doi.org/10.1007/978-3-030-10653-9>
47. Krause, I.: Coworking spaces: windows to the future of work? Changes in the organizational model of work and the attitudes of the younger generation. *Foresight STI Govern.* **13**(2), 52–60 (2019)
48. De Vaujany, F.-X., et al.: Experiencing a new place as an atmosphere: A focus on tours of collaborative spaces. *Scand. J. Manage.* **35**(2), 101030 (2019)
49. Gregg, M., Lodato, T.: Coworking, hospitality and the future of work. In: Röttger-Rössler, B., Slaby, J. (Eds.) *Affect in Relation. Families, Places, Technologies*, 1–22. Routledge, London (2018)

50. Bouncken, R.B., Reuschl, A.J.: Coworking-spaces: how a phenomenon of the sharing economy builds a novel trend for the workplace and for entrepreneurship. *RMS* **12**(1), 317–334 (2016). <https://doi.org/10.1007/s11846-016-0215-y>
51. Bouncken, R.B., Fredrich, V.: Good fences make good neighbors? Directions and safeguards in alliances on business model innovation. *J. Bus. Res.* **69**(11), 5196–5202 (2016)
52. Cheah, S., Ho, Y.-P.: Coworking and sustainable business model innovation in young firms. *Sustainability* **11**(10), 2959 (2019)
53. Orlikowski, W.J., Iacono, S.C.: Research commentary: desperately seeking the “IT” in IT research—a call to theorizing the IT artifact. *Inf. Syst. Res.* **12**(2), 121–134 (2001)
54. De Paoli, D., Sauer, E., Ropo, A.: The spatial context of organizations: a critique of ‘creative workspaces.’ *J. Manag. Organ.* **25**(2), 331–352 (2019)
55. Clifton, N., Füzi, A., Loudon, G.: Coworking in the digital economy: context, motivations, and outcomes. *Futures*, 1–16 (2019). (in press)
56. Bardhi, F., Eckhardt, G.M.: Liquid consumption. *J. Consum. Res.* **44**(3), 582–597 (2017)
57. McLaughlin, I.: *Creative Technological Change*. Routledge, London (1990)
58. Lave, J., Wenger, E.: *Situated Learning: Legitimate Peripheral Participation*. Cambridge University Press, Cambridge (1991)
59. Wellman, B., Boase, J., Chen, W.: The networked nature of community: online and offline. *IT & Soc.* **1**(1), 151–165 (2002)
60. Orlikowski, W.J., Scott, S.V.: Digital work: a research agenda. In: Czarniawska, B. (ed.) *A Research Agenda for Management and Organization Studies*, pp. 88–96. Edward Elgar, Cheltenham (2016)
61. Star, S.L., Ruhleder, K.: Steps toward an ecology of infrastructure: design and access for large information spaces. *Inf. Syst. Res.* **7**(1), 111–134 (1996)
62. Tilson, D., Lyytinen, K., Sørensen, C.: Research commentary—digital infrastructures: the missing IS research agenda. *Inf. Syst. Res.* **21**(4), 748–759 (2010)
63. Winner, L.: Upon opening the black box and finding it empty: social constructivism and the philosophy of technology. *Sci. Technol. Human Values* **18**(3), 362–378 (1993)
64. Kallinikos, J.: *Recalcitrant Technology: Cross-contextual Systems and Content-embedded Action*. LSE, London (2002)
65. Hanseth, O., Lundberg, N.: Designing work oriented infrastructures. *Comput. Support. Cooper. Work (CSCW)* **10**(3–4), 347–372 (2001)
66. Bruni, A., Gherardi, S.: *Studiare le pratiche lavorative*. IL Mulino, Bologna (2007)
67. Kornberger, M., Clegg, S.R.: Bringing space back in: organizing the generative building. *Organ. Stud.* **25**(7), 1095–1114 (2004)
68. Hatch, M.J.: *Organization Theory*. OUP, Oxford (2018)
69. Star, S.L., Strauss, A.: Layers of silence, arenas of voice: the ecology of visible and invisible work. *Comput. Support. Cooper. Work (CSCW)* **8**(1–2), 9–30 (1999)
70. Bygstad, B.: Generative mechanisms for innovation in information infrastructures. *Inf. Organ.* **20**(3), 156–168 (2010)