

A Taxonomy of New Working Spaces



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Abstract In this chapter, we present a definition of new working spaces (NeWSps). We then delve into the unique characteristics of different types of NeWSps. We propose a typology that classifies these spaces based on the primary needs of their users, distinguishing between two approaches: “do it together” and “do it yourself”. Drawing from our literature review, we introduce the concepts of coworking spaces, creative hubs, living labs, corporate labs, makerspaces, fab labs, open worklabs and hackerspaces. We argue that while these types of NeWSps share some similarities, there are important differences between them, and they may overlap in certain dimensions. To capture the wide range of new working spaces, we present two perspectives on makerspaces and creative hubs: *lato sensu* and *stricto sensu*.

1 Introduction

This chapter aims to provide a comprehensive classification of different typologies of new working spaces (NeWSps). NeWSps, also known as open creative labs [43], are collaborative spaces that attract a diverse range of users, offer flexible infrastructure and services, and foster a collaborative ethos [30, 45].

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The classification of NeWSps is based on users' needs and their approach to innovation and creativity. For example, makerspaces and fab labs can be categorized based on specific ideation and innovation methodologies. The majority of creative hubs rely on social innovation, while living labs follow the open innovation model, and hackerspaces often generate user-driven innovations [4]. However, this notion of NeWSps is not exhaustive, as it typically excludes open worklabs and creative hubs. Although different workspaces exhibit significant distinctiveness, Capdevila and Moilanen [5] raise doubts about their absolute separateness. Overlaps exist, such as certain hackerspaces that can simultaneously function as creative spaces, considering their role as predecessors to creative spaces [7].

In our taxonomy, we define NeWSps based on users' primary needs and the tools they utilize. Accordingly, we identify two broad typologies: collaborative and creative working spaces, which predominantly follow a "do it together" approach, and makerspaces *lato sensu*, which predominantly follow a "do it yourself" approach (Fig. 1).

On one hand, the essence of the "do it together" space concept, such as CSs, lies in the social interaction among their members ("people talk"). On the other hand, the core of the "do it yourself" space concept, including makerspaces, fab labs, open worklabs, and former Techshops, is centered around collaborative physical and production activities ("people do"), facilitating the creation of physical objects [26]. In "do it yourself" spaces, often referred to as "dirty" makerspaces, activities

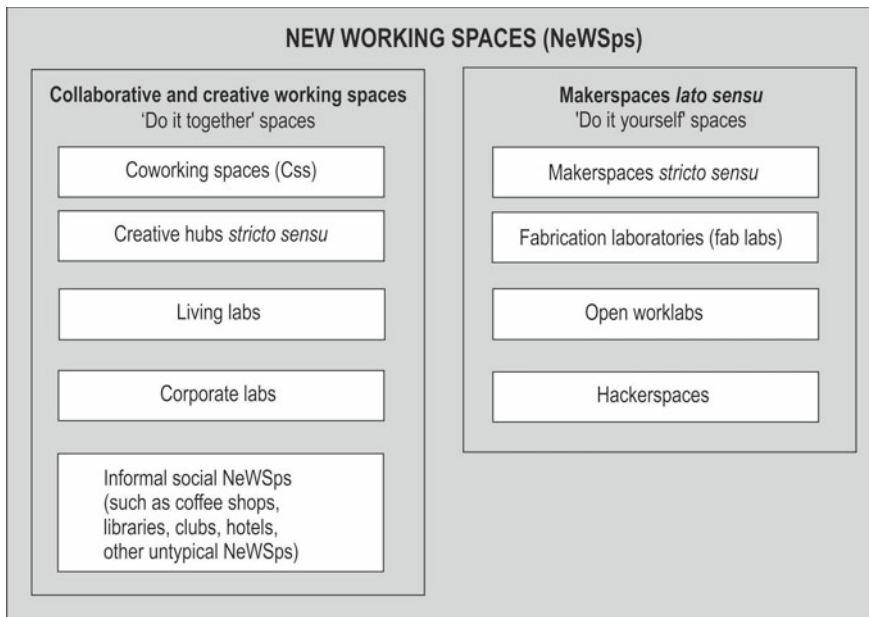


Fig. 1 Relations between two main typologies of NeWSps based on users' primary needs and used tools. *Source* Authors' elaboration based on [29]

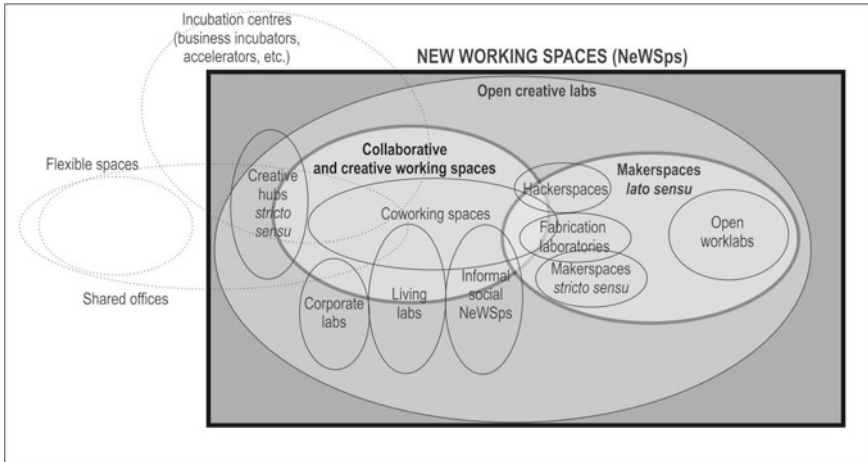


Fig. 2 Relations between various forms of NeWSps. *Source* Authors’ elaboration based on [29]

are carried out using tools and machinery, whereas in “do it together” spaces, often referred to as “clean” CSs, the work is primarily computer-based.

It is important to acknowledge that some spaces combine both the “do it together” and “do it yourself” approaches, leading to the emergence of hybrid spaces in spatial-functional dimension [12, 45, 46]. This is demonstrated in Fig. 2, where certain types of NeWSps overlap, such as the combination of coworking spaces with hackerspaces.

In comparison to the approach by Montanari et al. [30], our taxonomy excludes business incubation centers (incubators and accelerators) since their primary objective is not directly related to fostering collaboration. Instead, they aim is to support startups in realizing their ideas, increasing their chances of success, adding value, and accelerating their development [28, 37]. Figure 2 provides a more nuanced view of the overlaps between different types of NeWSps.

In the next sections, we provide a description of selected types of NeWSps, representing both collaborative and creative working spaces (subchapters 2.1–2.2) and makerspaces *lato sensu* (subchapters 2.3–2.6).

2 Types of New Working Spaces

2.1 Coworking Spaces

Brad Neuberg coined the term coworking to describe a new way of working and addressing the issue of isolation faced by many professionals [36]. In 2005, as a computer engineer, Neuberg founded the CS Hat Factory in San Francisco, which served as a model for coworking spaces [20], cited by Parrino [36]. Neuberg observed

that workers often had to choose between working from home independently or in a corporate office environment. While working in an office provided community and structure, it often came at the cost of freedom and control over one's life. On the other hand, working from home offered independence but lacked a sense of community and could lead to loneliness [20].

Coworking spaces have spread worldwide, and their concept has evolved over time. In the second wave of coworking, large real estate development companies like Regus, WeWork, and The Office Group have entered the coworking market, leading to significant changes. Freelancers, self-employed individuals, and even major corporations such as Microsoft and Amazon have become users of coworking spaces [1].

Coworking spaces (CSs), according to Neuberg, provided a solution to this dilemma by offering a shared workspace where professionals could enjoy a sense of community, collaboration, and social interaction that they might not experience in a traditional corporate office [36]. The concept of community is central to coworking, emphasizing the role of shared spaces in fostering social connections among its users [36]. However, it is important to note that CSs may not necessarily lead to significant professional relationships or knowledge exchange [36].

Various authors offer slightly different definitions of CSs across disciplines. Spinuzzi [44], for example, defined CSs as open-plan office environments where professionals from different backgrounds work together for a fee, with a focus on knowledge-sharing dynamics. CSs not only provide infrastructure and a specific design but also create a dynamic and inspiring environment for collaboration and knowledge sharing [32]. CSs are considered the evolution of the coworking phenomenon, differentiating themselves from traditional serviced offices through their explicit emphasis on social and collaborative activities, as well as their aesthetic and material design [50].

Kojo and Nenonen [21] presented a broader definition of CSs, encompassing various business models and levels of user access. They classified coworking spaces *lato sensu* into different categories: public offices (e.g., free coworking spaces like libraries), third places (e.g., public spaces that require purchasing services such as cafes), collaboration hubs (public offices focusing on collaboration between workers), co-working hotels (shared office spaces with short-lease contracts and compact service packages), incubators (shared office spaces focusing on entrepreneurship), and shared studios (shared offices with flexible lease contracts, accommodating organizational or entrepreneurial needs within the community).

Bouncken et al. [2] conducted an empirical study in Germany and identified four distinct archetypes of CSs based on competition and entrepreneurship: the corporate, the open corporate, the consultancy, and the independent CS. These archetypes represent different approaches and characteristics within the entrepreneurial environment of CSs.

Nakano et al. [33] identified five roles that CSs can play simultaneously: infrastructure provider, community host, knowledge disseminator, local coupling point, and global pipeline connector.

In our typology, the primary need of users in CSs, aside from workspace provision, is collaboration. The specific tools and equipment used can vary greatly.

2.2 *Creative Hubs*

In a broader sense, a creative hub (CH) is a milieu that brings together creative and innovative individuals. “It is a convenor, providing space and support for networking, business development and community engagement” ([25], p. 4). Creative hubs *lato sensu* are environments where creative and social entrepreneurs connect and support each other while nurturing their businesses [9, 34]. Although there are some universally recognized core concepts associated with CHs, such as collaboration, networking, co-working, shared space, entrepreneurship, and incubation, there is no absolute consensus on their definition. Creative hubs are distinguished from other workspaces based on the social possibilities brought about by sharing of physical space that facilitates creativity. Although there are some common features, CH *lato sensu* is used differently from other collaborative spaces. The term is used for spaces, places, districts, clusters and cities [14, 40].

CHs offer a work environment that is built upon shared values of community, collaboration, openness, diversity, and sustainability. In a *lato sensu* context, it can be said that CSs, makerspaces, fab labs, and even business incubators fall under the umbrella of CHs [35]. As a result, the CHs, innovation labs, incubators, CSs, open creative labs [43], start-up spaces, innovation centers, makerspaces, and even research institutes [49] are used interchangeably. Despite varying interpretations of CHs, they share one common feature: they provide tailored environments to accommodate small and micro businesses at different stages of development [17].

Creative hubs *sensu stricto* attract specific economic activities, including cultural, creative [25], and high-tech industries. Furthermore, CHs, except for CSs, are distinct from other workspaces due to their direct focus on fostering socially shared experiences through physical space sharing. CHs often experiment with and implement community projects such as urban gardens, community farming, resource sharing, eco hackathons, and literacy programs for youth and the unemployed [31].

2.3 *Living Labs and Corporate Labs*

Besides the notion of Living Labs (LLs) as digital platforms, they may often be understood as “localized spaces where activities focus on the involvement of citizens in innovation processes with the focus on the return for the leading organization related to business interests” ([3]: 8). In contrast to open innovation agents, which are global companies operating in the private sector, most LLs are set up and managed by public and/or private organizations [3]. The main aim of LLs is to build research-centered milieux which facilitate the generation of innovation. LLs often engage local

inhabitants and employees in common innovation processes, so they may provide a new dynamism to deprived urban areas.

Corporate Labs are different from living labs in terms of their aims and ownership. Using [30] wording, Corporate Labs are corporate collaborative spaces. They are created within a company to promote cooperation between staff representing different internal units and often (but not necessarily) external stakeholders. Corporate Labs are usually located inside large firms' facilities—see the case of Renault's corporate lab described by Capdevila [3].

2.4 Makerspaces

The term “makerspaces” was originally coined by MAKE Magazine, primarily in the context of creating tinkering spaces for children [6, 42]. However, in recent years, the concept has become more widespread and is now used not only in the context of tinkering and other “do it yourself” (DIY) activities but also with regard to collaboration. Makerspaces *lato sensu* are primarily driven by the maker movement, which aims to fulfill people's need to engage with objects in ways that go beyond mere consumption [13, 42].

Makerspaces serve as physical representations of the maker movement and provide environments for prototyping and digital manufacturing [15, 42, 47] (Brahimi et al. 2019). Various concepts, such as makerspaces, hackerspaces, worklabs, and fab labs, have their unique histories, which will be briefly discussed in the following subchapters.

In its broader sense (*lato sensu*), a makerspace is defined as a physical location where people come together to co-create, share resources and knowledge, work on projects, network, and build. The activity within makerspaces promotes the development of high-end technology skills necessary for prosperity and social mobility [10].

Makerspaces *lato sensu* encompass fab labs, hackerspaces, and open worklabs, providing materials and tools to encourage individuals or groups to work and innovate [7, 27, 47]. Mersand ([27], 175) rightly pointed out that in a makerspace, individuals and groups can engage in multiple activities within the same space, work with components from different projects, and benefit from cross-pollination of ideas.

Makerspaces *stricto sensu* are open access, community-driven workshops that offer a diverse range of tools and equipment to support various making activities. These spaces enable individuals to embrace a DIY lifestyle [15].

2.5 Fabrication Laboratories (Fab Labs)

The concept of fabrication laboratories, or fab labs, originated from the Fab Lab program at the Massachusetts Institute of Technology's Center for Bits and Atoms,

with the first fab lab opening in 2005. The goal was to connect digital representation (bits) with physical fabrication (atoms) [18].

According to the Fab Foundation, a Fab Lab, or a digital fabrication laboratory, is a space for playing, creating, learning, mentoring, and inventing. It serves as a place for both learning and innovation [16]. In our understanding, Fab Labs, also known as digital fabrication laboratories or fabrication laboratories, are a specific subtype of makerspaces *lato sensu* that were established and funded by universities (such as the MIT Media Lab) or private corporations (like former Techshop). Both types of Fab Labs are equipped with similar, often pre-defined machinery, designed primarily for scientific activities, K-12 education, or innovative production. The primary objective of both educational and private Fab Labs is to provide hardware and software for innovative creation, often focusing on prototyping, and to facilitate global collaboration in the field of digital manufacturing. Fab Labs place a significant emphasis on digital production and technologies, and they operate within an international network of laboratories coordinated by the Fab Foundation. These characteristics distinguish them from makerspaces *stricto sensu*.

Fab Labs operating within the Fab Foundation network adhere to guiding principles and specific space requirements outlined in the Fab Charter. Like other NeWSps, Fab Labs connect local resources to global networks by linking local professionals, engineers, researchers, and students with international laboratories and groups of individuals who share practices and attitudes [51]. In summary, anyone interested in establishing a Fab Lab must meet four requirements: providing public access (usually after training or orientation sessions to ensure safe and effective operation of specific equipment), supporting and subscribing to the Fab Charter, sharing a standard set of tools and processes, and participating in the larger global Fab Lab network. There are currently 1,750 Fab Labs spread across 100 countries worldwide that meet these requirements [16].

2.6 *Open Worklabs*

Open worklabs emerged as niches for tinkering, repairing, fixing, and testing since 2000. Worklabs have always been relevant components in small enterprises, private households, or craftsmanship since the nineteenth century. Open worklabs received wider recognition as separate functional elements in the debate on new work and on the debate on consumer options to individually contribute to sustainability. While the first addresses questions of emancipation and new competencies in the change of digital and analog working skills, the latter addresses critical questions on consumer behavior, prolongation of the lifespan of goods (clothes, mobilities, furniture, but also technical items in households).

We define open worklabs as carefully arranged places of various technical and mechanic infrastructures as well as places of competencies of likeminded people that are driven to offer the expertise to others and to onboard interest people to learn how to fix, to build, to repair, to prototype personal items in open source practices.

Further attempts to define the term ‘open worklabs’ roughly relate to alternative ways of life and informal modes of production [38, 41], occasionally addressing them as a home for tinkerers or a pastime for the like-minded. Being a collective term for various open projects and initiatives, the only consistent definition so far has been delivered by the Verbund Offener Werkstätten (VOW) (German for “Association of open worklabs”):

“Open worklabs are at the disposal of all those who want to be active in self-organized crafts or arts. Frequently, open worklabs emerge out of private initiative, sometimes they are part of cultural, citizens’ or youth centers, more rarely of companies. While some command experience of several decades, others are still under construction” [48].

Accordingly, open worklabs are engaged in the open-ended development of self-organized work. This nevertheless requires knowledge, tools, materials, machinery, and spaces. Open worklabs are therefore “*places of opportunity for many, not of business for few. They offer the necessary space and a productive infrastructure for self-initiative and independent work*” [48]. The VOW emphasizes maximum openness (for all and everyone) and collective non-profit attitudes (i.e., no material profit-orientation). The strong commitment to an open source, open access culture distances this type of new working space from other commercial oriented new working spaces. As a clear political statement toward capitalistic consumption behaviors, open worklabs foster the prolongation of the lifespan of individual items, the recycling of existing goods, and the transformation of unused or misused goods for the purpose of producing new everyday items.

The strong commitment toward “openness” is reflected in the support for open access, the open source culture (also in software terms), and the adaptability of individually owned items.

Open worklabs comprise highly innovative and diverse elements such as “prototyping technologies, 3D printing, screen printing, traditional crafts, bicycle repairing, and others” ([23]: 96). Like fabrication laboratories, open worklabs are set up to test, experiment and integrate various technologies and solutions. ([19]: 35–36) identified common features that include:

- Real physical places, where people can come and work on, and contribute to collaborative projects in person.
- Blurred organizational borders between professional, semiprofessional, and non-professional ways to co-create and innovate. It indicates that open worklabs welcome both amateurs and professionals.
- Existence of intrinsic positive motivation of open worklabs members to create projects within a community formed around the worklab.
- Promotion of collaborative relations and common accountability based on mutual trust among members.
- Focus on independence and autonomy of open worklabs; that is, they should be self-sustaining entities not belonging to a specific company or governmental body.

- Community-driven functioning. Such places are indeed independent, but they are never standalone entities. Every worklab is connected to a community and network of other worklabs of a similar type.

The objects processed vary between low-tech and high-tech apparatuses, ranging from repairing bikes and trousers to toasters and computers. The practical topics and activities of open worklabs span from traditional craftsmanship to technologically advanced, innovative fabrication techniques such as 3D printing. In addition to various technological specializations (3D printing, laser cutting, wood processing, metal processing, repair of bicycles, production of clothing, etc.), there are important differences in “business” models and organizational forms. The spectrum comprises informally organized neighborhood groups, non-profit organizations, and commercial companies.

2.7 *Hackerspaces*

The origin of hackerspaces can be traced back to the hacker ethos that emerged in the 1960s within the university context of the Massachusetts Institute of Technology (MIT) [24]. The concept further developed in Berlin, Germany, with the founding, in 1995, of C-Base, the world’s first hackerspace [39, 42]. Initially, hackerspaces were created for the community of computer programmers, commonly known as “hackers,” as spaces for collaboration in code writing and testing, as well as for cooperative learning.

Kostakis et al. ([22], p. 3) define hackerspaces and their management styles as “physical, community-led places where individuals, immersed in a hacker ethic, regularly engage in meaningful, creative projects.” The term “hacker ethic” refers to a problem-solving and creative approach that leads to innovative works. Hackerspaces are community-led physical locations that provide a space for individuals with interests in information and communication technologies (ICT) and digital technologies [11]. Unlike Fab Labs, although some hackerspaces may follow similar norms and designs, many hackerspaces do not conform to specific standards [11]. They exhibit diverse practices, and their users are free to work on projects of their choice. The central idea behind the rise of hackerspaces is their community orientation, as they are operated by communities of individuals with shared interests in specific technologies and a common motivation to hack objects and codes.

In a narrower European understanding, hackerspaces differ from makerspaces in that the latter primarily involve the use of machines and tools, while hackerspaces focus more on software [8]. Hackerspaces also differ from other types of makerspaces in terms of their user profiles, which often include activists and exhibit a relatively strong counter-systemic reaction.

3 Conclusion

The analysis of NeWSps typologies and approaches has led to the development of a taxonomy for localized collaborative spaces, which are sometimes referred to as open creative labs or creative hubs in a broader context [3, 43]. This taxonomy aims to be relatively exhaustive, as shown in Figs. 1 and 2. However, it is important to note that there can be overlaps between different types of NeWSps due to the challenges in delineating clear boundaries based on user needs. Both the “do it together” and “do it yourself” approaches coexist within NeWSps. Furthermore, there is an increasing trend of spatial-functional hybridization in these spaces [12, 45, 46], where multiple types of NeWSps are often combined. For example, collaborative spaces and makerspaces may coexist within the same facility. Hybrid workspaces offer stronger resilience toward changing external conditions, so the spatial-functional hybridization should be further studied in order to distinguish the most common hybrid subtypes of NeWSps.

In this chapter, we aimed to explore six types of NeWSps and among them, two comprehensive and overarching types are makerspaces and creative hubs. To provide clarity, we introduced their broader understanding (*lato sensu*) and their narrower interpretation (*stricto sensu*). However, given the extensive variety of makerspaces in the broader sense, there is a need for a comprehensive taxonomy that delves deeper into categorizing makerspaces and other technical spaces. Additionally, further research should focus on examining the extent to which makerspaces in the broader sense facilitate opportunities for collaborative work and adhere to the “do it together” approach.

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