

Skunkworks: The design of casual creative environments for social innovation

Ana Bilandzic, Marcus Foth, Greg Hearn

QUT Design Lab, School of Design, Queensland University of Technology,
2 George Street, Brisbane QLD 4000, Australia
bilandzic.a@gmail.com; m.foth@qut.edu.au; g.hearn@qut.edu.au

Abstract. Casual Creative Environments (CCEs), such as coworking spaces, enable new work practices and workspace sharing across different urban places, aiming to foster innovation and new collaborations. However, many CCEs still struggle to fulfil their potential. This article reports on an inductive study examining social, spatial, and temporal insights from two CCEs in Australia with a social innovation focus. Through participant observations and interviews, we explore how these CCEs are designed to facilitate innovation using Lefebvre's triad of social space. We present design personas representing user archetypes of tribes that form within these CCEs. We characterise these CCEs as skunkworks for their perpetual messiness and organised chaos. Our findings inform policy makers, CCE organisations, and managers seeking to nurture a culture conducive for vernacular creativity and innovation. Additionally, we suggest further research to inform the design of different skunkworks spaces tailored to the needs of a diversity of creative practitioners and innovation communities.

Keywords: coworking spaces; design personas; collaboration spaces; innovation spaces; social innovation; vernacular creativity

1 Introduction

The founders of Spotify, Instagram, and Uber started their businesses in coworking spaces [1, 2]. In 2013, Johns and Gratton [3] reported that more than 2,000 coworking spaces were operating worldwide with new spaces opening up every day. The term Casual Creative Environments (CCEs) refers to coworking spaces, makerspaces, hackerspaces, co-living hubs, and creativity and innovation labs (Table 1) that have emerged around the world as new innovation and work environments [3–6]. CCEs provide open plan workspaces for their users, e.g., freelancers and digital nomads, to work alongside one another, and be creative and innovative [7]. Working and innovating in CCEs can lead to unintended experiences. Waters-Lynch and Duff [8] argue that coworkers' ambivalence towards their coworking experience "stems from the prevailing organising structure of Coworking itself." The sense of ambivalence refers to potential user conflicts between acknowledging a new and appealing work practice on the one hand and their unease about the space's typical open access and organisational modes on the other [8]. Therefore, CCEs need to act upon their users'

ambivalence if they want to live up to their stated goals around fostering collaboration and innovation.

Table 1. Different types of Casual Creative Environments and their foci.

CCE	Focus	Literature
Coworking spaces	Working away from the office	[4, 5, 7, 9–15]
Makerspaces	Fabrication and prototyping	[6, 16–20]
Hackerspaces	Tinkering and experimentation with digital technology	[13, 16, 21, 22]
Co-living hubs	Shared housing for people with similar values, occupations or work practices	[23–26]
Creativity & innovation labs	Entrepreneurial endeavours such as start-ups and incubators	[27–30]

While innovation in general usually focuses on creating new products, services, or processes primarily for economic growth and market advancement, in this paper we focus on social innovation. Section 2 offers a more detailed definition of the term, which refers to the creation and implementation of novel solutions that address societal challenges and improve the wellbeing of communities and society. Ziegler [31] argues for the need of resources and institutional space directed towards social innovation, because social innovation challenges existing ideas and creates new ideas to change rules, norms, and cognitive frames, e.g., preventing marginalisation and social exclusion. The United Nations 17 Sustainable Development Goals (SDGs) call for urgent action on such innovations, e.g., strategies for reducing inequality, improving education and health, and creating new partnerships [32]. Ziegler [31] suggests that innovation should not only be left to private entrepreneurs and investors, but include “direct public investment along with indirect ways of creating the preconditions for the innovation process in markets.” Similarly, Cajaiba-Santana [33] suggests policy structures and practice to empower and mobilise people to foster and pursue socially innovative ideas. Yet, we lack an understanding of the processes that lead to entrepreneurship and innovation in CCEs [5]. These processes can be described as precursors to innovation:

“Help and encouragement for better learning, networking, action and novel ideation, that is, the first steps towards mobilising people to be innovative and entrepreneurial in their thinking and actions.” [27]

Unpacking these precursors to innovation in CCEs with a social innovation focus will shed further light on the under-researched area of social—as opposed to commercial—innovation [33, 34], thus adding insights into a more socially inclusive approach to innovation in CCEs to a still relatively nascent body of scholarship [20, 35, 36]. In response, our study aimed to understand the enabling precursors to innovation in CCEs that have a focus on social innovation. Two CCEs in Australia served as case studies to help answer our research questions: (i) What are the social and spatial precursors to innovation? (ii) Why do they enable innovation in CCEs that have a focus on social innovation as perceived by their users? (iii) How can these findings be

translated into managerial recommendations and policy guidelines to make CCEs conducive to innovation for their users?

The findings contribute to knowledge in design research, space management, social innovation, and CCEs as spaces where vernacular forms of creativity and innovation emerge [28, 37]. More precisely, they bring attention to user experiences and relationships with one another and with CCE spaces during the pursuit of work and innovation. The two CCEs are social enterprises that give context to their organisational nature. Moreover, they come with limitations in resources and conditions with which they can encourage and support their users and their endeavours, hence, providing different processes and approaches to innovation. The following sections present in order: a literature review that connects innovation efforts and user experiences of forming and be part of innovation communities in CCEs (Section 2); the study's methodology that helps to understand and examine ways in which precursors influence innovation in CCEs (Section 3); our findings (Section 4) and discussion (Section 5) on innovation precursors in CCEs that reveal four design personas forming a tribe for innovation and skunkworks as a space for the tribe; and, finally, our conclusions (Section 6).

2 Literature review

This literature review discusses two main issues. The first issue contemplates the differences between innovation for profit and social innovation. The second issue is about CCEs and their different approaches to support their users and community to pursue entrepreneurship and innovation. The literature review then brings these two issues together to highlight the gap being addressed by this study.

First, definitions of innovation vary [38], although they most often connote two characteristics: (i) an invented or discovered novelty, and; (ii) its introduction into the marketplace [39–41]. The novelty—e.g., products, services, and processes [39, 40], or business models [41]—is often motivated to benefit profit maximisation [42] rather than social welfare or a common good. Social innovation provides a way to address this gap by putting societal needs first [42].¹ Therace et al. [43] define social innovation to be “social in both their ends and their means.” They found researchers from economics and business studies, sociology, social anthropology, and politics showing interest and noting that social innovation “has been insufficiently researched in comparison with its counterparts in business, science and technology” [43]. This highlights a lack in understanding various aspects in different disciplines on the topic of social innovation. Furthermore, CCEs only recently started finding support for social innovation in NGOs and the public sector for which “practice and understanding remains very patchy” [44]. While CCEs that focus on social innovation might be outnumbered by those with a commercial focus, they provide an environment in which the practice of being innovative is within reach to anyone, and their outcomes influence social change.

Second, CCEs are often associated with entrepreneurial and innovative pursuits [5, 7]. Their playful and open plan layout [45, 46] is believed to facilitate serendipitous

¹ Mulgan acknowledges non-distinct borders between business and social innovation.

encounters within their “diverse group of people” [7] that lead to innovative ideas. Opportunities to meet and connect with other users are understood as enablers of innovation in CCEs. Figure 1 illustrates an example of the open spatial layout and design of many CCEs: a common area for users to work at hotdesks and a few rooms separated by glass walls for group work or meetings. As a result, everyone can see everyone most of the time.



Fig. 1: CCE’s open space

Source: <https://www.flickr.com/photos/47022937@N03/31392421907> (CC BY 2.0)

Usually users pay the CCE a daily, weekly, or monthly fee to access the facility and its amenities. Therefore, CCEs risk marginalising and excluding tinkers and thinkers from the lower end of the socio-economic spectrum who may not afford these fees. Socio-economic welfare often correlates with socio-cultural and educational background [47, 48], hence, a diversity of culturally and educationally different users might be excluded. Furthermore, CCE users are often freelancers who are described as digital nomads [49, 50] and work “in the vast domain of the knowledge industry” [10]. Therefore, their innovations seem to live only in the digital realm of possibilities, e.g., apps or websites, indicating a potential lack of offline, physical, innovation outcomes. Gill and Larson [51] focused on high-tech entrepreneurial identity to demonstrate how place-based discourse constrains and shapes the ‘ideal entrepreneur.’ If CCEs are meant to be conducive to creative idea generation [4], the exclusion of people based on their socio-economic, educational or any other background should be concerning, because innovation thrives on diversity [52, 53]. Furthermore, Katila et al. [54] criticise CCEs because their “programs and space may function as important sites, or even ‘factories,’ for effective intensities that work to attach ‘competent’ entrepreneurial participants to

precarious work conditions, leaving little opportunity for scepticism or critical resistance.”

In the context of innovation, social interaction lets people exchange and create new innovative ideas [55, 56]. The innovative process benefits from people’s diversity that can be understood through many characteristics, e.g., professional fields [57], people’s characteristics [52, 53, 58] and motivations [59], or social networks [60]. Readiness to help and information sharing characterise a pro-social team climate [11, 61] in which diversity through inclusiveness and good team processes can benefit innovation [62]. Therefore, some CCE may miss out on innovation opportunities by following exclusive design and managerial strategies. The concept of tribes could help address the challenge of inclusiveness. The metaphor of “a ‘multitude of villages’ which intersect, oppose each other, help each other, all the while remaining themselves” describes tribes [63] in a similar way in which Watters [64] describes friendship groups as tribes. In *Consumer Tribes* [65], members can be actively involved entrepreneurs who enter and expand the marketplace. Tribes in which individuals co-exist and help one another, while remaining themselves, are currently under-researched in the context of CCEs. This study explored members and their relationships to one another and the space in CCEs.

Lastly, CCEs with a social innovation focus provide a case study to understand and examine how users of CCEs form tribes. Because social innovation has a more inclusive approach to innovation, we expected to find people from different walks of life in these CCEs that focus on social innovation. Following this logic, people from different socio-cultural, socio-economic, and educational backgrounds may form more diverse groups in these CCEs than in mainstream CCEs. This study examined how these groups of diverse people resemble a tribe in which individuals find respect for who they are, while they provide support and receive help from one another for their projects and innovative pursuits. As discussed earlier, innovation thrives on diversity [66]. Learning and understanding ways in which the tribes of these two CCEs operate and approach innovation for social benefit and welfare can inform the practice of other CCEs that aim to create more diverse communities in their space in order to broaden collaboration and innovation opportunities between their users. The next section outlines our approach to addressing this gap in examining CCEs with a social innovation focus and their diverse group of users as a tribe.

3 Methodology

We used two individual case studies [67] to examine the real life contemporary phenomena [68] of CCEs [5, 10]. The *Old Ambulance Station* (theoldambulancestation.com), also called The Ambo [29], in Nambour on the Sunshine Coast, and *Substation33* (substation33.com.au) in Logan are located in the ‘emerging entrepreneurial region’ of South East Queensland [69]. Their proximity to Brisbane, Australia, 100 km and 30 km respectively, gives them access to the resources of a bigger city. The Ambo promotes itself as a ‘Creative Space for Creative People’ and is recognised as a place for education [69], coworking, advocacy, and groups [70]. Substation33 is an electronic waste recycling and upcycling centre and circular

economy hub that provides up-skilling, learning, and vocational training opportunities to long-term unemployed people and at-risk youth. It has received media exposure [71] and the Banksia Foundation Minister's Award for the Environment [72] for its green innovations and social impact. These two sites were deemed suitable for our study, because they are inclusive of the often excluded creative fringe in innovation ecosystems [30]. The creative fringe refers to people with backgrounds in humanities, social sciences, design, and the arts, who account for 5.5% of the Australian workforce with double the growth rate in the workforce than the average across all industries [73]. Researchers [30, 74] argue that, while innovation in the STEM (Science, Technology, Engineering, and Mathematics) sectors is valuable, the creative fringe is equally able to contribute on their own terms.

Data was collected in two stages. First, we took field notes, photographs, and sketches during four observation sessions of four to five hours on each site during working hours at different times and days of the week. At this stage, we were provided with floor plans of the CCEs. Second, we interviewed 28 managers, staff members, tenants, and volunteers 15 of which were at Substation33 and 13 of which were at The Ambo. These semi-structured interviews lasted between 30 and 90 minutes, followed by a short survey to record the interviewees' demographics, hobbies and interests. The technique of convergent interviewing [75] helped us identify participants and gain insights efficiently from a highly socially diverse environment without missing out on relevant data. Figure 2 shows the gender and age groups of our interviewees.

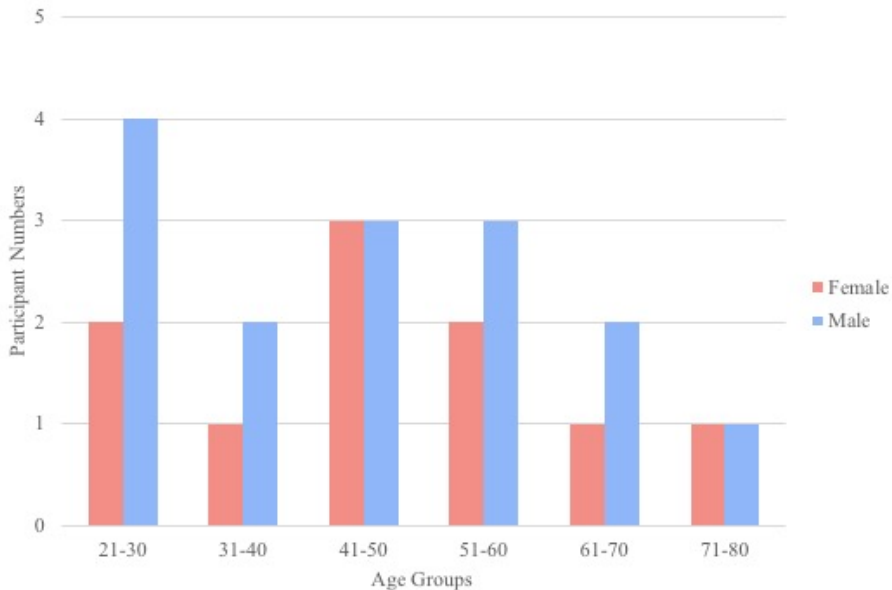


Fig. 2: Interviewees divided by gender and age groups (three interviewees choose to not share their demographics). Source: authors.

All interviews were audio-recorded and transcribed for analysis. We thematically analysed [76] our collected data to identify patterns and themes with regards to the

CCE's space and people's motivation for using and engaging with the CCE and other people in the CCE. Cooper explains:

“[p]ersonas are not real people, but they represent them throughout the design process. They are hypothetical archetypes of actual users. Although they are imaginary, they are defined with significant rigor and precision.” (2004, p. 151)

The creation of design personas aims to represent the diversity of archetypes characterised by behavioural patterns, motivations, attitudes, frustrations, activity flows, and goals through qualitative data, e.g., ethnographic observations and interviews [77]. In interaction design, personas help to better understand, meet, or target the needs, goals, and characteristics of potential user groups, through a human-centred approach [78]. They can also be used as a communication tool with stakeholders [79, 80]. We adopted the persona method to capture the diversity of users and their experiences in CCEs that have a focus on social innovation. As such, this method provided the benefit of capturing the perceived and lived space of users in relation to their experience of pursuing innovation in the CCE.

4 Findings

The findings are divided into two sections that address the impact of spatial and social precursors on innovation. First, we present skunkworks as unique CCEs that allow for specialised tools and equipment to tinker, experiment, and learn (from peers) in the offline world. Second, we introduce four design personas based on archetypal skunkworks users and derived from our observations and interview data.

4.1 CCEs as skunkworks with specialised tools and equipment

This section captures the CCEs' conceived space by its founders and managers. The CCEs' photographs and floor plans provide visual illustrations of the space. However, they also reflect the perceived and lived space, because the three aspects of Lefebvre's spatial triad mutually configure space. The two CCEs are located in two distinct buildings. The Ambo inhabits an old ambulance station (Fig. 3), which was operational from 1922 until 2001.



Fig. 3: The Ambo from the outside. Source: authors.

The brick building in its present form was opened in 1958 [81] and its entrance was remade with local government support and state government funding in 2017 [82]. Figure 4 shows the floor plan of the Ambo that is spread over two levels, with rooms colour-coded according to their purpose.



Fig. 4: Floor plan of the Ambo. Source: authors.

As indicated in Figure 4, the two galleries together form one large open area, which is occasionally separated by mobile room dividers, depending on exhibition requirements. The galleries are also used for events, such as talks, presentations, or the Ambo's monthly Long Table Dinner, which is an organised get-together for Nambour's community. The incubator spaces, recording studio, theatre, and meeting rooms are separated from one another by walls and the publicly accessible area. Tenants have keys to access the CCE and their space 24/7.



Fig. 5: Substation33 from the outside. Source: authors.

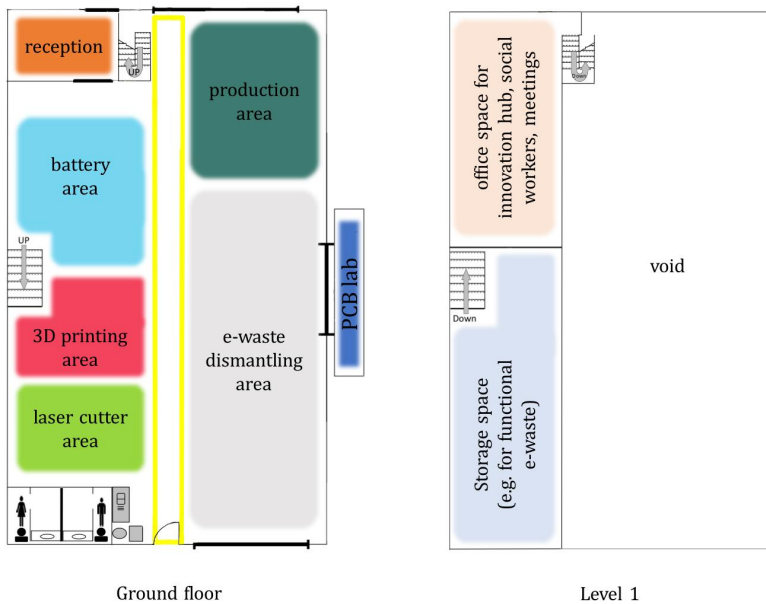


Fig. 6: Floor plan of Substation33. Source: authors.

Substation33 operates in a warehouse that is shown in Figure 5. Its two levels are illustrated in Figure 6, along with descriptions about its different operational areas. The ground floor is an open space with shelves for tool storage dividing the three operational areas on the left. The production area is also used for Friday BBQ lunches, food deliveries from OzHarvest, or electronic waste dismantling classes for people with disabilities. A small reception room is partitioned from the main area by walls.

A shipping container was attached to the building to overcome space shortage and is used as the printed circuit board (PCB) lab for soldering and programming. The yellow lines on the floor plan indicate the area that needs to be clear at all times to ensure safety when the fork lift is in use. Level 1 is split in two areas by curtains. One area is the office for the CEO and some staff members, and has several computers available to entrepreneurs and volunteers. The second area is used as an interim storage space for functioning electronic waste.

Although the CCEs have different spatial designs and layouts, i.e., open plan vs. office studios, they both have dedicated areas for task or tenant related work. This allows users to learn and work with (highly) specialised tools and equipment, i.e., previously described as (perpetual) messiness [16, 83]. The CCEs resemble a men's shed [17] in which users can tinker or repair something, while sometimes allowing their (grand)children to use and get a feeling for specialised tools to practise manual dexterity. Yet, our CCEs are of a bigger scale, and we call them *skunkworks* [30, 84] in which people can participate in tinkering, peer-to-peer learning, or (paid) workshops. The CCEs are accessible to the public to meet and engage with users, or explore and learn more about the innovations coming out of the CCEs during their working hours. At the Ambo, tenants have keys to access their studios at any time which gives them additional flexibility in scheduling their work. However, this flexibility can also lead to less personal offline interaction with other people in the space if they choose to work at different hours of the day. One of the managerial board members envisions the Ambo as an educational space for grunge entrepreneurship:

“In the context of my highly technical term ‘the weirdos’ which is to say the sort of young person who doesn’t fit neatly into the system, [...] who think almost genetically against authority, but did not necessarily play well with others, they are sometimes on one spectrum or another, they are idiosyncratic creative, [...] and don't do well in most places like school [...] So, what we could be talking about [...] Ambo’s Media Makers is a new kind of schooling or the augmenting schooling [...] a process which is based on a business case [...] [that allows for] grunge entrepreneurship – we were really talking about the educational space [to mobilise these weirdos].”

Figure 7 shows four spaces at the Ambo: a vintage shop selling clothes, cutlery and crockery, accessories, and chairs; the office of an audio specialist for geo-located storytelling; the audio recording studio; and the gallery in which local artists can exhibit their work.



Fig. 7: The variety of spaces at the Old Ambulance Station. From top left to bottom right: vintage shop, incubator space, audio recording studio, art gallery. Source: authors.

In contrast to the tenants' all-hours access at the Ambo, staff, volunteers, entrepreneurs, and visitors can access and make use of Substation33 only during its working hours. Although different tasks have dedicated work areas, the open plan layout allows for people to see one another and one another's work. This can facilitate talking and informal learning between the people in the CCE. Entrepreneurs are immersed within the CCE's operating business of recycling electronic waste, and so are staff and volunteers. The persons' roles or positions within the CCE are more ambiguous or harder to discern for an outsider or newcomer. Figure 8 shows the interim use for manufacturing a product, the 3D printing area with a volunteer using SketchUp for 3D modelling, the tables for dismantling electronic waste, and the innovation hub in which volunteers can seek help from staff members to get ready for job interviews.

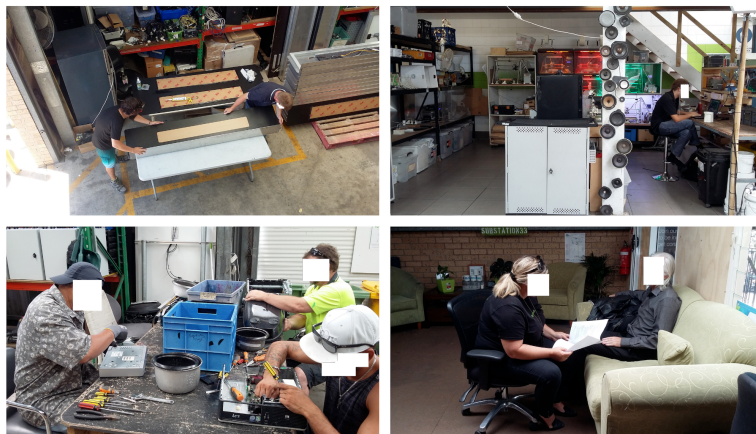


Fig. 8: Different work areas in Substation33's open plan skunkworks. From top left to bottom right: product manufacturing, 3D printing, and electronic waste dismantling area, and the innovation hub. Source: authors.

Although layout, operations, and equipment within the two spaces differ, it shows that CCEs can go beyond modern minimalistic equipped physical spaces with hot desks to support people who only depend on digital devices to pursue their entrepreneurial and innovative work. The founder and manager of Substation33 points out the difference between his skunkworks and urban, commercial CCEs and gives reasons as to why he wants to keep his practice and approach to innovation:

“[...] spaces like this, cause this is where true innovation happens, not in a fancy building in the city necessarily, [...] full of emptiness both in the number of people that are in the building, but also in the feel of the building. I hope people who come to Substation go, “Ah I get it, I’m home.” [...] Sometimes you go to innovation spaces [and] it feels cold, not inviting, and clinical. [...] We don’t wanna change the footprint, [...] we wanna maintain this space, [and] our social aspect.”

Innovation can and needs to happen in the offline world as much as in the digital realm. CCEs in the form of skunkworks provide a space that facilitates tinkering, experimenting, and peer-to-peer learning opportunities in the physical as well as digital world, and opening the door to more interest groups which provides opportunity to more cross-disciplinary knowledge and idea exchange.

4.2 Four personas as participants in social innovation skunkworks

The thematic analysis of our data informed the creation of four design personas that reflect the users’ lived and perceived experience of the CCEs’ space:

1. Opportunistic volunteer Olaf;
2. Second chance seeker Steve;
3. Business-focused Brian, and;
4. Problem-solving innovator Paula.

These four personas are based on our learnings and empirical data analysis from observations and interviews. They represent archetypes and composites of users from our two case study CCEs. Therefore, their quotes are taken from various interview participants as part of the purpose to create characters which are based on real-life users and have fictional elements, e.g., names and age, to protect users’ real identity and bring the personas to life. The discussion is based on the personas’ experiences and informs our recommendations to managers and policy makers to overcome perceived challenges and support the outcome and impact of social innovation as a result of work in CCEs.

Opportunistic volunteer Olaf, male, 26 years. Olaf has been on unemployment benefits ever since he finished highschool. His job agency sent him to the skunkworks site to work here three days a week. He is aware of the meaningful impact of the social innovations that come out of the CCE. He might help with the building process, but he is not too invested in the innovations per se. He rather works on his own ‘nerdy’ projects, and kills time to fulfil the welfare requirements:

“I mainly go to the table where I normally sit and just do my own thing. [...] After seeing a recent movie called ‘The Predator’ [...] I am determined enough to make [...] a full predator armour suit and go to Supernova in that. [...] when I 3d model it, [...] and [...] it's just the perfect fit, that's a sense of achievement.” (Interviewee 3)

“I don't pay too much attention [to the innovations]. But I have helped out with making [...] a [vertical] wall garden [...] Instead of sending it[s components] off to a recycling plant to be processed, potentially sent off to another country, we're using stuff that's already here to help the environment.” (Interviewee 8)

A staff member adds a comment on Olaf's sense of contribution to innovation:

“[...] you recognise that you're stopping [e-waste] from going into landfill and when you see the volume of it that comes through here [...] that helps people to think there's meaning in what they're doing.” (Interviewee 10)

Olaf appreciates the relaxed atmosphere that allows him to choose his level of work engagement. He gets frustrated over getting his fingers dirty, so he is picky about the work he wants to do. Yet, he puts up his hand to help prepare social gathering events in the CCE:

“I could be down the floor working all day or I could be sitting, just playing games. [...] I refuse to pull apart a printer. [...] Ink is everywhere. I'm not a fan of that. [...] [For Friday's lunch] I usually end up volunteering [...] to drive down [to the grocery store], grab all the stuff, come back, and cook.” (Interviewee 8)

A staff member comments on Olaf's work attitude:

“Whatever reasons they have for not wanting to work [...] we don't force them [...] we're not police in that manner. [...] We're very much about help-making, not making, allowing people to manage their time and themselves to meet their requirements.” (Interviewee 10)

He lacks professional aspiration and is unsure about his future. His self-esteem is low. He appreciates the encouragement and help from staff members who treat everybody equally in the CCE:

“They'll [staff members] be probably more than happy to say ‘yeah’ and ‘go there,’ [to] whatever you wanted to do – [if you are] working for the dole or volunteer. [...] [In the future, I wish to have a] stable job, my own place, car, and a family [...] But the way the cards [are] being dealt for me, [that] probably [will] not [happen]. [...] I saw a number [of job ads] [...]: 16 years old, open driver's licence, four years experience, and all require licences, [...] but that's also impossible odds.” (Interviewee 8)

In his free time he likes playing video games or being out of home to avoid tension with family members even if that means coming to the skunkworks site:

“It keeps me out of the house, coming in here, doing the 3d printing, and doing my own bits and pieces.” (Interviewee 3)

“For someone who is on government payments, [...] [I] end up just staying at home and playing video games. That's the most cost effective way of entertainment nowadays.” (Interviewee 8)

Second chance seeker Steve, male, 32 years. Steve was unemployed for a few years. At home, he kept himself busy with hobbies. His advanced dexterity and computer skills are self-taught. Steve is a nice guy, but shy and often insecure about himself:

“My general interests are really spread out like furniture making, woodworking, electronics, [and] design. [...] Pretty much all the practical skills are self-taught, [...] starting with a project, and then figuring out all the things.” (Interviewee 2)

“[...] at some point I figured, “oh, I seem to be fitting in [with the] professional programmers.” [...] Confidence and communication skills were a big thing. I would have not applied for jobs previously that had anything face-to-face, because I always felt uncomfortable, I never knew what to say to people. [...] But here I got a chance to practise a lot [to] get better at that.” (Interviewee 12)

He was a loner at school where he felt he did not fit in or was not able to succeed. After a period of unemployment and poor mental health, he found out about the skunkworks through a friend. He fell in love with the place and its people:

“I’ve got [a] jack of all trades kind of background, so it was a really good fit to come in here and be able to help out wherever I can rather than specialise in one area.” (Interviewee 2)

“It’s not individuals, it's a whole group of people working together. [...] It's [a] pretty laid back and relaxed environment. [...] If it was driven by money, it wouldn't be so relaxed, fun, or friendly. [...] [But this place] help[s] the environment and the community instead of money.” (Interviewee 11)

“I didn’t feel perfectly at home immediately [...] with the space, but home with the people. [...] I think we recycle people as well as waste. [...] So, I had skills just sitting and doing nothing, and here they've been put to use.” (Interviewee 12)

It suits him to learn from peers and figure things out by himself in an environment that is free of stress, time pressure, or success measures. He feels lucky to be here and is positive about his future:

“Since coming here I know that I can do things if I put my mind to it. [...] knowing that people believe in me [...] really helped my confidence a lot. [...] I’m very grateful that I came here. [...] if I wasn’t here I don’t think I’d be going back to university, [...] so it’s very empowering.” (Interviewee 11)

Considering himself so fortunate to be part of the CCE, Steve finds it difficult to find any opportunities or needs for improvement. A few suggestions for minor improvements seem almost mundane to him:

“In summer it gets hot, so maybe big industrial fans on the roof [would be nice]. [...] In the battery department, [...] there is a charger down there. I have no idea what batteries to put on there. [...] that’s when a reference [on a computer] would probably come in handy.” (Interviewee 11)

“I think if I knew of that thing [that needs improvement] I would do that thing or ask for that thing.” (Interviewee 12)

Business-focused Brian, male, 45 years. Brian has a start-up so an affordable space was crucial to maintain the sustainability of his business. As an artist, his work routine is far from typical ‘9 to 5’ office work, so he needs an adaptable workspace. He joined the CCE in the hope of joining a creative and inspiring community:

“I don’t just want a desk, I want something to stand up, move around, experiment, and improvise [for writing theatre plays] [...] I’m a bit of a hermit in my space. [...] I just need to know when I can come in, [I can] do my work and go. [...] The easiest thing, [...] was the ease of moving in [...] often there’s a lot of paperwork [...] here, there are no rules as long as I leave it in good condition. [...] [To rent extra workshop space, the manager] said, ‘let’s see how it goes, if you get [people’s] interest, then we’ll talk about funding.’ That’s helpful not [...] to pay for something [up front].” (Interviewee 16)

“[The rent was] \$100 a week [...] including electricity [and] Wi Fi. [...] you’ve got to start off with your overheads low [...] and build up. [...] I wouldn’t take on, going for a year’s lease with the rent being \$450, because I wouldn’t last.” (Interviewee 23)

“[Conventional coworking spaces have [a] straight down the line business model [...] [where you] meet other people hanging around the cappuccino machine, but I don’t think there’s a lot of creative conversation. [...] [This CCE] was² very dynamic, very busy, very vibrant. [...] people were coming and exploring what it might mean to be involved in the space and to work together.” (Interviewee 22)

His innovative work is filling a gap in the market and approaches entrepreneurship in a socially or environmentally meaningful way:

“I’m writing from a post-colonial feminist point of view, using archival research into the internment of women during war [...] a lot of the theatre industry in Australia [was not] really reflecting stories that resonate with me and my experiences.” (Interviewee 16)

² This tenant speaks in past tense referring to the CCE under the old manager. His experience is not the same since the change in management.

“Anything that’s reusing something is definitely environmentally friendly instead of throwing it away, you can up-cycle it.” (Interviewee 23)

He has been a tenant for three years now. A number of reasons come to his mind why collaboration with other tenants is missing, or what can be improved to make the CCE a more inspiring place:

“[At the networking event,] I did find it was older people [...] I think it’d be good to get a little more fresh blood in.” (Interviewee 16)

“[The new board] had meetings and [...] there was no signal that they were interested in what I might have to offer. [...] [So, I went] back to bare minimum, which is being a tenant here: have a studio, make cups of tea, go to the toilet. [...] There’s no possibility of collaborating with any[one here for me]. This is not a criticism, but it is to suggest that if you want a natural symmetry in a place like this, you look to bring people who have got things in common [...] [to] hopefully realise that there’s something to gain for them working together.” (Interviewee 22)

He has decided to focus on his own business. Either he will help activate the CCE to also promote his own start-up, or he will move out to another place where he can scale up his business:

“I’ve spoken to people here about maybe running some workshops in the theatre space. So we’ll see what comes next year in that regard.” (Interviewee 16)

“The last two years, I’ve wondered why I’m here, because I have had no collaboration. [...] I’m a leader internationally now, and when we rebuild this [business] platform, [...] it’s going to be affiliated with a larger institution—some sort of national institution or university.” (Interviewee 22)

Problem-solving innovator Paula, female, 35 years. Paula had been following her own interests and passion until the social-oriented business opportunity came along. In the CCE, she gets the opportunity to move her business out of home for a better work-life balance. Her work requires the use of highly specialised tools:

“[At Substation33] I realised that there’s so much value in electronic waste to build cool things with it. [...] I got obsessed with batteries for a while, and then at a startup weekend here, the idea was to form a business around some sort of social and environmental problem.” (Interviewee 14)

“[After] 15 years, I wanted to start teach[ing] people, [so] I needed a space. [...] It’s actually improved my sense of separating work from home. [...] I’ve got the space set up with a torch, propane, oxygen generator, [...] a kiln to anneal all the glass work, [...] a few tools, and all the glass rods. [...] [If] you’re suffering from mental illness, doing something like this really helps your mind and your soul.” (Interviewee 25)

Paula is a very social and chatty person. She appreciates the diversity of the people in the CCE:

“The best here is the ecosystem of people that this place attracts [...] the diversity in different people. For instance, our project wouldn't have started if I didn't meet [this guy] from West Papua, and our backgrounds are completely different, but we came together to try and figure out a solution to that problem.” (Interviewee 14)

“I love to feel like I belong to a tribe [...] and I'm part of it [here], [...] it's a whole growing community and we're all working in the same direction, even though it's on individual projects.” (Interviewee 19)

“There are people here from various fields you can approach [them for help].” (Interviewee 25)

Paula believes that if she wants to see the CCE more frequently used and activated, it requires her and other tenants' positive self-selection to step-up and take action:

“The first few months that I was here it was very quiet. [...] [Another tenant and I run] workshops, and people are coming in [to participate] [...] it's creating more energy in the place.” (Interviewee 19)

“I need to get an A-frame [to advertise my workshop] [...] I want to make it more open to the [passing] public.” (Interviewee 25)

Paula is satisfied with her business's progress. Nevertheless, she would like to see a few changes in policies and the CCE's community to nurture more social entrepreneurs:

“The Queensland Chief Entrepreneur Office actually talks a lot about social innovation and companies that have come out of these [social accelerator] programs, [...] yet they have not done the funding or anything to put towards [these programs].” (Interviewee 14)

“It would be really good if the government could give us lots more money [...] [to] support [an Artist in Residence program and] [...] have someone to take [graduates by their] hand and say, ‘This grant would be good for you for that project.’ [...] [A program] just focusing on the art sector.” (Interviewee 19)

“[The CCE is in] such an old building, there are things that need doing to it. [...] A good idea [could be] a [shared] online shop [...] and a photography booth here [for tenants to advertise their products and services].” (Interviewee 25)

Paula's long-term future is unplanned. She will follow where life takes her:

“Hopefully [...] [the second start-up] is getting a bit of money behind it, but I just have no clue.” (Interviewee 14)

“I’ve seen myself having more space [for workshops, paper drying racks, and surfaces to showcase artwork]. [...] This goes back to my dream of an ARI [...] I can see this place turning into that.” (Interviewee 19)

In the context of CCEs with a social innovation focus, our findings present skunkworks and four design personas as spatial and social innovation precursors. The skunkworks remind one of a shed characterised by messiness and organised chaos that create opportunities for their users to use specialised tools and equipment for tinkering, experimenting, and learning (from peers) in the offline world. The four design personas represent archetypal skunkworks users. In contrast to the high-tech entrepreneur ideal [51], they exemplify that entrepreneurship and innovation in CCEs can be pursued without chasing the next high-tech ‘unicorn’ start-up.

5 Discussion

Lefebvre’s triad of social space [85] was used as an analytical framework. It conceptualises three spatial aspects—conceived, perceived, and lived space—that can mutually configure one another. The *conceived* space manifests in physical space that is planned, designed, and maintained. The *perceived* space encapsulates the interpretation of space that provides context, meaning, and rules. The *lived* space is the way in which space is experienced by people who use it, e.g., through people’s interactions. We employed Lefebvre’s spatial triad as a conceptual aid to help us understand and interpret space usage practices from different viewpoints. Previous studies on shared or open plan work environments, e.g., hair salons [86], and an organisation that operates in the area of furnishings and interior design [87], used Lefebvre’s spatial triad to analyse creation, interpretation, and experience of work spaces. Liu and Grey hypothetically apply Lefebvre’s triad:

“So, for example, whereas an open plan office may be designed to promote team working, its users may ‘live’ the space by separating themselves off with plants or files, or by wearing headphones. In this way, the lived space may be resistant to the power effects of conceived space.” [88]

Previous research on understanding the social space and motivation of users within CCEs in the context of libraries [12, 36] inspired us to use the triad of social space [85] as a conceptual framework for our study. This framework helps us understand the social space of CCEs with a social innovation focus:

1. **Conceived space** – long-term goals, mission, and vision for the CCEs – created by their founders and managers;
2. **Perceived space** – infrastructure, facilities, and service – provided by the CCEs in the pursuit to fulfil its organisational goals and mission, as well as how it is perceived by its users, and;

3. **Lived experience** – use and action in the CCEs – practised by CCE users, such as tenants and volunteers.

We discuss our findings in two parts. First, we examine the diversity of people in the CCE represented by the four design personas. This part illustrates what a tribe for innovation is and what it entails. Second, we discuss the CCEs' spaces that are used by their tribes. Together these two discussion parts provide insights into the impact of precursors to innovation in CCEs based on insights from their conceived, perceived, and lived spatial aspects.

5.1 A tribe for innovation

Our four personas expand on previous research on innovation space users [13]. They offer new insights into users' motivations, characteristics, and approaches to innovation. Olaf and Brian value the social aspect. Nevertheless, their priority for coming to the CCE lies with their individual or professional benefits, e.g., welfare requirements or a very affordable workspace. In contrast, Steve and Paula who have introverted and extroverted personality characteristics, respectively, enjoy using the CCE for self-teaching, peer-to-peer learning, and collaboration opportunities. They refer to the CCE's community as a tribe to which they have a strong feeling of belonging. Although Olaf and Brian do not mention this notion, it might still apply to them. A tribe is usually a group of people bound together by a common language, culture, and history [89] or, as described in our context, a 'home with the people' who are like-minded and pursuing an innovative and entrepreneurial journey despite their differences in socio-economic, socio-cultural, or educational background. The two CCEs are welcoming people from different walks of life which creates diversity within the tribe. Watters [64] describes how, in urban tribes, friends build up a community and provide one another with support that is similar to that provided by family members. In the CCEs, the tribe that comprises a diversity of people allows its individuals to engage, learn, and innovate on their own terms, e.g., peer-to-peer learning, self-taught moments, or experimentation [90, 91]. Furthermore, this opens up collaboration and innovation opportunities between individuals of the tribe. We found the feeling of belonging to a tribe is a key experience for CCE users:

1. Users greatly appreciate the hands-on support from CCE managers and staff members, e.g., to provide job-seeking help or advice on business operations. Although users may know their goals, they are unsure as to how to achieve them. The guidance from staff and members is encouraging and just the right amount of push for the users to get going.
2. Positive self-selection is demonstrated in two ways. First, users voluntarily choose to come to the CCE with the exception of Olaf who is sent by his job agency, though he appreciates and likes the opportunities to socialise with others in the CCE. Second, positive self-selection accounts also for individuals' progress; help is provided to those who ask for it. A relaxed, community-driven environment provides everyone with the opportunity to

achieve goals and learn at their own pace, i.e., no time pressure is put upon tribe members or visitors by deadlines.

3. Almost no rules apply. At the Old Ambulance Station, tenants can use studios to their needs, but are asked to leave it as found when moving out. Substation33 is regarded as a safe environment for tinkering and experimentation, and it does not tolerate disrespectful language, e.g., sexism or racism.
4. The CCEs foster a group of like-minded individuals, each pursuing their own entrepreneurial and innovative journey alongside one another. Yet, the group is not isolated from the outer environment. The tribe is an open community, inclusive of the public. During its opening hours, the public is welcome to explore the CCE and engage with its tribe.

5.2 A space for the tribe

The aspects for creating and holding a tribe together in the CCE link to entrepreneurial and innovative endeavours. Typically, CCEs have a paid plan which grants access only to their members, in addition to occasional public events on particular topics for networking. CCEs with more accessibility to the public open up additional opportunities for innovation. In our study, we found users sensed a positive energy from the public visiting the CCE. The broader public's presence may create more diversity within the CCE, enabling more creative and innovative conversation and allowing the public to engage and discover new things, e.g., through participation in education workshops or tinkering on their own projects. These findings challenge the definition of coworking claiming a "diverse group of people" [7] working alongside one another in an open, transparent, and playful workspace [46] which increases the chance of serendipitous encounters, e.g., at the coffee machine [92]. Our findings suggest an openness towards public accessibility rather than a necessarily open spatial layout. This openness can attract positive energy as potential customers discover and experience products and services, engage actively in their creation, or become interested in experimenting and tinkering themselves. In contrast, (expensive) membership plans may stifle new business creations and exclude people from lower socio-economic backgrounds.

Furthermore, we shed light on the users' spatial use and interactions. Previous studies show that 'digital natives' pursue a nomadic work lifestyle [49], working as freelancers, remote workers, entrepreneurs, consultants, or contractors [10, 14, 15] with an "overwhelming majority" working in the creative industries and new media, including PR, marketing, and journalism [93]. While digital nomads' work depends on their digital devices, our study found the need and usability of skunkworks within the globally spreading numbers of CCEs [3–5]. The skunkworks allow users to bring, use, and leave specialised equipment. Our findings show users appreciate learning opportunities through practising dexterity while dismantling electronic waste or assembling products, but also link their practice to therapeutic capabilities and improved mental health. Although digital work practices have opened up many new

opportunities to innovate and have been changing our work culture and lifestyle, our findings suggest that offline practice and innovations do not only belong to the past.

6 Conclusion

Our inductive study applied Lefebvre's triad of social space to understand social and spatial precursors to innovation in CCEs that focus on social innovation. We gained in-depth insights into the operations of the two case study CCEs through user observations and semi-structured interviews with their managers, staff and users. Based on our empirical data, we presented four personas that are archetypes of users within the CCEs. Their motivation for using the CCE can be opportunistic for individual or professional benefits, or driven by the opportunity to socialise, collaborate and learn in a relaxed, community-focused environment. As users refer to the CCE's community as a tribe, our findings support previous research where people perceive the space 'as social environments, rather than purely physical destinations' [13]. We discovered four aspects—i.e., hands-on manager and staff support, positive self-selection, almost no rules, and an open community that is inclusive of the public—to support the notion of a tribe conducive to CCE users' creativity and innovation journeys. These findings can inform policy and managerial practices.

The CCE space that is truly open to serendipitous encounters that foster creative conversations, may not necessarily require (only) an open plan layout. We suggest that openness to the public could achieve unorchestrated diversity. The public may then engage with the CCE's community as a customer of their products or actively engage in entrepreneurial and innovative endeavours. Furthermore, CCEs may attract more creative people if they allow tenants to bring and use highly specialised equipment, as opposed to offering only hot desks for digital production. Our study challenges traditional notions of coworking and spatial layouts and suggests that public accessibility—rather than solely an open spatial design—can foster innovation within CCEs, allowing for diverse interactions, creative conversations, and engagement with the community. This insight can inform managerial practices and policy recommendations for enhancing social innovation in CCEs.

Government funding can provide support for CCEs that are social enterprises. Social enterprise CCEs may inhabit a government-owned facility. Their managers face difficulties in managing the CCEs, because facilities require maintenance. Furthermore, funding may be used for training opportunities to help social entrepreneurs and innovators build up their business to have a meaningful impact on society.

In contemplating the implications of our study, we note ongoing concerns surrounding the commercial and organisational viability of CCEs. While the past two decades have seen the proliferation of FabLabs and makerspaces dedicated to nurturing creativity, fostering diversity, and providing learning opportunities, the intricate challenge of ensuring the lasting success of these ventures, both financially and organisationally, persists [18–20]. Our study underscores the multifaceted dimensions of CCEs that contribute to their potential for sustained effectiveness. The sense of community, hands-on support from managers and staff, flexible operational guidelines, and inclusive public engagement collectively position CCEs as unique spaces primed

for addressing the business viability conundrum. Unlike conventional models, CCEs offer an environment that encourages diverse interactions, creative serendipity, and active engagement, potentially amplifying their impact and fostering lasting partnerships with the public. The emphasis on ‘tribes’ and the cohesive dynamics within CCEs present a promising avenue for generating a sense of ownership and shared purpose among users, potentially mitigating some of the challenges seen in other collaborative spaces. However, we recognise that while spatial design is undoubtedly significant, the intricate interplay between the physical layout and the underlying organisational and commercial strategies remains quintessential for CCEs to thrive and flourish. Our findings offer a unique vantage point for informed managerial practices and policy considerations, laying a foundation to unravel the complexities and address the critical issues surrounding the sustainability of these vital spaces for fostering social innovation.

This study has taken a qualitative and exploratory approach, focusing on a specific context and set of CCEs. The findings presented herein provide rich insights into the dynamics of social innovation within these particular environments, but caution should be exercised when extrapolating these observations to different global contexts and other types of CCEs, as outcomes may be influenced by specific contextual factors unique to each local setting. Future research could investigate how cities may adapt and design public skunkworks for their citizens to use. Additional research may also further unpack such CCEs’ communities or tribes and any explicit correlations of the different ways that CCEs and their innovation precursors enable innovation. Long-term studies may look into persona journeys over time, starting prior to joining a CCE and documenting potential involvement with the tribe even after leaving the CCE. This could provide a richer understanding of user needs and the interactions within tribal CCE communities to better guide managerial practices and policy development for social innovation.

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References

1. Deep A.: 10 Famous Startups That Started From Coworking Spaces - Uber, Instagram & More, <https://coworkingmag.com/blog/famous-startups-that-started-from-coworking->

- spaces/
2. Weil A.: 9 Successful Companies Launched in a Coworking Space, <https://sharespace.work/9-successful-companies-launched-coworking-space/>
 3. Johns T., Gratton L.: The Third Wave of Virtual Work, <https://hbr.org/2013/01/the-third-wave-of-virtual-work>, (2013)
 4. Kojo I., Nenonen S.: Evolution of co-working places: drivers and possibilities, *Intelligent Buildings International*, pp. 1–12 (2014). doi:10.1080/17508975.2014.987640
 5. Bouncken R., Reuschl A.: Coworking-spaces: how a phenomenon of the sharing economy builds a novel trend for the workplace and for entrepreneurship, *Review of Managerial Science*, 12, pp. 317–334 (2016). doi:10.1007/s11846-016-0215-y
 6. Bilandzic A., Foth M., Hearn G.: The Role of Fab Labs and Living Labs for Economic Development of Regional Australia in Fuente, E. and Van Luyn, A. (eds.) *Regional Cultures, Economics and Creativity: Innovating Through Place in Australia and Beyond*. pp. 174–197. Routledge, Abingdon, UK (2019). ISBN 9780429459290. doi:10.4324/9780429459290-10
 7. DeGuzman G.V., Tang A.I.: *Working in the Unoffice: A Guide to Coworking for Indie Workers, Small Businesses, and Nonprofits*, Night Owls Press LLC, (2011). ISBN 9781937645014
 8. Waters-Lynch J., Duff C.: The affective commons of coworking, *Human Relations*, 74, pp. 383–404 (2021). doi:10.1177/0018726719894633
 9. Houghton K., Foth M., Hearn G.: Working from the other office: Trialling coworking spaces for public servants, *Australian Journal of Public Administration*, 77, pp. 757–778 (2018). doi:10.1111/1467-8500.12317
 10. Gandini A.: The rise of coworking spaces: A literature review, *Ephemera*, 15, pp. 193–205 (2015)
 11. Bilandzic M., Schroeter R., Foth M.: Gelatine: making coworking places gel for better collaboration and social learning in Shen, H., Paay, J., Smith, R., Wyeld, T., and Calder, P. (eds.) *Proceedings of the 25th Australian Computer-Human Interaction Conference: Augmentation, Application, Innovation, Collaboration*. pp. 427–436. Association for Computing Machinery, United States (2013). doi:10.1145/2541016.2541027
 12. Bilandzic M., Foth M.: Libraries as Coworking Spaces: Understanding User Motivations and Perceived Barriers to Social Learning, *Library Hi Tech*, 31, pp. 254–273 (2013). doi:10.1108/07378831311329040
 13. Bilandzic M., Foth M.: Designing hubs for connected learning: social, spatial and technological insights from Coworking, Hackerspaces and Meetup groups in Carvalho, L., Goodyear, P., and de Laat, M. (eds.) *Place-Based Spaces for Networked Learning*. Routledge, Abingdon (2017). ISBN 9781138850866. doi:10.4324/9781315724485-15
 14. Garrett L.E., Spreitzer G.M., Bacevice P.A.: Co-constructing a Sense of Community at Work: The Emergence of Community in Coworking Spaces, *Organization Studies*, 38, pp. 821–842 (2017). doi:10.1177/0170840616685354
 15. Spinuzzi C.: Working Alone Together: Coworking as Emergent Collaborative Activity, *Journal of Business and Technical Communication*, 26, pp. 399–441 (2012). doi:10.1177/1050651912444070
 16. Bilandzic M.: Connected learning in the library as a product of hacking, making, social diversity and messiness, *Interactive Learning Environments*, 24, pp. 158–177 (2016). doi:10.1080/10494820.2013.825811
 17. Ballinger M., Talbot L., Verrinder G.: More than a place to do woodwork: a case study of a community-based Men's Shed, *Journal of Men's Health*, 6, pp. 20–27 (2009). doi:10.1016/j.jomh.2008.09.006
 18. Soomro S.A., Casakin H., Georgiev G.V.: A Systematic Review on FabLab Environments and Creativity: Implications for Design, *Buildings*, 12, pp. 804 (2022). doi:10.3390/buildings12060804

19. Rayna T., Striukova L.: Fostering skills for the 21st century: The role of Fab labs and makerspaces, *Technological Forecasting and Social Change*, 164, pp. 120391 (2021). doi:10.1016/j.techfore.2020.120391
20. Sadini C., Nørregård Rasmussen A., Real M., Cipriani L.: Co-creating social and sustainable innovation in Makerspaces and Fab Labs. Lessons learnt from the SISCODE European project Proceedings of the Fab 16 Research Papers Stream. pp. 141–153. Zenodo (2021). doi:10.5281/zenodo.5169840
21. Ratti C., Claudel M.: *The City of Tomorrow: Sensors, Networks, Hackers, and the Future of Urban Life*, Yale University Press, (2016). ISBN 9780300204803
22. Townsend A.: *Smart Cities: big data, civic hackers, and the quest for a new utopia*, W.W. Norton & Company, New York, (2013). ISBN 9780393082876
23. von Zumbusch J.S.H., Lalicic L.: The role of co-living spaces in digital nomads' well-being, *Information Technology & Tourism*, 22, pp. 439–453 (2020). doi:10.1007/s40558-020-00182-2
24. Bergan T.L., Gorman-Murray A., Power E.R.: Coliving housing: home cultures of precarity for the new creative class, *Social & Cultural Geography*, 22, pp. 1204–1222 (2021). doi:10.1080/14649365.2020.1734230
25. Chevtaeva E.: Coworking and Coliving: The Attraction for Digital Nomad Tourists *Information and Communication Technologies in Tourism 2021*. pp. 202–209. Springer International Publishing (2021). doi:10.1007/978-3-030-65785-7_17
26. Karadima D., Bofylatos S.: Co-living as a means to re-engagement. A literature review, *The Design Journal*, 22, pp. 751–762 (2019). doi:10.1080/14606925.2019.1595397
27. Bilandzic A., Casadevall D., Foth M., Hearn G.: Social and Spatial Precursors to Innovation: The Diversity Advantage of the Creative Fringe, *The Journal of Community Informatics*, 14, pp. 160–182 (2018). doi:10.15353/joci.v14i1.3408
28. Edensor T., Leslie D., Millington S., Rantisi N. eds: *Spaces of Vernacular Creativity: Rethinking the Cultural Economy*, Routledge, (2009). ISBN 9781134018451. doi:10.4324/9780203886441
29. Johnstone S., Choi J.H.-J., Leong J.: Designing for diversity: Connecting people, places, and technologies in creative community hubs *OzCHI '16 Proceedings of the 28th Australian Conference on Computer-Human Interaction*. pp. 135–139 (2016). doi:10.1145/3010915.3010971
30. Foth M., Hughes H.E., Dezuanni M.L., Mallan K.: *Skunkworks: Designing regional innovation spaces for the creative fringe C&T 2017 Workshop Proceedings – Designing Participation for the Digital Fringe*. ACM (2017)
31. Ziegler R.: Justice and innovation – towards principles for creating a fair space for innovation, *Journal of Responsible Innovation*, 2, pp. 184–200 (2015). doi:10.1080/23299460.2015.1057796
32. United Nations: Sustainable Development Goals, <https://sustainabledevelopment.un.org/?menu=1300>
33. Cajaiba-Santana G.: Social innovation: Moving the field forward. A conceptual framework, *Technological Forecasting and Social Change*, 82, pp. 42–51 (2014). doi:10.1016/j.techfore.2013.05.008
34. Kickul J., Griffiths M., Bacq S., Garud N.: Catalyzing social innovation: is entrepreneurial bricolage always good?, *Entrepreneurship and Regional Development*, 30, pp. 407–420 (2018). doi:10.1080/08985626.2017.1413771
35. Murray R., Caulier-Grice J., Mulgan G.: *The Open Book of Social Innovation*, NESTA, London, UK, (2010). ISBN 9781848750715
36. Zbiejczuk Suchá L., Novotný R., Štefek T., de Moor A., Belehradová Svitáková J., Bartošová E., Škyřík P., Buchtová B., Vichová E.: Designing an incubator for social innovations in libraries: Learnings from the Research through Design approach, *Interaction*

- Design & Architecture(s), pp. 215–236 (2021). doi:10.55612/s-5002-047-010
37. Burgess J.: *Hearing Ordinary Voices: Cultural Studies, Vernacular Creativity and Digital Storytelling*, Continuum, 20, pp. 201–214 (2006). doi:10.1080/10304310600641737
 38. Hauschildt J., Salomo S.: *Innovationsmanagement*, Vahlen, München, (2011). ISBN 9783800643530
 39. Kline S.J., Rosenberg N.: An overview of innovation in Landau, R. and Rosenberg, N. (eds.) *The positive sum strategy*. pp. 275–306. National Academy Press, Washington, D.C. (1986). ISBN 9780309036306
 40. Porter M.E.: *The competitive advantage of nations*, The Macmillan Press LTD, (1990). ISBN 9780333518045
 41. Arteaga R., Hyland J.: *Pivot - How top entrepreneurs adapt and change course to find ultimate success*, John Wiley & Sons, New Jersey, (2014). ISBN 9781118559710
 42. Mulgan G.: *The process of social innovation*, *Innovations: technology, governance, globalization*, 1, pp. 145–162 (2006)
 43. Therace A., Hubert A., Dro I.: *Empowering people, driving change : social innovation in the European Union*, Publications Office of the European Union, (2011). ISBN 9789279192753. doi:10.2796/13155
 44. Mulgan G., Tucker S., Ali R., Sanders B.: *Social Innovation: What it is, why it matters and how it can be accelerated*, The Young Foundation, (2007)
 45. Blythe M.A., Wright P.C.: *Funology in Blythe, M.A., Overbeeke, K., Monk, A.F., and Wright, P.C. (eds.) From Usability to Enjoyment*. pp. XIII–XIX. Kluwer Academic Publishers; Springer Science + Business Media, New York (2005)
 46. van Meel J., Vos P.: *Funky offices: Reflections on office design in the “new economy,”* *Journal of Corporate Real Estate*, 3, pp. 322–334 (2001). doi:10.1108/14630010110811661
 47. Soja E.: *Seeking Spatial Justice*, University of Minnesota Press, Minneapolis, (2010)
 48. Young I.M.: *Justice and the politics of difference*, Princeton, New Jersey, (2011)
 49. Czarniawska B.: *Nomadic Work as Life-Story Plot*, *Computer Supported Cooperative Work*, 23, pp. 205–221 (2014). doi:10.1007/s10606-013-9189-3
 50. Rossitto C., Bogdan C., Severinson-Eklundh K.: *Understanding Constellations of Technologies in Use in a Collaborative Nomadic Setting*, *Computer Supported Cooperative Work*, 23, pp. 137–161 (2014). doi:10.1007/s10606-013-9196-4
 51. Gill R., Larson G.S.: *Making the ideal (local) entrepreneur: Place and the regional development of high-tech entrepreneurial identity*, *Human Relations*, 67, pp. 519–542 (2014). doi:10.1177/0018726713496829
 52. O’Connor G.C.: *Open, radical innovation: Toward and integrated model in large established firms in Chesbrough, H.W., Vanhaverbeke, W., and West, J. (eds.) Open Innovation*. pp. 62–81. Oxford University Press, New York (2006). ISBN 9780199290727
 53. Callon M.: *Techno-economic networks and irreversibility*, *The Sociological Review*, 38, pp. 132–161 (1990). doi:10.1111/j.1467-954X.1990.tb03351.x
 54. Katila S., Kuismin A., Valtonen A.: *Becoming upbeat: Learning the affecto-rhythmic order of organizational practices*, *Human Relations*, pp. 0018726719867753 (2019). doi:10.1177/0018726719867753
 55. Johnson S.: *Where good ideas come from*, Riverhead Books, New York, (2010). ISBN 9781594487712
 56. Dunbar K.: *How scientists think: On-line creativity and conceptual change in science Presented at the (1997)*. ISBN 9781557984043. doi:10.1037/10227-017
 57. Norman D.A.: *Technology First, Needs Last: The Research-Product Gulf, interactions*, 17, pp. 38–42 (2010). doi:10.1145/1699775.1699784
 58. Roberts E.B., Fusfeld A.R.: *Critical functions: Needed roles in the innovation process in Katz, R. (ed.) Career Issues in Human Resource Management*. pp. 182–207. Prentice Hall, Englewood Cliffs (1982)
 59. Battistella C., Nonino F.: *Exploring the impact of motivations on the attraction of*

- innovation roles in open innovation web-based platforms, *Production Planning & Control*, 24, pp. 226–245 (2013). doi:10.1080/09537287.2011.647876
60. Granovetter M.: The Strength of Weak Ties, *The American Journal of Sociology*, 78, pp. 1360–1380 (1973)
 61. Moser K.S., Dawson J.F., West M.A.: Antecedents of team innovation in health care teams, *Creativity and Innovation Management*, 28, pp. 72–81 (2019). doi:10.1111/caim.12285
 62. Guillaume Y.R.F., Dawson J.F., Priola V., Sacramento C.A., Woods S.A., Higson H.E., Budhwar P.S., West M.A.: Managing diversity in organizations: An integrative model and agenda for future research, *European Journal of Work and Organizational Psychology*, 23, pp. 783–802 (2014). doi:10.1080/1359432X.2013.805485
 63. Maffesoli M.: *The time of the tribes: the decline of individualism in mass society*, SAGE, London, (1996)
 64. Watters E.: *Urban Tribes: Are Friends the New Family?*, Bloomsbury, (2003). ISBN 9780747565871
 65. Cova B., Kozinets R.V., Shankar A.: *Consumer Tribes*, Butterworth-Heinemann, Burlington, (2007)
 66. Wood P., Landry C.: *The Intercultural City: Planning for Diversity Advantage*, Earthscan, London, (2008). ISBN 9781844074372
 67. Yin R.K.: *Case study research: design and methods*, Sage, Los Angeles, (2014)
 68. Baxter P., Jack S.: Qualitative case study methodology: Study design and implementation for novice researchers, *The Qualitative Report*, 13, pp. 544–559 (2008)
 69. de Villiers Scheepers R., Mealy E., Clements M., Lawrence A.: *Sunshine Coast: The place to be*, University of the Sunshine Coast, (2018)
 70. Sunshine Coast Council: *Sunshine Coast entrepreneurship and innovation brochure*, (2019)
 71. ABC News: *Substation33 on ABC News*, 17 February 2018, YouTube, Australia, (2018)
 72. Banksia Environmental Foundation: *2019 Minister's award for the environment*, <http://banksiafdn.com/2019-ministers-award-environment/>
 73. Cunningham S., McCutcheon M.: *The Creative Economy in Australia*, Queensland University of Technology, (2017)
 74. Withers G.: *The innovation imperative: applying knowledge and ideas to build Australia's advantage*, <http://theconversation.com/the-innovation-imperative-applying-knowledge-and-ideas-to-build-australias-advantage-50590>, (2015)
 75. Dick B.: *Convergent interviewing: a technique for qualitative data collection*, <http://www.aral.com.au/resources/iview.html>
 76. Braun V., Clarke V.: Using thematic analysis in psychology, *Qualitative Research in Psychology*, 3, pp. 77–101 (2006). doi:10.1191/1478088706qp063oa
 77. Cooper A., Reimann R., Cronin D.: *About face 3: the essentials of interaction design*, Wiley Pub., Indianapolis, Indiana, (2007). ISBN 9780470084113
 78. Cooper A.: *The Inmates Are Running the Asylum: Why High-Tech Products Drive Us Crazy and How to Restore the Sanity*, Sams Publishing, United States of America, (2004)
 79. Chang Y.-N., Lim Y.-K., Stolterman E.: *Personas: from theory to practices* Proceedings of the 5th Nordic conference on Human-computer interaction (NordiCHI '08). pp. 439–442. ACM, New York, NY (2008). doi:10.1145/1463160.1463214
 80. Foth M., Satchell C., Bilandzic M., Hearn G., Starkey D.: *Dramatic character development personas to tailor apartment designs for different residential lifestyles in Foth, M., Gibbs, M., Forlano, L., and Satchell, C. (eds.) From Social Butterfly to Engaged Citizen: Urban Informatics, Social Media, Ubiquitous Computing, and Mobile Technology to Support Citizen Engagement*. pp. 461–484. The MIT Press, United States (2011). ISBN 9780262016513. doi:10.7551/mitpress/8744.003.0036
 81. Sunshine Coast Open House: *20. Old Ambulance Station*, <https://www.sunshinecoastopenhouse.com.au/building/20-old-ambulance-station>
 82. Sunshine Coast Council: *New look for Old Ambo*,

- <https://www.sunshinecoast.qld.gov.au/Council/News-Centre/New-look-for-Old-Ambo-300117>
83. Foth M., Forlano L., Bilandzic M.: Mapping New Work Practices in the Smart City in Friese, H., Nolden, M., Rebane, G., and Schreiter, M. (eds.) *Handbuch Soziale Praktiken und Digitale Alltagswelten*. pp. 169–181. Springer, Wiesbaden (2020). ISBN 9783658083571. doi:10.1007/978-3-658-08357-1_33
 84. Foth M.: Australia needs an innovation “skunkworks,” <https://theconversation.com/australia-needs-an-innovation-skunkworks-51326>
 85. Lefebvre H.: *The production of space*, Blackwell Publishing, Carlton: Victoria, (1991). ISBN 9780631181774
 86. Shortt H.: Liminality, space and the importance of “transitory dwelling places” at work, *Human Relations*, 68, pp. 633–658 (2015). doi:10.1177/0018726714536938
 87. Sivunen A., Putnam L.L.: The dialectics of spatial performances: The interplay of tensions in activity-based organizing, *Human Relations*, 73, pp. 1129–1156 (2020). doi:10.1177/0018726719857117
 88. Liu Y., Grey C.: History, gendered space and organizational identity: An archival study of a university building, *Human Relations*, 71, pp. 640–667 (2018). doi:10.1177/0018726717733032
 89. Cambridge University Press: Tribe, <https://dictionary.cambridge.org/dictionary/english/tribe>
 90. Felasari S., Peng C.: Collating a city’s collective memory in co-production of an online urban design learning space, *Interaction Design & Architecture(s)*, pp. 84–96 (2021). doi:10.55612/s-5002-049-005
 91. Sharp D., Raven R.: Urban planning by experiment at precinct scale: Embracing complexity, ambiguity, and multiplicity, *Urban Planning*, 6, pp. 195–207 (2021). doi:10.17645/up.v6i1.3525
 92. Sayiner S.: *Physical Space Drives Innovation: How the Environment Can Increase an Organization’s Productivity, Creativity, and Innovation*, *Intersect*, 8, (2015)
 93. Foertsch C.: *The Coworker’s Profile*, <http://www.deskmag.com/en/the-coworkers-global-coworking-survey-168>