# Makerspaces
## Third places for a sustainable (post-growth) society?

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## 1. Introduction

For several years there has been discussion of the significance of so-called 'third places' for a sustainable and future-oriented society. The currently much-discussed open workshops or makerspaces are third places of this kind (e.g. Lange 2017). Although a theoretical debate on the importance of third spaces and third places has been ongoing for decades in social sciences, makerspaces are a relatively new phenomenon. Such cooperation between people in collectively used places is particularly interesting and is discussed in the post-growth debate as a hopeful symbol of urgently needed social transformation towards sustainability (e.g. Simons/Petschow/Peuckert 2016, Smith/Light 2017).

By questioning the classical relationship between production and consumption, makerspaces provide important stimuli in all three dimensions of sustainable development and are thus considered as a positive vision of a new industrial DIY/DIT revolution (DIY = Do-it-yourself, DIT = Do-it-together) (Gershenfeld 2005). Taking the transformative potentials of third places as a starting point, we argue that makerspaces are catalysts for more sustainability, especially with regard to their social functions. This is because they (can) contribute towards consolidating a culture of making and thus to implementing a post-growth society. We begin the discussion by considering what third places actually are and how they contribute towards a sustainability transformation. Attention then turns to the specific phenomenon of makerspaces, considering their potentials as third places in the post-growth context. The article closes with a conclusion and prospects for further research.

## 2. Third places and sustainable development

The terms 'third space' and 'third place' can be traced back to debates in and on cultural and social theory. Important authors are Ray Oldenburg (1989), Homi K. Bhabha (1994) and Edward W. Soja ([1996] 2007). Third spaces and places have received much attention within post-colonial studies (Struve 2017: 227) and have also been discussed in geographical research. This article draws on the various concepts and then applies them to makerspaces in the context of post-growth.

### 2.1 From 'third space' to 'third place' – theoretical approaches

Third space is concerned with the interaction of culture, identity, space and power relations. Drawing on postmodern definitions of space as the articulation of social power relations (Massey 1994: 120), Bhabha proposes reading spatial identities and individuals' movements in space as the result of history, hybridity and hierarchy. Bhabha conceptualizes third space at the interface between the representation of space and representational space, which is where change emerges (Elmborg 2011: 342 ff.). In terms of the transformational power of cultural difference, 'third space is the space of potentially meaningful contact between cultures and people' (ibid.: 344) and thus a kind of space of possibilities that emerge from cultural exchange between people (Struve 2017: 226). Edward W. Soja ([1996] 2007) refers further to the difference between third space as opposed to first space and second space. While first space is understood as a 'real' space, limited by the built environment, and second space is the space that is perceived and negotiated in discourse, third space refers to the combination of the two (Soja [1996] 2007: 56f.). This understanding views third space as being characterised primarily by hybridity and openness (Austen 2014: 49).

The spatial theory conceptions of Bhabha and Soja are characterised by a high degree of abstraction (Struve 2017: 228) and do not provide a tangible basis for the analysis of concrete places and their potentials. However, since the late 1980s numerous authors have tackled the issue of transferring these concepts and applied third place concepts to everyday places like cafes, kiosks, neighbourhood centres or libraries (e.g. Elmborg 2011, Peterson 2019). One of the first who conceived of third place as a public place was the urban sociologist Ray Oldenburg (1989: 20 ff.) . From his perspective, transforma-

tion can only emerge in a public place that is outside the home (first place) and place of work (second place), as encounters between strangers on neutral ground can only occur in a place to which nobody has personal ties (ibid.: 26). There must also be low thresholds for participating in interaction processes. People's social status should not play a role, or at least plays much less of a role than in other places. The precondition for encounters between different people is that the place is open and freely accessible (Sleeman 2012: 37). This includes ensuring that the atmosphere is inviting and fulfils the needs of users, but standards should nonetheless be simple (function before appearance). In addition to openness towards new participants, communication is seen as decisive for setting things in motion and managing change. The design of third places therefore needs to focus on community and enable collaborative work. The conversational atmosphere should not be tense but needs to be playful and conspirative, giving the individual a feeling of warmth and belonging to the group. This can be further underlined by regular joint activities and events (ibid.). Before our attention turns to how these conditions are fulfilled in makerspaces, we discuss the extent to which third places are relevant from the perspective of sustainability.

## 2.2 Third places and their role in sustainability transition

Since at least the 1970s, critiques of growth have been an established part of scientific debate. At the beginning of the 2020s, these critiques are often thought of under the heading of 'sustainability', a term which is used extremely vaguely and is linked to numerous different concepts (Pufé 2018: 93). Drawing on the concept of the sustainability triangle (ibid.: 112 f.), we do not consider the three dimensions of sustainability (ecological, social and economic dimensions) as pillars standing next to one another but as an integrative 'common whole' (ibid.: 113, translated from German). This approach to sustainable development can also be applied to third places.

If we consider the global sustainability goals (SDGs) developed by the United Nations (UN 2015) and the sustainability principles as summarised by Pufé (2018: 116), it can be seen that third places offer a whole series of starting points for a sustainability transformation. As meeting places they enable encounters and networking between people of different age groups (principle of intergenerational justice) and between those of different origin, gender, religion and social status (principle of intragenerational justice) (ibid.). As they are

generally intended as long-term structures, they support the creation of inclusive and resilient social and cultural infrastructures in towns and cities (SDG 11) – also in line with the sustainability principle 'think global, act local' (Pufé 2018: 116). Thanks to the opening up and pooling of cultural offerings, education and encounters, third places are 'anchor points for cultural diversity and a cultural contribution towards strengthening social cohesion, creating equivalent living conditions and strengthening identity' (MKW NRW 2019, translated from German). In the long run, they contribute to the promotion of psychosocial well-being (SDG 3) and lifelong learning (SDG 4) and support the transformation of processes of production and consumption from a growth-based economy towards a socio-ecological economy focused on the common good (SDG 8).

Third places are primarily relevant for meeting social sustainability goals, although there are complex interactions with other dimensions (Bauriedl 2008: 33). In the following, the example of makerspaces is used to explore how third places function and contribute towards a social transformation to (more) sustainability.

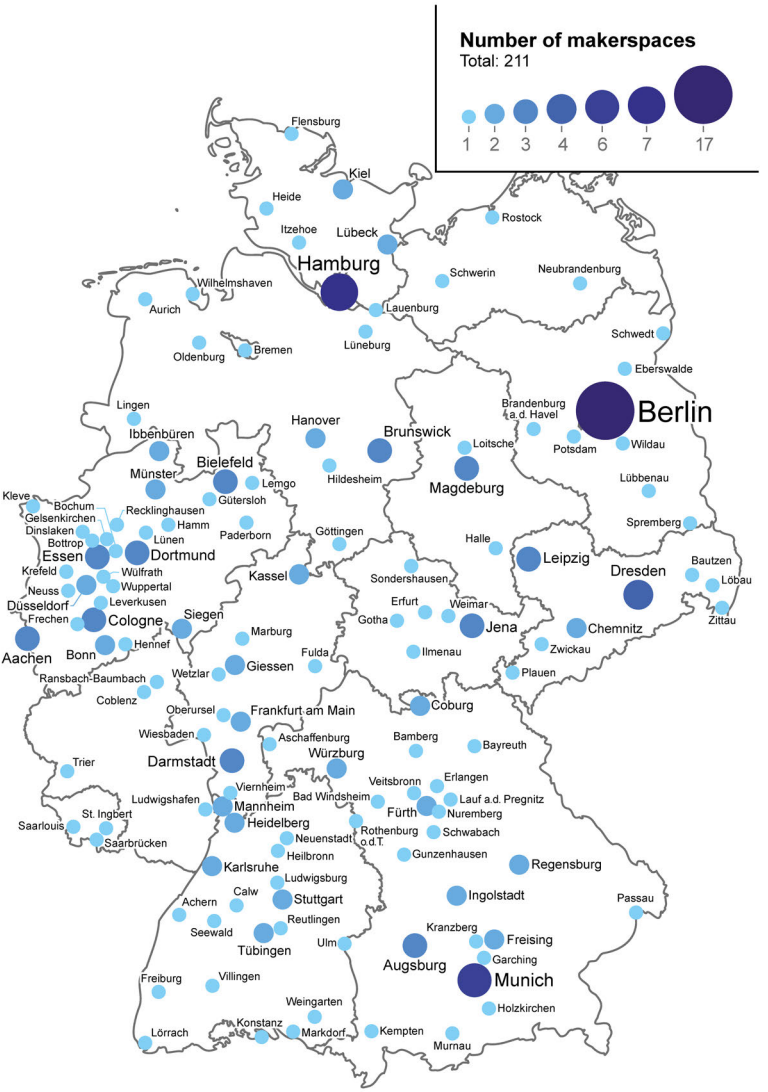
## 3. Makerspaces as third places of the post-growth society

In order to understand why makerspaces can be understood as third places, they are initially described in brief. Subsequently, their potential as infrastructure for a sustainability transformation is critically discussed in the context of post-growth discourses.

### 3.1 High-tech workshops for everyone: Development, organisation and examples

Debates held in the 1980s and 1990s about the predicted end of mass production and the increasing flexibilisation of industrial production (Piore/Sabel 1985) have been spurred on since the turn of the millennium by radically new digital and networked production and additive manufacturing technologies. This is the context in which authors like Gershenfeld (2005, 2012) and Anderson (2012) developed a positive vision of a new industrial DIY/DIT revolution, in which the relationship between production and consumption is renegotiated through cooperation between people using shared production facilities.

*Figure 1: Map of makerspaces in Germany*




Source: the authors (data research: Matti Kurzeja; graphics: Irene Johannsen)

In the international literature, makerspaces are variously referred to, for instance as 'community-based fabrication workshops' (Hielscher/Smith 2014). In German-speaking countries the term *Makerspace* describes open

workshops with digital infrastructure that are dedicated to 'collaborative (digital) production in publicly accessible spaces' (Simons/Petschow/Peuckert 2016: 29, translated from German). It thus acts as an umbrella term for various manifestations of workshops (Smith 2017: 6) that make available tools and technologies which were originally confined to the sphere of industrial production (Gershenfeld 2012: 44). Makerspaces are a global phenomenon and are growing in number: in 2006 there were only a few dozen, by 2016 almost 1400 (Browder/Aldrich/Bradley 2019: 461). In Germany alone there are now over 200 makerspaces spread across the whole country, although primarily in the larger cities (Figure 1).

The origins of today's maker movement (Anderson 2012, Hatch 2013) can be traced back to the hacker community of the late twentieth century, who worked collaboratively on software and hardware in so-called hackerspaces (Cavalcanti 2013a). Indeed, some makerspaces call themselves hackerspaces, drawing on the hacker movement, although this is not an established term, unlike that of fab labs (fabrication laboratories), a concept initiated in 2001 by Neil Gershenfeld from MIT which also had considerable influence on the maker movement and serves as a point of reference for many makerspaces (Gershenfeld 2005). The magazine *Make*, in existence since 2005, and 'maker faires', festivals where makers can present their projects and creations, have further encouraged the emergence of places worldwide that are dedicated to collaborative digital production in facilities open to the public (Burke 2014: 11). The maker movement differs from previous open workshop movements, DIY movements and independent work initiatives in two ways. First, the available technologies and open hardware concepts enable participants to develop their own new technologies. Second, social-media platforms allow intensive forms of cooperation over large distances, based on digital collaboration (Smith 2017: 7).

### 'DingFabrik' Cologne

The '*DingFabrik*' ('ThingFactory') founded in 2010 in Cologne describes itself as a 'combination of open workshop, hackerspace and fab lab'. It is organised as a non-profit association and run by about 120 association members (as of mid-2019). The DIY principle characterises its offerings, such as workshops and information sessions, and it is a grassroots democratic organisation with regular plenums where all important decisions are discussed. Both the operations and the premises are largely financed by membership fees. The premises house a store for materials and areas for woodwork, metalworking, screen printing, sewing and bicycle repairs, but also facilities for working with hardware and software and computer-based maker tools like a laser cutter, 3-D printer and a CNC milling machine. There are courses to learn how to use specific tools, lectures, working groups and projects that explicitly focus on the sustainable use of resources and offer corresponding 'help to self-help' (e.g. repair cafes). The weekly crafting afternoon is perfect for getting an idea of the place. What happens in the '*DingFabrik*' is just as diverse as the raw materials and tools used: from bicycle repairs to making furniture and musical instruments to the development and construction of complex technical equipment like CNC-milling machines or laser cutters. The '*DingFabrik*' is thus an example of a makerspace initiated and run by civil-society actors.
Further information at: https://dingfabrik.de/

### A makerspace at the urban district library of Cologne-Kalk

The library of the urban district Kalk is run by the city of Cologne and was comprehensively renovated in 2018. Since then, it has a making room, with finance provided by a fund for neighbourhoods with special development needs. The library was designed with the aim of creating a non-commercial place for cultural interaction, experimentation, tinkering and participation. The design process included the architects and the library team but also involved the active participation of residents of Kalk. Based on the concept of an 'open library', the premises can be used without staff support during the opening hours of the district town hall. Visitors identify themselves with their library cards at the entry panel

and can use the place independently. The makerspace is located on the ground floor and in close vicinity to the library itself with its communal areas to spend time in and a comprehensive collection of media. It provides a 3-D printer, educational robots, laptops, tablets, soldering equipment and corresponding self-help literature. Every week tools and techniques are explained in workshops to anyone interested. In addition to courses for learning to use 3-D printers, there are courses on programming and building electric circuits, on robot control systems and on single-board computers. It is also possible for individuals to hold their own courses in open hours for 'Kalk's makers'. Another part of the Kalk makerspace concept is the 'Maker Mobil', a cargo bike that can be used flexibly for events in the city and promotes the makerspace among the general public. Through its integration in the urban district library, the Kalk makerspace illustrates how state actors, especially public libraries and museums, are embracing the DIY movement and the concept of third places, thus finding ways to embrace digitisation and the resulting social change (Rasmussen 2016: 547, Braybrooke 2018: 41).
Further information at: https://www.stadt-koeln.de/artikel/04943/index.html

Among those running the makerspaces are associations, which have often emerged from local (grassroots) initiatives (see the example in Box 1), but also research institutes, universities, schools, public libraries (see the example in Box 2) and even businesses. The focus and facilities provided by the workshops are correspondingly varied: from spaces for learning to empowering places of DIY production to state-funded 'innovation laboratories'; from voluntary, grassroots democratic organisations to classical enterprise hierarchies. Makerspaces are often financed by membership fees but also by donations, public funds, sponsoring or proceeds from events (Cavalcanti 2013b). Despite these different forms of organisation, makerspaces can be regarded as third places, especially due to the low-threshold access to (digital) production equipment and the particular significance of community, as the two case studies from Cologne illustrate.

## 3.2 Makerspaces as infrastructure for transformation?

In the context of sustainability and post-growth debates, makerspaces are exciting because they provide spaces and opportunity structures for alternative and potentially transformative economic practices. Even if they lead something of a niche existence within society as a whole, they point to paths towards a sustainable post-growth economy (e.g. Lange 2017: 40). Smith (2017) suggests that activities in makerspaces facilitate participation, openness and community and can generate transformative social innovations. In their capacity as third places, makerspaces are a kind of technical and social infrastructure for a socio-ecological sustainability transformation. By promoting a culture of repairing and upcycling (for instance in repair cafes), they enable digital, decentralised production and can, thanks to extended product lifecycles and closed material cycles, contribute to a reduction of resource consumption and CO2 emissions (Smith/Light 2017:164).

## 3.3 Open access to resources as a basis for encounter and interaction

For third places to emerge as places of social participation they must have a low threshold of access. Although practices vary between makerspaces[1], it is this 'open access for the broad public' (Simons/Petschow/Peuckert 2016: 29, translated from German) that defines them as 'community-oriented spaces' (Smith/Hielscher/Dickel et al. 2013: 4). In addition to access to material resources like tools, they provide access to non-material resources, especially knowledge. With the growing importance of access to technology and its use for social participation (Ringwald/Schneider/Cagan 2019), makerspaces carry out groundwork in a rapidly changing technology landscape. There are diverse opportunities for participation ranging from attending workshops to membership to designing your own offerings. As the example of the '*DingFabrik*' in Cologne clearly demonstrates, makerspaces are in many cases established and run by their users. Makerspaces in public institutions, like in the urban district library of Cologne-Kalk, are more closely managed

1 In line with their settings, there are periods for selectively public processes in most makerspaces (e.g. for members, university students, school students, etc.), which temporarily limit access.

but here users are also increasingly involved in the design of premises and offerings (Rasmussen 2016: 547).

Access to resources often involves collective forms of property. Due to the collaborative organisation of production, several authors discuss makerspaces as a version of 'commons-based peer production' (Kostakis/Niaros/Giotitsas 2015). However, there are examples of makerspaces with a commercial, hierarchical form of organisation (e.g. the business TUM MakerSpace GmbH near Munich), and even in non-commercial, association-based makerspaces the process of communalisation can be limited, for instance when working with consumable materials (Seravalli 2014). At the same time, however, the production practices based on open-source software and hardware make it possible to avoid many of the exclusions that are characteristic of classical concepts of property. Furthermore, the vast majority of makerspaces in Germany are run as associations or public corporations and do not have a direct profit orientation.

## 3.4 Lifelong learning through and with community

Makerspaces offer their users 'neutral ground' where they can realise individual and collaborative projects within a community. Surveys reveal that community is a decisive factor here: in addition to the production of objects and software-hacking, social aspects and learning have been identified as central reasons for participation (e.g. Moilanen 2012). There is continuous interaction between collaboration, mutual teaching, learning by making and the finished products. Makerspaces in general – not just the ones in public libraries – thus become places of informal education and demonstrate the strong link between social capital and lifelong learning (Ferguson 2012: 26). While the concrete culture of community is shaped in diverse ways, important principles are captured by the headings of the 'Maker Movement Manifest' by Hatch (2013): 'make', 'share', 'give', 'learn', 'tool up', 'play', 'participate', 'support' and 'change'.

A particularly important aspect of the community in makerspaces is its playful and conspirative character: 'Play, fun, and interest are at the heart of making' (Martin 2015: 35). The movement is characterised by a positive culture of failure which understands experimentation and tinkering as new impulses for learning, so that in the end skills are acquired and goals reached (ibid.). As informal places of education, makerspaces offer their users an

opportunity structure for empowered, voluntary and informal (adult) learning processes (Schön/Ebner/Grandl 2019). There is furthermore potential for their use in formal educational institutions like schools and universities (Barrett/Pizzico/Levy et al. 2015, Martin 2015), as is already the case in Cologne-Kalk, where the Maker Mobil is used for school events (see Box 2). In any case, in and through makerspaces, users are becoming prosumers; they can acquire and share knowledge, and develop and experiment with sustainability innovations at a local level. They thus provide ideas and approaches for a post-growth society.

## 3.5 Critical reflection on the post-growth potential of makerspaces

Use of the term 'makerspaces', like that of 'third places', has become almost inflationary and tends to be applied to a diffuse space of possibility. Peterson (2019: 35) argues nonetheless that it is important not to abstract encounters in such places from their historical, political and geographical contexts. Rather, they do not exist outside of social power relations, which are materialised in such places and impact on the individuals involved (Berlant 2016: 395). It is therefore necessary to investigate concrete examples to establish the extent to which makerspaces in practice fulfil expectations and which exclusions they (re)produce.

In terms of the ecological effects of makerspaces, Hielscher and Smith (2014: 44), for instance, emphasise that positive ecological evaluations of 'grassroot digital fabrication' remain speculative because the relevant effects depend on which materials are used for production. It is rather the case that a whole range of conditions must be met if the decentralised and individualised production in makerspaces is to be described as ecologically sustainable (Petschow/Ferdinand/Dickel et al. 2014, Olson 2013). Similarly, not all makerspaces are characterised by the radical break with capitalist growth logics that post-growth approaches demand (Schmid 2019: 3). Indeed, there are diverse and increasing interactions between makerspaces and processes of capitalist exploitation (Morozov 2014). For example, in the RepRap project the idea of a freely available and easily replicable 3-D printer ended up as a commercial and very profitable product (Söderberg 2013). This example indicates the problems caused by commercial and political actors (for instance state institutions in China and the USA) who support 'making' as a way to promote economic growth and innovations (Morozov 2014). At this point,

logics of commercial exploitation and growth collide and compete with the self-image of many makerspaces as collective economic spaces for independent making and as alternatives to a consumer and throwaway society. The claim that makerspaces are places of low-threshold access should also be critically examined. The costs for machines, premises, insurance, etc. can be considerable (Cavalcanti 2013b), which, for instance, means that members of the '*DingFabrik*' pay a minimum monthly fee of 23 euros (17 euros for low-income groups). Many makerspaces have voluntary or progressive (solidarity) fees, demonstrating the efforts made to promote inclusivity and broad social participation, but in practice people with low incomes are unlikely to feel addressed by the initiatives in the first place. Finally, in a number of cases the ongoing commercialisation of makerspaces runs counter to any logic of inclusion (Hielscher/Smith 2014: 49).

The divergence between aspiration and reality is revealed by a glance at the users of makerspaces, who are not representative of society as a whole, but are more often than average white, male and well-educated (Make 2012). Several initiatives have attempted to tackle this problem by focusing on traditionally underrepresented groups. In this vein, special makerspaces offer socially marginalised groups like people of colour ('Liberating Ourselves Locally' in Oakland) or people with disabilities ('Selfmade' in Dortmund) access to the making culture in a protected space. However, such places, and explicitly feminist makerspaces (e.g. the 'Mz* Baltazar's Lab' in Vienna), do not follow the concept of an openly accessible third place but rather the concept of a safe space 'in which boundaries offer both safety and a platform for political resistance' (Toupin 2014: 7).

## 4. Conclusion and prospects

The notion that, as third places, makerspaces can provide impetus for sustainable development in the sense of post-growth must be critically assessed, particularly in light of the increasing capitalist exploitation of such spaces. Sustainability, equitable participation, empowerment and a democratisation of production are not necessarily inherent to makerspaces. Nonetheless, as collaboratively used, participative places, they bring people into contact with one another and with technology. They thus offer diverse points of departure for post-growth discourses and relate to all three dimensions of

sustainable development (ecological, social, economic). Particularly on the social level, they promote collective learning processes and are important places of encounter where digital participation can be experienced, and they can therefore contribute towards achieving social sustainability goals. Makerspaces are thus starting points for, and the result of, transformation processes, as well as catalysts and opportunity spaces for testing and developing transformative practices.

Nevertheless, makerspaces are embedded in existing social power relations and produce their own exclusions. The growing interest of commercial actors is associated with the threat of commercial appropriation, which constrains the transformative power of makerspaces. Simultaneously, the concept of makerspaces as third places is being increasingly seized upon by municipal actors involved in urban development (policies). From a geographical perspective, it is particularly exciting to observe the extent to which such places (can) challenge hierarchical management styles (Braybrooke 2018: 43) and how their participative structures and processes (can) develop and realise into new governance styles and forms, e.g. in urban development.

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