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## Hybrid cities and new working spaces – The case of Oslo

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## ABSTRACT

Recent decades have seen the emergence of hybrid models of living and working associated typologies. These developments have been analysed from the perspective of different disciplines, each with their own interpretation of this phenomenon. Planning and architecture have addressed hybridization as a specific form of interaction between spatio-functional features (such as mixed use, multi-functionality and flexibility) and social features (such as formal and informal interactions and the spontaneous appropriation of spaces) or have sometimes simply focused on the spatio-functional dimension in urban spaces. Studies from other disciplines (e. g. mobility networks, transportation, sociology and information technology) have shown that hybrid spaces cannot exist without access to digitalization technologies. Such technologies are accelerating hybridization processes. This study examines the complex and layered phenomenon of hybridization as a possible combination of (or interaction between) spatio-functional, social and digital features within the planning debate and related fields. Most of the case studies explored by scholars so far have focused on interactions occurring between residential, social and recreational functions, but working functions are playing an increasingly important role. Furthermore, the COVID-19 pandemic has accelerated the development of new forms of hybridity in cities. As a consequence, the rising use of hybrid (on-site and on-line) working practices, planners, policy makers and stakeholders, as well as scholars, have increasingly discussed the concept of hybridization. In this context, various hybrid typologies of urban spaces have materialized in forms such as new working spaces (NWS) which include co-working spaces, incubators, as well as some cafés and multi-functional public libraries, which have recently provided working spaces. This paper focuses on the evolving concept of hybridity from the planning perspective. Based on five hybrid NWS including their surrounding neighbourhoods in Oslo, it provides empirical evidence for an understanding of the phenomenon that may support the development of hybrid spaces and buildings and develops suggestions for planning strategies.

## 1. Introduction

In the on-going processes of globalization and neoliberalism, the emergence of new hybrid models of living and working has been noted, as well as new spatial and functional organization within our cities (Cho et al., 2016). Hybridity (or hybridization) has been explored from the perspective of different disciplines, such as sociology, mobility, entrepreneurial and organizational studies, information technology, as well as urban planning and architecture. Thus, there are varied interpretations of this phenomenon.

In the fields of urban planning and architecture, hybridization is viewed mainly as the combination of spatio-functional and social interactions in buildings and urban spaces (Cho et al., 2016, 2017; Migliore et al., 2021), or even simply the spatio-functional dimension. To this end, hybridity is often associated with mixed use, flexibility and multi-functionality (Leclercq and Pojani, 2020). Furthermore, empirical cases used for exploring the notion of hybridity tend to focus on spatial interactions between residential, social and recreational functions (Krasilnikova & Klimov, 2020), whereas working functions have hardly been explored.

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The debate among scholars covers various aspects which contribute to the hybridization process. Some experts are of the view that hybridity cannot exist without access to digital technologies; in other words, the technology is currently accelerating the process of hybridization. To be precise, spaces can be called hybrid when various socio-spatial connections occur therein, thus enabling the merging of the physical and digital (Volpi & Opromolla, 2017; Houghton et al., 2015; Bazzanella, 2014; de Souza and Silva, 2006). Hybrid spaces enable the mediation of socio-spatial relationships, particularly as a result of the further development and use of mobile technologies (Krasilnikova & Klimov, 2020). Nevertheless, interactions in hybrid spaces remain related to the location: “We still have to physically be somewhere even if it is remote from the person we are communicating with, but it is more complex and layered” (Willis & Aurigi, 2011, p.100). In this context, the digital dimension should be further explored as a component that can affect the use of urban spaces (and new functions) in our city neighborhoods.

During the Covid-19 pandemic, the term ‘hybrid’ became increasingly used by official planners, policy makers and stakeholders. This debate around hybrid city spaces and buildings has also gained greater attention in relation to the hybrid work revolution in several cities around the world, such as Helsinki, Montreal, Johannesburg, London, Milan, Amsterdam and many others. Nonetheless, evidence from this debate seems to appear mainly on social media and local debate; thus, we found it interesting to explore further in this study the emerging policy debate about the *hybrid city*, particularly in the city of Oslo (see Section 5).

The phenomenon of hybridization has been studied at the level of neighborhoods and urban spaces (Krasilnikova & Klimov, 2020; Castells, 2011; Paay et al., 2007), workplaces (Halford, 2005; Vartiainen & Hyrkkänen, 2010), as well as hybrid New Working Spaces (NWS) (such as coworking spaces, incubators, coffee shops and public libraries) (Foth et al., 2020; Bilandzic et al., 2018; Waters-Lynch, 2016; Bilandzic & Foth, 2013). However, there are several aspects about this phenomenon, both theoretical and empirical, that must be further investigated in terms of urban planning and related fields. This paper considers interaction among the spatio-functional, social and digital dimensions.

In this study, we use the term New Working Spaces (NWS) that encompasses a wide variety of flexible spaces for working (Di Marino et al., 2021; Akhavan et al., 2021; Mariotti et al., 2017). Digital work hubs or coworking spaces are environments that can be used as formal or informal spaces for work (Mengi & Bilandzic, 2020). They are often co-located with coffee shops, incubators, makerspaces, FabLabs, and public libraries (Di Marino et al., 2018; Houghton et al., 2018; Bilandzic & Foth, 2013). These spaces support interactions among workers from various professions and industries, production of new knowledge, and growth of personal networks (Houghton et al., 2018). They can be “close to home and yet away from home-based distractions” (Houghton et al., 2018, p. 758). Moreover, these varied spaces are associated with flexible workers, such as nomadic workers, mobile workers, itinerant workers, digital immigrants and digital natives (Czarniawska, 2014; Humphry, 2014). For example, nomadic workers travel long distances, work while in transit wherever they happen to be, in temporary workplaces (moving from one place to another), and with integrated technology platforms (Ciolfi and de Carvalho 2014; Zenkteleer et al., 2022).

The term NWS provides a comprehensive picture of this growing phenomenon, referring to a broad spectrum of places and opportunities for workers. Today, workers seek multiple locations within cities (Nadler, 2016; Di Marino et al., 2018). One can increasingly find free and paid (or limited access) NWS in our cities (Houghton et al., 2018; Di Marino et al., 2021), and more recently, hybrid NWS have emerged (Bilandzic et al., 2018; Foth et al., 2020).

From the sociological perspective, hybrid spaces were originally conceptualized according to three distinct but overlapping trends: hybrid spaces as connected spaces, mobile spaces, and social spaces (Castells, 2001). Physical proximity and online connectivity have developed closer interactions. Online and off-line social interactions

have created hybrid patterns of sociability that may have extraordinary consequences for spatial structures and dynamics (Castells, 2001, 2011). Among planners and architects, hybrid spaces have often been recognized based on (but not limited to) their comfort, multi-functionality, and provision of services (Krasilnikova and Klimov, 2020).

More lately, discourses on hybridity have embedded the evolving forms and flexible places of NWS (Foth et al., 2020; Bilandzic & Foth, 2017; Migliore et al., 2021; Orel & Bennis, 2021; Waters-Lynch 2016; Brown, 2017). New forms of multi-functionality and flexibility are appearing in physical workspaces in which emerging socio-spatial interactions occur. These interactions have been increasingly driven by a high degree of digitalization, and this is also the case of some NWS which are becoming more hybrid than others.

Furthermore, the coronavirus pandemic has at least temporarily reconfigured city life and shaped our cities in significant ways (Banai, 2020). Due to the multi-use of private and public spaces for work, education, commerce, and leisure, the built environment has had to adapt to new users’ habits (Maturana et al., 2021). Without a doubt, the spread of COVID-19 has impacted every level and scale of planning and design: from the home and work environment to the public space, from residential neighborhoods to cities, and from urban regions to worldwide networks. This has involved individuals, communities, and organizations (Maturana et al., 2021). Furthermore, the accelerated adoption of working from home or other locations as a viable long-term approach to employment, has begun to influence the future of housing, infrastructure, public space, as well as institutional, office, and commercial buildings (Maturana et al., 2021).

It will certainly require some years to understand the effects of the pandemic on the accessibility, physical distancing, morphology, as well as the spatial dynamics of interaction and diffusion in our cities (Batty, 2021). Thus far, it has been the very polarized forms and the largest hubs (in both monocentric and polycentric cities) which have represented the highest densities of work and living functions, serviced by highly congested transport systems (Batty, 2021). Nevertheless, technology is helping us to re-think these hubs in different forms and designs as they may become innumerable and used at multiple times within the metropolitan networks (Batty, 2021). Indeed, people still avoid using crowded public transport and working in such concentrated poles. In this context, there are emerging questions in the built environment, such as the use of urban spaces and buildings. Moreover, standard urban planning tools, comprehensive plan, and zoning regulations are still limited and often disjoint these challenges (Banai, 2020).

Thus, the coronavirus pandemic has revealed the strengths and vulnerabilities of the urban system (Banai, 2020). The physical network has been deeply impacted by the COVID-19 pandemic. Due to global travel, global supply chains, and their creation of tight and frequent connections between people, the disease spread much faster than imagined compared to earlier epidemics (e.g., SARS and Ebola). Nevertheless, through the Internet, there has been an accelerated development of a large network consisting of thousands of nodes and links. This network has been structured around social, communication, and economic links (Batty, 2020).

It has also become evident that after more than two years of pandemic, there are knowledge workers who cannot or do not want to work from home for several reasons (van Sprang & Groen, 2021). For instance, people may feel exhausted being in the home-working environment due to distractions, such as young children creating background noise and family members performing other activities that would impact their concentration (Rahaman et al., 2020). Workers have recognized the impact of Zoom fatigue and wish to socialize by enjoying a cup of coffee with colleagues on-site rather than just online. In this context, there are also employees who have been increasingly working multi-locally (in multiple and flexible locations) (Reuske & Ekimsmyth, 2021, Di Marino et al., 2018). They have combined working from their first and/or second home with working in public libraries and coworking spaces, as well as by working a couple of days per week at the

office and by virtually coworking (Sinitiyina et al., 2022). There are also people working from hotels, which has resulted in new forms of hybrid hospitality, as well as mixed forms of co-living and coworking (van Sprang & Groen, 2021; Scullica & Elgani, 2019).

These emerging trends are more visible in contemporary cities, in which we see innovative and unconventional uses of urban spaces (Cho et al., 2016). Among them, some NWS are showing hybrid characteristics (based on the interaction between spatio-functional, social, and digital features) (Foth et al., 2020; Waters-Lynch, Potts, et al., 2016). Although these trends are being gradually discussed, an overview of the main discourses on hybridity is still lacking, not to mention a conceptual model that can be used to explore hybrid models of working as well as functional and spatial organizations (at the city level, neighborhood, urban spaces, workplaces, and NWS). Moreover, the understanding and combination of spatio-functional, social, and digital features that create NWS hybrids are not yet clear. In this context, there is a need for further knowledge on the variety of hybrid NWS and related characteristics of the place itself, including the surrounding neighborhoods (which can be mutually influenced), as well as the effects of COVID-19 on the hybridity of NWS.

In order to address these issues (mentioned above), the study examines the case of Oslo that, compared to other European cities, has recently addressed new policies and planning strategies for a hybrid city. The post-COVID 19 scenario has been recently portrayed by the Oslo Business region (a state agency of Oslo region). Several drivers are identified in the Oslo context. Amongst them, one can see the digital acceleration that has really been impacting the city and its region, which have both been adjusting to the current Corona virus. Moreover, the digitalization has been causing major lifestyle changes, which are very visible, such as working-from-home, and a lack of NWS in the peripheral neighborhoods, limited movements, fewer commutes, and less travel, as well as accelerating emerging new industries and as a lifeline for social cohesion (Oslo Business Region, 2021). Policymakers have recognized that the digital is no longer separated from other physical and social features of cities and regions. The digital drivers will further support remote working (which was already an established practice among Norwegians before the pandemic), thus influencing the city development and being part of a much wider hybrid future for Oslo. Oslo's future will depend on the degree to which the spatio-functional, social, and digital features can be successfully mixed among visitors, residents, investors, and entrepreneurs (Oslo Business Region, 2021). In addition, there is an ongoing planning debate among policymakers, official planners, and stakeholders on the importance of rendering the central areas more vital and livable after working hours (see Oslo Campus Strategies, in City of Oslo, 2020). The NWS, which are open from 7 to 24 h per day, may attract more people and businesses due to their greater flexibility than traditional offices.

The aim of the study is threefold: i) to examine characteristics of neighborhoods that may support the development of hybrid spaces; ii) to explore the hybridization of NWS; and iii) to identify the main impacts of the COVID-19 pandemic on hybrid NWS. By using the specific urban setting of Oslo as an analytical case, the study contributes to an understanding of the emerging links (and mutual overlaps) between neighborhoods and hybrid NWS and highlights the implications of hybridity for the built environment and planning.

A preliminary analysis (information from the database constructed by two of the four authors, and desk research) showed that some hybrid features (e.g., multi-functionality, variety of social interactions and digital activities and services) are co-located in five selected NWS (SoCentral, HerSpace, Mesh Youngstorget, 657 Oslo and Gamlebyen Loft). The five NWS are located in the three central districts (*bydeler*) of Oslo: Oslo Sentrum, St. Hanshaugen, and Gamle Oslo. Spatial analyses are used to examine the features that may increase opportunities for hybrid conditions in the three districts (e.g., degree of multi-functionality, accessibility and IT infrastructure). The cross-case analysis of the five NWS aims to highlight differences and similarities among

them. The sub-method of walking interviews (with the managers of the five NWS) includes participant observations (by three of the four authors of this paper). The outcomes contribute to exploring hybridity in the five NWS, and the mutual influences and overlaps among them and their neighborhoods. The findings of this study should expand the current planning debate on hybridity and engender wide discussions among architects and planners on the future of hybrid models of living and working, and hybrid urban typologies.

The paper is structured as follows. In Section 2, the current debate on hybridity is discussed, embracing the definitions and evolving concept of 'hybrid'. The focus is on the hybridization of cities, architecture and urban spaces; hybridization and the degree of publicness and privateness; new links between neighborhoods, digitalization, people, and workplaces; and the development of hybrid workplaces. Section 3 presents a conceptual model of hybridity, aimed at supporting understanding of this complex phenomenon and its relations with the city, the neighborhood, and the workplace itself. The interactions between the main spatio-functional, social, and digital features which can render our workplaces hybrid, are summarized in this section. Section 4 presents the research gaps and research questions. Section 5 goes on to introduce the case of Oslo (characteristics of the population, main planning strategies and policies of the city, overview of NWS, current trends on remote working, as well as an introduction to the selected NWS).

Section 6 presents the methods used in the study – spatial analyses, cross-case analysis of the five NWS, and walking interviews – as well as the data collection and data analysis methods. In Section 7, the paper discusses the conditions (such as accessibility, multi-functionality, digitalization, proximity to urban functions, and the degree of diversity) that support the development of hybrid spaces in the three selected districts of Oslo Sentrum, St. Hanshaugen and Gamle Oslo. Section 7 also reveals the most relevant outcomes on the hybridity of the five NWS in Oslo, including similarities and differences (based on the content analysis of manager interviews and data from participant observations, including diagrams and mapping of interiors), as well as the temporal dimensions in the five NWS, managers' perspective on hybridity, and impacts of COVID-19 on the five NWS. Section 8 discusses the theoretical and practical implications of this study. Finally, Section 9 concludes by highlighting the limitations of this study and future research paths and insights for planning practitioners. The structure of the paper is supplemented by the research structure presented in Table 1.

## 2. Literature review

Over recent decades, there have been several interpretations of hybridity, and within several disciplines (such as sociology, mobility, architecture and urban planning). A common understanding is that hybridity has originated from the fast changes in our cities, in terms of spaces and society, and increasing digitalization (Matern et al., 2020; Santos, 2022).

Scholars have increasingly discussed several drivers of hybrid urban environments. Our cities are experiencing rapid urban transformation due to densification of the population, intensive and diverse uses and users, increasing mobility, new and complex living conditions (Cho et al., 2016), and new ways in which work is organized. Moreover, there are ongoing technological advances, demographic changes, growth of empowered individuals, and emerging international networks of knowledge (Zenkteler et al., 2022). For example, the knowledge-based economy and technological advances have made our cities more appealing as co-location sites for entrepreneurs and businesses that can operate virtually, without the need for a physical venue (Zenkteler et al., 2022).

In terms of spatial changes, the reorganization and distribution of work are affecting the decentralization of urban functions (Zenkteler et al., 2022 referring to Shao, 2015). In addition, lifestyle preferences (for example, home/neighborhood-based workers, and other flexible

**Table 1**  
Research and paper structure.

Research structure	Overview of the sections and main themes	
<b>Background</b>	1 Introduction and objectives of the paper	
<b>Literature review</b>	2.1 Definitions and the evolving understanding of ‘hybrid’ 2.2 Hybridization of cities, architecture and urban spaces 2.3 Hybridity and the degree of publicness and privateness 2.4 Neighborhoods, digitalization, people and workplaces 2.5 Hybridization of workplaces 2.5.1 Hybridization of NWS 2.5.2 The impact of digitalization on the hybridization of NWS	
<b>Conceptual model</b>	3.1 Conceptual framework of hybridization (on the basis of the literature review) 3.2 Hybridization features (preliminary list of features to explore)	
<b>Research gaps and questions</b>	4.1 Research gaps and Research Questions: RQ1) What are the conditions of neighborhoods that support hybrid spaces? RQ2) How do we understand the hybridization of NWS? RQ3) How is the COVID-19 pandemic impacting hybrid NWS?	
<b>Research design</b>		
<b>Case of Oslo and five NWS</b>	5 The hybrid City of Oslo and NWS <i>The planning context and strategies</i> <i>Overview of NWS</i> <i>Remote working</i> 5.1 The five NWS in Oslo	Review of current planning and policy documents Based on data extracted from the database that was constructed by two of the four authors Review of current documents and statistics Data extracted from the database above and supplemented by desk research and info from managers
<b>Methods</b>	6.1 Spatial analyses of the three selected districts of Oslo Sentrum, St. Hanshaugen and Gamle Oslo 6.2. Cross-case analysis of the five NWS  6.2.1 Walking interviews in the five NWS (with the NWS managers including participant observations of the authors) 6.3. Data analysis 6.3.1 Qualitative content analysis of interviews 6.3.2 Data analysis of observations	Data collection and data analysis on the conditions which may create hybrid environments  This aims to identify the main hybrid features (see Table 2) of the five NWS (Table 7). This also supports the discussion about differences and similarities among the five NWS (Table 8) Qualitative data collection
<b>Research findings</b>	<i>To directly answer the RQs (RQ1, RQ2 and RQ3), the findings are presented as follows:</i> 7.1 Results from the spatial analyses of the neighborhoods 7.2 Results from the cross-case analysis of the five hybrid NWS 7.2.1 Surroundings, exteriors and interiors of buildings in the five NWS 7.2.2 Spatio-functional, social and digital features of the five NWS: similarities and differences 7.2.3 Spatio-functional features and interaction with the other two dimensions 7.2.4 Social features and interaction with the other two dimensions 7.2.5 Digital features and interaction with the other two dimensions 7.2.6 Temporal uses, spaces, presence and activities 7.2.7 Understanding of hybridization by the managers 7.2.8 Impacts of COVID-19 on the five NWS	
<b>Discussion</b>	8.1 Theoretical implications 8.2 Contribution to the current empirical studies 8.3 Practical implications in planning 8.3.1 Conditions for hybrid spaces 8.3.2 Role of managers of NWS in the hybridization processes 8.3.3 Mutual influences and interactions between hybrid NWS and neighborhoods (and beyond) 8.3.4 Lesson learnt	
<b>Conclusions</b>	9.1 Limitations of the study 9.2 Future research paths and insights for planning strategies	

workers, such as remote and nomadic) are affecting the flexible use of urban districts (Zenkter et al., 2022). However, urban planning processes have not yet shown an adequate response to the current needs and changes (Zenkter et al., 2022; Zenkter et al., 2021; Di Marino et al., 2018; Foth et al., 2020).

Cities need to create (or recreate) urban spaces that can respond to the emerging hybrid conditions and expectations (Cho et al., 2016). Hybrid spaces are defined as “contemporary spaces shaped by a dynamic process which aims to synergize the various aspects of urban design from spatial configuration and programming to utilization and management” (Cho et al., 2016, p. xiv). Hybrid spaces are often characterized by tensions and negotiations between users and agencies (Cho et al., 2017). Among them, hybrid NWS are not yet recognized in the planning agenda of most cities, despite the increasing demand by new users of building, public spaces and hubs that can provide economic, socio-spatial and technological infrastructure (Foth et al., 2020; Mangi et al., 2021).

Contributing to the various interpretations of hybridity, this study embraces the interaction between spatio-functional, social and digital features in urban spaces (see e.g. Paay et al., 2017). For example, hybrid

spaces can be places transformed within urban regeneration processes, based on functional planning and flexibility principles that simultaneously support a successful city and social development. In addition, through access to technology, hybrid spaces allow new spatio-functional, social and digital interactions among people (Paay et al., 2007). The literature review aims to highlight approaches to hybridity which emphasize the combination of the above features and their synergies at city, neighborhood, urban space and workplace (traditional and non-traditional) levels.

To be more precise, in this study, hybridization is analyzed as follows i) definitions and evolving understanding of ‘hybrid’ (Section 2.1); ii) hybridization of cities, architecture and urban spaces (Section 2.2); iii) hybridity and the degree of publicness and privateness (Section 2.3); iv) links among neighborhoods, people, digitalization and workplaces (Section 2.4); and v) work life outside the office, including hybridization of workplaces and NWS, and impacts of digitalization (Sections 2.5, 2.6 and 2.7).



## 2.1. Definitions and the evolving understanding of 'hybrid'

Studies on sociology and networked mobility have supported several discourses on hybridity that are relevant to the planning debate today. "A hybrid space is a conceptual space created by the merging of borders between physical and digital spaces, because of the use of mobile technologies as social devices" (de Souza and Silva, 2006, p.266). More specifically, the concept of hybrid reality is the result of social practices that occur simultaneously in digital and physical spaces, together with mobility (de Souza and Silva, 2006): "The term hybrid defines a situation in which the borders between remote and contiguous contexts no longer can be clearly defined" (de Souza and Silva, p.269).

Hybrid spaces merge the physical and the digital in a social environment created by the mobility of users connected via mobile technology devices. This is supported today using Information and Communication Technologies (ICTs), thus "physical and digital infrastructures help integrate the virtual spaces, in which city dwellers act and share values, with the physical spaces of the city" (Volpi & Opro-molla, 2017, p.3572). Furthermore, the logic of hybrid spaces mediates a set of various relationships and connections that happen not only in physical space, but rather in a space that merges the physical and the digital. These hybrid connections change people's perceptions of the physical space (de Souza and Silva, 2006).

Therefore, without access to technologies and mobility, there would not be access to hybrid spaces (Frith, 2012). Mobility is traditionally interpreted as access to transportation, modes of transportation, or travel time, as well as the travel experiences of individuals who share the same spaces. With the adoption of the technology, one can see the growth of hybrid spaces and the increase of the digital divide into the physical space (who has access to the technology) (Frith, 2012). Hybrid occurs when networking communities move into hybrid spaces (Willis & Aurigi, 2011). "The hybrid space is more malleable than physical space because information can be filtered through the interface of the mobile devices" (Frith, 2012, p.145). Thus, on one hand, there are groups of people that move through malleable, personalized, digitally infused streets and spaces and, on the other hand, other groups that experience spaces in an impersonal way (Frith, 2012).

Furthermore, mutual influences between the digital and physical dimensions are rather crucial to the notion of hybridity. "The lack of interest in public space could be overcome with a 'hybridization' of the physical and digital public space" (Bazzanella (2014, referring to Freire and Brunet, 2012, p.24). The case of Volpiano, analyzed by (Bazzanella et al., 2014), shows that the use of digital tools can support the development of a new platform for studying and participating, thereby transforming an urban space. Thus, it is necessary to work on the potential of urban space by combining traditional analyses and modes of participation with digital strategies. The combination of on-site and digital interactions (at a distance) can yield more hybrid experiences (Bazzanella et al., 2014). Hybridization brings new forms of interaction within the local community, by animating the space and creating temporary 'smart' communities. The role of the community can be either active or rather passive (as a driver of the new meaning of public spaces) (Bazzanella et al., 2014).

To conclude this section and recall some key points, it remains relevant to understand the way in which society constructs and defines space. Hybrid spaces can contribute to mediate socio-spatial interactions, with the further development of technology (Krasilnikova & Klimov, 2020), as well as negotiation between physical dimensions and electronic flows (Salinas et al., 2016). Hybrid connections impact the perceptions and understanding of physical spaces, as well as users' habits (Krasilnikova & Klimov, 2020).

## 2.2. Hybridization of cities, architecture and urban spaces

The hybridization of cities has been discussed in relation to the interactions of spatio-functional, social and digital spaces. In the last

decade, cities have become increasingly digital by working with companies to offer new services and spaces, and there is evidence of increasing use of digital devices by citizens. The Internet is contributing in that it offers new places for social relationships, compared to common and traditional places to build such relationships (Bazzanella et al., 2014). Thus, the availability and use of technology are accelerating hybridization processes.

In one study, Houghton et al. (2015) present an interesting case study of the UR[BNE] Festival 2012 in Brisbane, where events and discussions happened both physically and digitally. The digital social networks and socio-spatial interactions involved both citizens and planners. The role of ICTs was particularly strategic in revitalizing some underused places and spaces. For example, social media were used to advertise a rather unattractive restaurant between two blocks as a new place where people can have lunch, have fun and interact with neighbors. The researchers tried to encourage people to rethink the current use of the space, including ways to attract people and catalyze new connections (Houghton et al., 2015). This represents a new approach to urban planning that tried to combine outputs and inputs of ICTs with new initiatives in inactive physical places in order to reinvigorate them (Houghton et al., 2015).

Contemporary hybrid development may redefine the urban form, the scale, the enclosure, and the location of public spaces, the ways in which public spaces interact with their surroundings as well as the ways in which they are used, experienced, and managed (Cho et al., 2016). The urban space can become fully hybridized with other functions of development. At the city scale, several places in the city can be reinvented by a new use of spaces and interactions that people are able to create. Rapidly appearing hybrid typologies refer to intensified residential developments, mixed-use developments, infrastructural transit-led spaces, recreational green hybrids, and hybrid urban voids (Cho et al., 2016). Hybrid conditions for spatial negotiations have analyzed within the residential uses which are gradually integrated with various social functions for inhabitants and visitors, as well as uses, activities and forms that aim to create vibrant hybrid environments (see the high-density residential developments in Asian cities studied by Cho et al., 2017).

Neighborhoods can be hybrid for several reasons: i) the built density; ii) density of population and users; and ii) the concentration and diversity of functions and activities. "Hybridization of spaces is based on the multi-functional connection with the internal city structure and suburban areas" (Krasilnikova & Klimov, 2020, p. 63). According to Krasilnikova and Klimov (2020), hybrid spaces can support a successful city development which is characterized by: i) providing services and infrastructures to citizens, companies, and visitors; ii) offering new places that can develop current business and public support; iii) helping an active image or communication; and iv) supporting citizens, leaders, and governments as well as attracting companies, investors, and visitors.

Furthermore, Krasilnikova and Klimov (2020) – referring to Ellin (2006) and Zanni (2012) – highlight the importance of the development of hybrid spaces from planning and land-use perspectives. Hybrid spaces are emerging in the urban fabric of modern cities, and they are often considered as multi-functional architecture complexes, in proximity to other areas (Krasilnikova and Klimov, 2020). Hybrid spaces contribute to "the cutting edge of spatial, social and public changes" (Krasilnikova and Klimov, p. 89). Moreover, "urban hybridization is determined by the multi-layered and multi-scaled urban tissue" (Krasilnikova and Klimov, 2020, p.92, referring to Zanni, 2012).

Among several hybrid urban spaces that have emerged since the 1980 s, Parc de la Villette (Paris) is considered to be a multi-functional architectural and landscape complex, which has affected urban planning, social and economic changes in its surroundings (Krasilnikova and Klimov, 2020). In this case, hybridization is related to the space-planning structure of the area, the design and creation of new public recreational spaces, and spatial connectivity with other areas, through for example, public greenways which are accessible to all residents.

Thus, hybridization can be interpreted as the interaction of spatio-functional and social features across a wide variety of functions, including public recreational and residential activities. Structural multifunctionality is one of the features of hybrid spaces that generates synergies among various spaces and their functions.

Hybrid spaces can be recognized as catalysts for creating sustainable urban environments, since they provide flexible solutions as well as multiple and adaptive approaches to the whole urban system (Volpi & Opromolla, 2017). The creation of hybrid spaces in the city also represents important places of interaction and relation among people, designers, institutions, and other stakeholders leading to cities becoming simultaneously and increasingly complex systems (Volpi & Opromolla, 2017, p.3577).

In this context, emerging typologies of hybrid urban spaces can be dynamic and conflicting in terms of synergies between spatial configurations, programs, ways of utilization (see users and activities) and management (agencies and ownership). In addition to this, Cho et al. (2016) distinguished three mutually overlapping modes of hybridization: i) spatial hybridization signifying structural and layout complexity, technological innovation, as well as the relationships with the surroundings in terms of access, connectivity, physical flexibility, and innovative public uses (including multi-level or elevated public spaces); ii) the programmatic or functional hybrids which cover a variety of activities that may support unconventional ways of using the space; and iii) operational (ownership) hybridization referring to the redefinition of conventional notions of boundaries and accessibility through negotiated ownership, time regulations, and management of space (e.g., public-private partnerships and other types of contracts).

To conclude this section, architectural hybridization moves beyond the physical complexity and multiple programs within a building itself; instead, hybridization “requires greater interaction between structural and programmatic pieces, and the mutual intensification and activation of the surrounding context”. (Cho et al., 2016, p.7). Architectural hybridization can create some sterile urban environments: “It (...) can breed sterility in its offspring: those all too familiar barren, mix-use megastructures that have invaded our rural and urban landscapes” (see Kaplan in Fenton, 1985, p.4). Fenton (1985) originally catalogued hybrid buildings and identified them as models for revitalizing American cities. He states that “the catalogue examines the complex relationship between form, function, technology, urban context and society, with the hybrid building establishing a coherent balance of parts” (Felton, 1985, p.5). Hybrid buildings are the result of formal variations and rich architectural expression. The forms and functions and combination of programs are numerous (Felton, 1985). More recently, Per et al. (2014) state that the hybrid building has the mixed-use ‘gene’ in its ‘code’. The hybrid building can create multiple opportunities and be a key player in revitalizing the urban scene. Elements of private and public life can co-exist within a hybrid building. The hybrid building is a concentration of several interests, rather than an architectural prototype.

To summarize, the main outcomes of this section are related to discourses on hybridity which are intertwined within planning processes and architecture. Interactions between spatio-functional and social features seem to be predominant in urban transformation processes, as well as at architectural and building scales. On the other hand, within these interactions, digital features that are increasingly found in urban spaces and neighborhoods should be further explored (see Section 7), considering the related impacts on people’s habits.

### 2.3. Hybridity and the degree of publicness and privateness

Today people are increasingly reconfigured in hybrid spaces, since they move through physical spaces while being connected to other people digitally, and it can happen in a bar, a square or similar spaces. This phenomenon is clearly rather different from the traditional use of public and semi-public spaces (de Souza and Silva, 2006, p. 260). Thus,

hybrid spaces encompass aspects related to the degree of publicness or privateness (privatized space) (Leclercq and Pojani, 2020).

To this end, some years ago, Nissen (2008) introduced the idea of “spaces of hybrid character as a genus that reflects different kinds of public, semi-public, semi-private and private spheres” (p.1130). The proliferation of hybrid spaces in our cities may be ascribed to several factors, such as the transfer of state and/or local rights to private actors, as well as diminishing levels of public control (Nissen, 2008). The privatization processes that Nissen (2008) describes refer mainly to streets, parks and plazas, train stations, shopping centers, business districts and community spaces. Shifts between public and private spaces may be visible in the built environment, through fences and other features, such as security and signs that can indicate “spaces of hybrid character” (Nisse, 2006; 2008). These hybrid spaces present “mixtures of public and private structures, different degrees of accessibility, and varying extents of usability” (Nissen, 2008, p.1139). Based on these combinations, Nissen (2008) focuses on developing a list of spaces that are being hybridized due to privatization tendencies.

The concept of public spaces today is more open to new urban types such as “shared spaces or relational spaces, as well as diversified typological hybrids” (Setti, 2013, p. 835). Infrastructural and technological nodes are reformulated as “common places” or defined as “interspaces” (Setti 2013, referring to Crotti, 1997). Hybridization can occur in residual spaces in industrial areas that are being transformed in new public projects and spaces (Setti, 2013). In these “interspaces”, there is a complex layering of functions and features that shape the urban form (Setti, 2013).

Thus, the interaction between spatio-functional, social, and digital features is related to the complexities of the concepts of public and private as well as the network in which we would reconfigure and embed hybrid urban spaces (Salinas et al., 2016). These flexible approaches to public and private seem to reflect the heterogeneity and multiplicity of hybrid urban spaces (Salinas et al., 2016). “New hybrids of private-in-public and public-in-private may replace the gradient semi-public and semi-private” (Salinas et al., 2016, p.116). In addition, there are new hybrid urbanities and modes of publicness, such as the blurred borders among the public, the private, and semi-public-private (Cho et al., 2016 referring to Németh & Schmidt, 2011; Madanipour, 2006).

The hybridization of the public and the private has led to re-conceptualizing the public space in a more flexible and inclusive way (Cho et al., 2016). In this context, hybrid spaces are also interpreted as self-organized and ‘soft’ forms of governance (Matern et al., 2019), which are based on voluntary networks and cooperation between several actors from different sectors (public administration, economy, politics, and civil society).

The discourses on publicness and privateness in this section are relevant to our understanding of hybridization processes and our conceptualization of hybrid spaces. The interaction between the three dimensions (spatio-functional, social and digital) is linked to the complexity of privateness and publicness, and the blurred borders between public, semi-public and private spaces.

### 2.4. Neighborhoods, people, digitalization, and workplaces

Further transformation has been seen in the role of urban neighborhoods. Since the 2000 s, studies on augmented cities, digital cities and virtual spaces have supported discourses about the ways in which scientific research should further emphasize interactions between people, place, and technology (Herzog, 2006; Hampton, 2007). New opportunities in neighborhoods have arisen as a result of the appeal of ICTs. Indeed, digital technology is an integral part of modern society and neighborhoods are becoming more digitalized. Our lives are impacted by digital transformation and the use of digital devices (Jacobs & Cooper, 2018). There are tangible and intangible effects of digitalization on our neighborhoods and public spaces.

Before and during the pandemic, there was a sizeable debate on the ways the technological development could revolutionize social life, re-shaping places and communities, as well as daily activities, such as work, shopping, business, and socializing (Banerjee, 2001; Carmona, 2021). Well-designed and managed public spaces can bring communities together and provide meeting places which have been disappearing in many neighborhoods due to rapid urban transformations (Cho et al., 2016). Further, belonging to a network society may further reduce the need for public encounters in the public spaces of our neighborhoods (Banerjee, 2001; Hampton, 2007).

Over the last two decades, the disciplines concerning urban design, urban planning, and architecture have partly acknowledged the impacts of the new technology facilities (Foth & Sanders, 2008). This is seen, for example, in the way that, mediated by new technologies, everyday public spaces are being increasingly transformed (Green, 2006; Humphreys, 2010; Willis & Aurigi, 2011). As Willis (2008) has argued, different types of aesthetic are no longer dominated by visual access but by informational access. Since the arrival of IT infrastructures, the on-line public spaces have offered new opportunities for city dwellers to collectively meet, such as in chat rooms, discussion forums, community networks, digital cities, and massive multi-user online games (Foth & Sanders, 2008). Furthermore, free Wi-fi in public spaces has meant a revitalization and re-population of parks, pedestrian walkways, outdoor cafes, and civic squares by attracting citizens, tourists, and mobile workers equipped with wireless devices (Middleton, 2008).

We have experienced new forms of civic engagement, urban interactions (Herzog, 2006), and community values, even though these have resulted in a growing shift towards individualism and privatization of leisure time (Putnam, 2000; Foth & Sanders, 2008). These meetings and social gatherings occur somewhere in the city. In addition, virtual and physical urban spaces have become increasingly interactive with urban residents maintaining or creating social links, online interactions, and exchanges of day-to-day life (Hampton, 2002).

Thus, prior to COVID-19, scholars have already debated on privatization and the communications revolution, as well as on the globalization that would shape future demand and the supply of public space, including the conventional urban form of our neighborhoods (Banerjee, 2001; Németh & Schmidt, 2011). Planners should have anticipated the impacts of these trends as well as the concept of public life, which covers both private and public realms.

The public realm is a specific social setting that may include several urban public spaces, such as city streets, parks, and plazas (Lofland, 1989; Hampton & Livio, 2010). It is a non-private arena of social life hosting encounters with existing acquaintances as well as with strangers (Lofland, 1989; Hampton & Livio, 2010). In contrast, the private realm is seen as a social setting whose domain is characterized by intimate social ties. The dichotomy (and the continuum) of these two realms has been very much discussed as well as the blurring and overlapping of the two realms (see e.g., Madanipour, 2006; Mehta, 2014).

In addition, the 'parochial realm' is a social setting appropriated by particular groups of people who "feel(s) either like a stranger or a guest, depending on how they fit in" (Carmona, 2010, p.129, referring to Lofland, 1998). Thus, in these social settings, neighbors may have established interpersonal networks based on their lifestyles (e.g. values, opinions, gender, race, ethnicity, stage in life, and other forms of diversity) (Hunter, 1985; Lofland, 1989; Hampton & Livio, 2010, referring to Strauss, 1961). People are surrounded by others with whom they share much in common, such as in a neighborhood, small town, or workplace (Hampton & Livio, 2010; Lofland, 1998).

Therefore, the neighborhood and workplace are embedded in a 'parochial realm' since they offer more diversity than the private realm (Hampton & Livio, 2010; Mutz, 2006). Compared to the public realm, those spaces are still more likely to be a focus of activity for those with common interests, lifestyles, backgrounds, behaviors, and beliefs (Hampton & Livio, 2010; Marks, 1994).

Furthermore, the identity of a neighborhood and the sense of place

have been linked with the use of the built environment. The transitory residents use the third place, which includes cafes, bars, and parks, especially for meeting friends (Oldenburg, 2001, Soukup, 2006, Foth & Sanders, 2008). In the beginning of the 2000 s, the case study carried out by Oldenburg (2001) at the Oakland University in Rochester was already relevant. This study pioneered the new functions occurring in the café by describing a group of students who would meet there to attend a series of lectures. Hence, the coffee shop near the campus became a place in which one could learn to present speeches; this also happened with the neighborhood's people being simultaneously present. In this way and during these moments, the café was temporarily transformed into a kind of workplace/classroom. Presently, the third place remains informal public gathering places in which the predominant activity is conversation.

However, in the last few years, the meaning of third place has partly changed (see Section 3.1). Through multiple means, technology has enabled the formation of new communities that greatly contrast to earlier communities (Christensen, 2003). The concept of third place as workplace is the result of a debate started in the 2000 s, according to which "the work can be done any place and any time, whatever best suits the individual" (Pyöriä, 2003, p.168). The uses of these third places as workplaces are strongly linked with the existing community of wireless networks that produce an intersection between code and place (Forlano, 2008a). In this context, using public spaces as workplaces should focus on the ways in which they were originally conceived, their traditional functions, and adaptation to new people's needs. Certainly, the conventional forms and functions of public spaces cannot survive everywhere in this new urban environment composed of off-online spaces (Herzog, 2006). On the other hand, the place from which we work still matters for several reasons, such as the flexibility, atmosphere, and proximity to home and office (Di Marino and Lapintie, 2017).

In addition to this, the city is represented as a structure of interwoven spaces, allowing for continuous passage from public external enclosures to public rooms inside buildings, incorporating the entire range of sequences connecting the public and semi-public to the private (Kallus, 2001). Simultaneously, the development of the neighborhoods and localities has been among the priorities of planners considering the chronic lack of amenities (public spaces, grassroots initiatives). Thus, planners should find creative alternatives involving both the public and private realms in dense and built-up areas, mediating between the public, private, and nonprofit sectors, as well as focusing on the concept of public life rather than public spaces (Banerjee, 2001).

Furthermore, access to public Wi-fi is no longer confined to semi-public spaces (such as public libraries, coffee shops and other spaces); instead, urban parks and squares can be used as hybrid hubs for several purposes. Among the first digital mediated spaces, Bryant Park in New York (Townsend, 2000) and Dundas Square Toronto (Hampton & Livio, 2010) are both examples of this metamorphosis.

Since 2001, New York has presented itself as a significant case study, thanks to NYC's wireless and access to the many free Wi-fi and public hotspots installed in the city. Broadband enables fast connections for our desks at home (first place) and at work (second place), to leave these places and navigate around the city (Spiegel, 2007). In this way, public spaces can be visited for different purposes, considering the new facilities offered by high-speed internet access. In the last few years, the park department in many cities has developed this kind of deployment of Wi-fi for the public space in the form of Wi-fi hotspots and Park Wi-Fi. The Bryant Park project was launched in 2002 and was a public park privately managed in midtown Manhattan. The park is located on Forty Second Street between Fifth and Sixth Avenues directly behind the New York Public Library (Forlano, 2008b). The park, designed at the end of the 1700 s, was closed in the 1970 s, then reopened in 1991. Recently, the park has completely changed and provides multiples services. Bryant Park is just one example of the many parks, coffee shops, and other small businesses throughout the city that have begun to provide free networks which are used by tens of thousands of New Yorkers. Forlano (2008b)



analyzed the principal reasons for the popularity of the neighborhood, finding them to be the park, furniture, Wi-Fi, and attractive open spaces. Some of the respondents have affirmed that it is the ‘best office in the world’ in which it is possible to simultaneously stay outside and work. Currently, the park is still very attractive for the multi-activities proposed to visitors and residents (<https://bryantpark.org/>).

Among the pioneering cases discussed in the literature, one can also find Dundas Square, located at one of the busiest pedestrian intersections in Toronto (Hampton & Livio, 2010). Although the square is completely devoid of green spaces, free Wi-fi access is provided. It is managed through a public-private partnership, but use of the park is rather restricted and more limited than Bryant Park. In both cases, users and technologies really revitalized the surrounding neighborhoods. However, the geographical location of urban spaces also matters, and accordingly, the weather conditions (extremely hot or cold) and the lightest and darkest days within the year (see e.g., Nordic countries) which may affect the use of public spaces.

Thanks to ICTs, in the early 2000 s, the concept of co-workplace was used to describe a new type of local neighborhood-facility which would enable remote working. At that time, the new co-workplace model incorporated the idea of shared spaces among several professionals by combining the idea of a teleworking center and business incubators. Its location was conceived in neighborhoods, particularly residential, and as an alternative to home and traditional offices (Johnson, 2003).

To some extent, the discourses more recently elaborated by scholars are related to the studies in this recent past. We are still aware that ICTs remain a very relevant subject to the public space and neighborhoods since they continue to attract and gather people to a specific urban environment. Furthermore, they represent one of the key factors for the progress of the city as well as support the exchange of ideas, thus generating development (Abdel Aziz et al., 2016). “The creation of hotspots providing wireless Internet access encouraged the return to the public, for both work and recreation” (Abdel Aziz et al., 2016, p.491). Planners and urban designer still tackle several challenges when blending these technologies into the urban fabric (e.g., good design, electricity, plugs, street furniture, and assessment of technological needs of people) (Abdel Aziz et al., 2016; Di Marino and Lapintie, 2015).

In addition, Cho and her co-authors (2016) stated “(...) density alone is insufficient to warrant desirable interactions for living, working and recreation. It is often the subtle differences in the quality, not the quantity, of interactions, which make one city or neighborhood more attractive than another” (p.3). Another aspect to consider is that the public realm is diminishing in those places in which emerging mixed-use buildings are creating new identities of urban districts (consider mega-complexes, such as shopping malls and transportation hubs). However, these are dominant models of contemporary urban developments which we cannot ignore since they contribute to the new public realm (Cho et al., 2016). Mixed-use complexes are often seen as arenas for unconventional experimentations with urban space typologies and innovative uses (Cho et al., 2016). New modes of publicness are not static, but rather transient and always evolving, seeking flexibility and experimentation (Cho et al., 2016).

To summarize this section, digitalization is contributing to neighborhood lives in various ways, considering people’s new habits and digitalized practices in the built environment. These approaches support the mutual overlaps and influences between hybrid neighborhoods and hybrid NWS, that can supplement each other by increasingly offering new services and spaces for social and cultural events, compared to traditional public squares. Both neighborhoods and public squares are now becoming the newest and most common meeting points in the city.

## 2.5. Hybridization of workplaces

Since the beginning of the 2000 s, there has been conceptual room for the hybrid workplace. During that period, scholars from organizational studies, business and management, as well as Information

Technology have defined the hybrid workplace as an opportunity for highly skilled employees and freelancers to work not only at the office but also remotely at home and/or from other locations. In order to provide hybrid workplaces, it is crucial to gather the socio-spatial and digital characteristics of a workplace. Thus, in a physical environment for work, there are certain spatial configurations or affordances for action which facilitate activities (Bakke and Ytrri, 2003). A hybrid workplace can accommodate a varied set of activities and opportunities to enable digital and physical collaboration. In hybrid environments, workplace behavior, innovation, and creativity are influenced by the distributed and hybrid working environments (Bakke and Ytrri, 2003).

The hybrid workplace is not a relocation or dislocation of a traditional workplace (Halford, 2005). Instead, it was originally meant to be part of a multiply located network rather than a fixed location (Halford, 2005). Initially, the hybrid workplace was especially used by white-collar workers for several reasons, including office costs and space, growth in the use of hotdesking, contemporary architectural trends, increased commuting distances, and increasingly difficult and time-consuming commuting journeys (Halford, 2005). The combination of digital space, organizational and domestic space as well as other spaces (e.g., cars, restaurants, cafés, or trains) was embedded within a “spatial package of working lives” (Halford, 2005, p.18). At that time, other locations, such as coworking and public libraries, were not included in the spatial package conceived by Halford (2005). The hybrid workplace for Vartiainen and Hyrkkänen (2010) was perceived as ‘in-between’ homes, organizations’ premises, and virtual spaces. The phenomenon considered three aspects: i) the flexibility of work; ii) the new spatial arrangements of public and private organizations; and iii) the needs of freelancers (Vartiainen et al., 2007).

‘Hybrid work’ and ‘hybrid workplace’ have gained greater momentum during the pandemic (Florida et al., 2021; Petani & Mengis, 2021; Gratton, 2021) as a result of several working practices shifting to remote interactions (Florida et al., 2021). More recently, managers, IT and space designers have developed several hybrid spaces that can be used particularly when crises interrupt or discontinue existing working practices. In this context, they should re-adapt and repurpose their workspaces (Petani & Mengis, 2021; Orlikowski & Scott, 2021). Due to IT, people can currently work more ‘flexibly’, managing their time across different places (thus being ‘multiply located’ among home, corporate offices, coworking spaces). Current hybrid work is meant “as new ways of working using the technology which also increases the multiple locatedness of workspaces” (Petani & Mengis, 2021, p.2). This is due to work being simultaneously located both virtually and physically. This phenomenon is also known as multi-locational work (Vartiainen, 2021).

There has been an increase in hybrid modes of work “where individuals dip in and out of virtual and physical spaces” (Tredinnick & Laybats, 2021, p.108). In the post-pandemic period, the changes to the place and style of work also offer an opportunity to rethink the culture, organization, and function of the workplace (Tredinnick & Laybats, 2021, p.109). On one hand, this can happen by replicating the structure of the organization of office-based work into the virtual sphere. On the other hand, organizations and individual teams may negotiate the new terrain of blended work by adopting flexible and efficient hybrid models. These contingent changes in work give way to more permanent patterns in the establishment of a genuinely sustainable ‘new normal’ (Tredinnick & Laybats, 2021). In this context, remote links are increasingly included in physical meetings and have become standard practice, thus allowing more mobile people to participate (Florida et al., 2021). The adoption of a hybrid working model may attract several talents which are more mobile, and since commuting is decreasing, employees and freelancers may live further from city centers.

To summarize, hybridization of the workplace (conceived as multiply located networks, in-between several premises, and in both physical and digital spaces) is not a new concept. The hybrid workplace has been supporting the work life outside of offices in the last two



decades. Nonetheless, during the pandemic, a greater number of people have experienced new hybrid models of working. Hybrid work and workplaces are becoming thought of as a key component of the ‘new normal’.

### 2.5.1. Hybridization of NWS

As mentioned in Section 2.4, urban spaces are becoming more hybridized through spatio-functional, social and digital practices. This means that the urban environment is increasingly perceived through “nearby information and people” (Gordon & de Souza e Silva, 2011, p.14). The understanding of what is ‘near’, and the co-presence of individuals contributes to the development of hybrid spaces. Recently, there has been an increasing mapping of NWS and practices in our cities, openly advocating sharing and collaboration, including various forms of hybridity (Foth et al., 2020).

There are several terms used in the literature to define hybrid working styles, users, and spaces, such as open-plan workspaces (Spinuzzi, 2012; Waters-Lynch, Potts, et al., 2016), third places and their evolving forms (from Oldenburg, 1997 to Brown, 2017; Avdikos and Iliopoulou, 2021); fourth places (Simões Aelbrecht, 2016; Morisson, 2018); innovation-driven/innovative spaces (Schmidt et al., 2014; Morel et al., 2018); collaborative workspaces (Capdevila, 2017; Schmidt, 2019; Montanari et al., 2020; Avdikos & Merkel, 2020); and then new working spaces (Bähr et al., 2021; Mariotti et al., 2021; Di Marino et al., 2021).

Among them, the ‘coworking’ term has become highly popular between scholars and the media, resulting in many spaces possibly using the label to refer to different or new offerings (Orel & Bennis, 2021). In this context, activities, functions, and the spatiality of the space may add a new typology or reveal a mixed typology; in other words, a blended or a hybrid model which has not yet been fully studied. The conceptualization of a coworking space itself is rather complex.

Coworking itself is a phenomenon with plural and hybrid organizational forms as well as contrasting manifestations (Ivaldi & Scaratti, 2019). Coworking spaces are identified as hybridized workspaces for several reasons (such as social supporting dependent professionals and creating a place for collaborative communities) (Orel and Dvoutely, 2019). Sharing is considered as a hybrid practice which presents several configurations. Professionals share spaces which they rent but they do not possess. In addition to facilities and rooms, the values of coworking lie in relationships, community, communication, and collaboration, as well as knowledge, resources, and networks. In this context, the physical workspace partially brings sociality and community (Ivaldi & Scaratti, 2019; Clifton et al., 2022). Thus, in addition to typical entrepreneurial-led coworking spaces, there are community-led coworking spaces (Avdikos & Iliopoulou, 2019). Furthermore, community, knowledge exchange, and collaboration may facilitate tangible outcomes, such as innovation and growth (Clifton et al., 2022). By considering their influence on innovation, coworking spaces have been considered as hybrid organizations under the impact of digital technology (Marchegiani & Arcese, 2018). Often, there is a spectrum of practices and approaches, such as forms of sharing and market exchange that usually coexist in the hybrid context in which CSs operate (Arvidsson, 2018; Gandini & Cossu, 2021).

Within the broad typologies of collaborative workspaces, in addition to coworking spaces, there are also business incubators, startup accelerators, hacker spaces, makerspaces and fablabs, public libraries, and cafés (Waters-Lynch, Potts, et al., 2016; Capdevila, 2017; Montanari et al., 2020, Di Marino and Lapintie, 2018, Bilandzic & Foth, 2013). Moreover, one can find additional interpretations such as ‘work-learn-play third spaces’ (Waters-Lynch, Potts, et al., 2016) and ‘new social environments’ (Morisson, 2018).

Activities in such spaces are sometimes blended rendering them difficult to differentiate, meaning that “many spaces fall into hybrid categories” (Waters-Lynch, Potts, et al., 2016, p.4). Morisson (2018) refers to examples of ‘coworking cafes’ in Paris, which require paying an

hourly or daily fixed charge ‘to work and network’ in the cafe and includes free access to drinks and food, which is different from traditional cafés as third places. In recent years, there have been multiple working spaces to which the concept of third place can be applied.

These multiple spaces for working are currently conceived as being in between the first place (home) and the second place (work); spaces in which play, and exploration are typically combined with explicit learning programs (Waters-Lynch, Potts, et al., 2016). Coworking spaces are predicted to globally expand as the knowledge-based economy, digital nomad lifestyle, and mobile technology continue to develop (Yang et al., 2019). As elaborated some years ago by Moriset (2013), work organization, time, and space have changed in their categories; for example, commuting became teleworking, and corporate offices became “hybrids such as third place and coworking spaces”. To understand the coworking phenomenon, it is important to both consider and differentiate it from other types of third places discussed by Oldenburg (1999) and, more recently, Waters-Lynch, Potts, et al. (2016). For example, the combination of the second and third places is the coworking space (Morisson, 2018).

In addition, Yang et al. (2019) recall coworking spaces as ‘hybrid second-third places’ by referring to the concept developed by Morisson (2018): coworking spaces include more blended functions and are rich in terms of the physical ‘space-wealth of areas’ – supporting environmental psychology and the wellbeing of the users – such as flexible and modern furniture, rooftops, library or cafe space, daylight, and plants. Coworking spaces are viewed as desirable alternatives to working from home or semi-public third places including cafés or libraries, especially among young entrepreneurs and independent creative workers (Brown, 2017).

In recent years, public libraries have been considered as informal social learning environments (Bilandzic & Johnson, 2013); social spaces (Montanari et al., 2020; Bilandzic & Johnson, 2013); transitory workspaces (Di Marino & Lapintie, 2015); and informal and free new working spaces (Di Marino et al., 2021). Due to the impact of digitalization, the traditional functions of public libraries – as being only a physical space for reading and borrowing books – have been questioned (Weise, 2004). Today, on-site visitors may benefit from mixing social, spatial and digital affordances (Bilandzic & Johnson, 2013). Yang and his co-authors (2019) recall the public library studied by Bilandzic and Johnson (2013) as being a space for the community, rather than a space for members only.

In addition, places in the knowledge economy are progressively overlapping, resulting in a fourth place (a new typology of place), leading to the creation of new places (Morisson, 2018). These new social environments may also result in being hybrid, since fourth places are a combination of first, second and third places, and can be defined as “the frontier between social and private dynamics, work and leisure, networking and social interactions, and collaboration and competition are blurry” (Morisson, 2018, p.6).

Defining coworking spaces as ‘microclusters’ hints at the ways in which citizens and inventive people contribute to “localized knowledge dynamics in industrial clusters” (Capdevila, 2017). This realization drives Marchegiani and Arcese (2018) to name coworking spaces as being “hybrid or intermediary organizational forms” (p.55), which results in the establishment of highly collaborative communities of diverse users. Coworking spaces seem to operate as ‘relational milieus’ that allow employees to “enact distributed organizational practices” based on constantly negotiated interactions in both physical and digital modes (Marchegiani & Arcese, 2018, p.68). Coworking also promotes interactional impacts as well as larger neighborhood interactions (Brown, 2017).

From the entrepreneurial perspective, there has been a continuous hybridization of the coworking space model (Orel & Dvoutely, 2020). This progress may predict that hybridized coworking spaces would gradually concentrate on centralizing all requested and operational services in one location in order to comprehensively serve the

individual's living, working, and social aspects (Orel & Dvouletý, 2020). Hybridization is not only evident in franchised spaces, but examples can also be found in local or independent types (Orel & Dvouletý, 2020).

As stated by Ivaldi and Scaratti (2019, referring to Moriset, 2013), there are several forms of hybridization between coworking spaces and various types of spaces, such as tele-centers (characterized by low interactions among professionals), flexible offices (spaces for renting but without any forms of collaborations), and incubators (which support the development of business and innovative projects). 'Startup hub' is a general phrase that Murphy (2018) considered to describe locations and areas in which innovative entrepreneurs operate. However, these locations are varied and complicated. As she discusses, three typical forms have arisen in the limited but developing scholarly literature on new methods of working: coworking, incubator, accelerator (Murphy, 2018). Many refer to incubators and accelerators as "coworking programs" (e.g., Madaleno et al., 2021). In this part of the study, coworking spaces and incubators are discussed in order to refer to the case studies.

Moreover, some coworking spaces host incubators and some incubators use the coworking space as a model and layout of their workspace. Nonetheless, coworking spaces and incubators present some differences. Coworking spaces are similar to the serviced offices, in which customers pay a fee to access a space/desk as well as other facilities (Marchegiani & Arcese, 2018; Merkel, 2015). Incubators provide desk space for a fee; however, they are often available for a short time, during which renters receive personalized assistance to establish their enterprise (Murphy, 2018). Moreover, they are usually non-profit organizations acting as "clubs—coworking space with mentoring and networking" (Madaleno et al., 2018, p.3). Incubators provide programs of 1–5 years duration to help early-stage startups; whilst coworking spaces supply working spaces for startups to also contribute to other startups or individuals (Tripathi & Oivo, 2020; Madaleno et al., 2018; Krajcik & Formanek, 2015). "A coworking space enables the creation of a culture where startups can collaborate to become partners" (Tripathi & Oivo, 2020, p.2). The major goals of incubators are to foster young entrepreneurs to generate new business ideas (Cohen and Hochberg, 2014). The similarities between coworking space and incubators are "in terms of physical set-up, some input-sharing, business models aimed at early-stage firms and based on low-cost flexible rents" (Madaleno et al., 2018, p. 285). In addition, they are both complex social communities (Madaleno et al., 2018; Waters-Lynch, Potts, et al., 2016). By considering similarities and differences between these space concepts, this study partially aims to affirm their physical hybridity.

Thus, scholars have investigated coworking spaces as hybrid and flexible new workplaces by considering additional features. Coworkers can be attracted by coworking spaces which are characterized by a wider environment in which the coworking 'micro-habitat' is edited into a hybrid digital-physical space. Thus, coworkers may identify and communicate with other coworkers within an associated network. "The spaces are hive-like in that coworker typically do not work standard, full-time hours in a space, but frequently come and go bringing resources (usually in the form of information) from outside back into the coworking environment" (Waters-Lynch, 2016, p.3). The 'hybrid' physical-digital environment is based on a physical office environment in which internal digital tools support coworkers to share information. "Some spaces even consummated this hybridity by projecting the digital 'conversational' wall onto a physical wall within the Coworking space" (Waters-Lynch, 2016, p.16). In this example, the interaction between physical, social, and digital features is evident as well as the temporal features (e.g., temporal use and the appropriation of spaces by the routine users and/or more transient coworkers, remote workers, and neighborhood residents).

These emerging examples of formal and informal formations of knowledge and innovation spaces, such as incubators and coworking spaces, need to be integrated into formal land-use and planning strategies, as well as economic development initiatives (see the pioneering case of Australia in Mengi & Bilandzic, 2020). However, before the

Covid-19 pandemic, most existing NWS were not acknowledged by traditional organizations and firms (Foth et al., 2020). From the perspective of urban planning, it would be important to envision a city that can bridge organizations' strategies and city resources. There are buildings, public spaces and hubs that currently offer (or may do so, in the future) hybrid NWS which provide a variety of spatio-functional, social and digital infrastructures (Foth et al., 2020), such as meeting rooms, services and working spaces, including cafés (Lifestyle cities, remote work and implications for urban planning | Semantic Scholar). In addition to remote and nomadic workers, NWS can act as new local centre for increasing numbers of home/neighborhood-based workers (Lifestyle cities, remote work and implications for urban planning | Semantic Scholar).

In summary, this section has focused on the current debate about NWS that may exhibit hybridized features. In urban environments, new types of spaces may arise, with new names, or under existing categories of working spaces. In some cases, different categories of NWS may come together, thus complement the services they each offer. On the other hand, a single category may add a new service to the whole complex (e.g., childcare, café, social and professional support to users etc.), which adds a hybridity value to the space. These hybrid spaces offer diversified activities, events and functions for their users. Moreover, these NWS are often associated with hybrid second-third, fourth and fifth place. But these links are not yet clear.

#### 2.5.2. The impact of digitalization on the hybridization of NWS

The implementation of new technologies, cloud services, and information systems have created the supportive environment that have consequently enabled the shift towards the more time-and space-flexible working routing from the traditional office (Samadi and Sattarzadeh, 2017). Such a change in the working routing has produced a new class of independent freelancers, namely, digital nomads, who apply the digital infrastructure to live independently in different locations (Müller, 2016; Lee et al., 2019). Later, the high level of digitalization and appropriation of the digital nomad lifestyle has contributed to the emergence of coworking spaces that are the next stage of the traditional office evolution in terms of flexibility and mobility (Woodcock & Graham, 2019; Vallas & Schor, 2020). The more digitalized features in the workplaces enable "meeting the right people at the right time" (Shearmur, 2017, p.68).

Digitalization has transformed the way people connect and communicate as well as provided a tool for global cooperation. In these times of a knowledge economy, the processes of production and innovation creation have become more complex and required the connective efforts of many professionals across the globe (Benkler et al., 2015). As a consequence, innovations as well as the process of creating were opened. In turn, open innovation has raised the value of online cooperation that required a collaborative space for work in which professionals and knowledge workers share their ideas and collaborate. Sometimes, physical space is simply insufficient for global collaboration as it limits knowledge workers by forcing them to remain in the same place (Waters-Lynch et al., 2016).

Thus, digitalization and ICT technologies have eased the process of hybridization of the coworking space by connecting the digital and physical spaces as well as providing more flexibility for coworking members. More often, knowledge workers choose independent work in an online environment and benefit from the high level of adoption of new communication technologies (Orel and Kubatova, 2019). As a result, this diversifies the community of knowledge workers, increases the diversity of skills, and raises the diversification of the tasks that overall increase the productivity and efficiency of open innovation production. During the COVID-19 pandemic, the virtual dimension as one of the parts of the hybrid working spaces became more important as the result of imposed face-to-face restrictions. However, the virtual dimension of hybrid spaces varies over time in accordance with the level of technologies and digitalization of different countries (Purnell &

Breede, 2018). “Existing Information and communication technologies (ICTs) offer virtual spaces to socialize, but schemes and purposes for transmuting from an online space to another are required” (Abd Elrahman, 2021, p.117, referring to Memarovic et al., 2014).

Indeed, ICT and informational technologies have removed the barriers between home and work duties, thus merging family and work routines. More recently, being in a place often means moving “from the physical space to virtual space, and between synchronous and asynchronous communicative modalities” in a fifth place (Abd Elrahman, 2021, 2021, p.117, referring to Calderon, 2016).

To summarize, the digitalization and multi-functionality of communication and digital solutions have supported hybrid spaces for working, including possibilities for new digital work functions, and socialization opportunities. Such a mixture of communication and work duties reflects the virtual parts of NWS that have become vital for coworkers, digital nomads and remote workers, with the effect of expanding the global network of knowledge workers.

### 3. Conceptual model

The conceptual model (Section 3.1) and the overview of hybrid features shown in Table 2 (Section 3.2) aim to review and synthesize the representative outcomes from the literature review that focused on hybridity as the interaction between three dimensions (spatio-functional, social and digital).

#### 3.1. Conceptual framework of hybridization

Hybridization requires an underlying conceptual model that anchors and facilitates the approaches and discussions (see Fig. X). By following current approaches to the theme, we stated that hybridization is defined based on an interaction between three dimensions (spatio-functional, social and digital) and it should be investigated at the city and neighborhood (and urban spaces) level; workplaces and NWS, and within a temporal dimension. Temporality indirectly and directly effects the

whole concept of hybridization.

To comprehend our actions in the hybrid city, we firstly need to understand the ways in which online and real social networks are being linked (Willis & Aurigi, 2011). People may have temporal presence in a place or space which can reflect the idea of ‘being there’ (Willis & Aurigi, 2011 referring to Ijsselsteijn et al., 2000). Presence manifests itself in physical (being in a physical environment), social (feeling of being with others locally or remotely), and co-present (where someone feels co-located with others and mixes social and physical presence) ways (Willis & Aurigi, 2011 referring to Ijsselsteijn & Riva, 2003). The relationship between the media generation and presence discussed by Willis and Aurigi (2011), and currently the impacts of the pandemic (Sinitzyna et al., 2022), have moved the boundaries to simultaneously define the concept of presence from physical-only to virtual space. A Zoom call between coworkers or a virtual attendance of courses, or events and webinars can also create a degree of closeness and intimacy between people. On the other hand, Willis and Aurigi (2011) also aim to connect the concepts of presence and temporality with hybrid spaces. The characteristics of hybrid spaces suggested by them are: event-based presence (dematerialization of co-proximity); changing rhythms (time-space experiences of individuals through cities; people’s movement patterns; natural occurrences); and revaluing in-between spaces (division of spaces with physical elements; transit or stranger spaces among others).

Considering these characteristics and the three dimensions (spatio-functional, social, and digital) of hybridization, we propose and highlight four traits of temporality in the context of our study from the city level to the NWS; temporal dimensions (in terms of uses, functions, activities, and presence) which may directly and indirectly effect these hybrid cities and spaces. We aim to identify the temporal dimension from more prolonged to temporary uses and functions, since users are increasingly transient, and can spontaneously appropriate urban space (Willis, 2008). The hybrid NWS usually have spaces with temporary functions, or to accommodate temporal activities or as Migliore et al. (2021) call it “temporal in-betweenness of activities and interactions”

**Table 2**  
Hybridization of NWS and other urban spaces: spatio-functional, social and digital features.

Spatio-functional features	Some argumentations and references
Physical flexibility	Flexible layout and spaces (Leclercq and Pojani, 2020, Bilandzic et al., 2018)
Multi-functionality	Functional diversity of space use (Krasilnikova & Klimov, 2020; Bilandzic et al., 2018; Foth et al., 2020)
Accessibility and connectivity	Multi-functional connection with the internal city structure (Cho et al., 2016, Cho et al., 2017)
Provision of innovative public uses	Including multi-level or elevated public spaces (Cho et al., 2016, Cho et al., 2017)
Programmatic or functional hybrids	Variety of activities that support unconventional ways of using the space (Cho et al., 2016, Cho et al., 2017)
<b>Social features</b>	
Diversity and inclusivity of a place	(Leclercq and Pojani, 2020, Migliore et al., 2021)
Informal social interactions	(Montanari et al., 2020; Foth et al., 2020; Mengi et al., 2021; Bilandzic et al., 2018; Bilandzic & Johnson, 2013)
Provision of service and infrastructures	This is meant for citizens, companies, and visitors (Krasilnikova & Klimov, 2020)
Offering new places	These places can develop current business and public support (Orel & Bennis, 2021)
Getting support and attracting stakeholders	Among them, citizens, leaders, and governments, as well as companies, investors, and visitors (Krasilnikova & Klimov, 2020)
Helping in providing an active image or communication	To citizens, companies, and visitors (Krasilnikova & Klimov, 2020)
Degree of publicness of privatized spaces	Cho et al., 2016 (referring to Németh & Schmidt, 2011) Bazzanella et al., 2014; Setti, 2013; Carmona, 2010, Nissen, 2008; Madanipour, 2006)
Management of space	Public-private partnerships and other types of contracts (Cho et al., 2016)
Spontaneous and temporary appropriation of place	(Leclercq and Pojani, 2020)
Time regulations	(Cho et al., 2016, Cho et al., 2017)
Psychological support to the customers	This feature includes well-being and wealth areas (Yang et al., 2019; Morisson, 2018)
Social support for independent professionals	Combined with a physical and virtual space (Orel & Bennis, 2021)
Self-organized and ‘soft’ forms of governance	Voluntary network and cooperation among the actors who are involved (Matern et al., 2019)
<b>Digital features</b>	
Digital solutions	Digital platforms (Zoom, Teams, Slack, Google teams) and well as Webinars, Podcasts, and TV talks (Sinitzyna et al., 2022)
Virtual spaces to socialize	Social dimension within virtual community (Memarovic et al., 2014; Volpi & Opromolla, 2017)
Virtual space to cooperate	New form of collaboration that has not yet been really explored (Benkler et al., 2015; Bilandzic et al., 2018)
Moving from one virtual space to another	New habits that are supported by existing and new ICT skills of users (Memarovic et al., 2014)
Flexibility within online membership	Already discussed prior to COVID-19, it is becoming very relevant (Memarovic et al., 2014)
Digitalization and support customers’ preferences	This also includes digital nomad lifestyle that is more common among the users (Lee, 2019; Yang et al., 2019; Orel and Kubatova, 2019; Shearmur, 2017)
Digitalization and active design	Both flexibility and mobility are facilitated (Woodcock & Graham, 2019; Vallas & Schor, 2020).

(p.7). Activities reflect a temporality which has a duration with a beginning and an end, although they may fade away (Neuhaus, 2015).

Some NWS are more flexible, open, and inclusive urban spaces, in which hybridization is increasingly consumed in informal workspaces as well as through digital conversations and social interactions. These hybrid NWS are often recognized as micro-habitats by coworkers and remote workers who do not use the space permanently but move from outside (the city, the neighborhood, digitally) into the workspace (Waters-Lynch, 2016). In other words, “people saw value in residing for a period of time in a desirable location” (Willis & Aurigi, 2011, p.6). This also changes and impacts the movement patterns at the city level. Reading a paper in a café as a third place rather than at home can be a simple example to describe the practices in hybrid cities (also given by Willis & Aurigi, 2011).

To conclude this discussion of conceptual model to hybridization, this study embraces the concept of hybrid NWS which is based on the interaction between the three dimensions (spatio-functional, social, and digital) and refers to the temporal dimension (e.g., when users shape and use space both physically and virtually, and how often). We can summarize that a hybrid NWS may offer a spatio-functional, social and digital package of working life (and not only a spatial package as developed by Halford in 2005, see Section 2.5), and the space itself can be also used temporarily and in a self-organized way.

### 3.2. Hybridization features

The interaction between the three dimensions is well recognized as fundamental to identifying whether and in what way an urban space can be considered hybrid. However, the description of the features has not yet developed further, and neither have the possible various combinations that may happen. From the studies analyzed (see Section 2), we extracted the predominant features which can contribute to the

hybridity of a place. To specify, to date, very few scholars (around 30, see the references in Table 2) have debated the effective combination of some of the features (both empirically and/or theoretically) when discussing hybridity. The study introduces a list of features for each dimension: spatio-functional, social, and digital, that can contribute to exploring the hybridity of NWS and other urban spaces (Table 2). This list can be further expanded by embracing new theoretical and empirical studies; nevertheless, it is a good starting point to keep in mind the features from the three dimensions and their interactions when approaching the hybridity of NWS and other hybrid urban spaces. Then, the various combination of features and interactions among the three dimensions are analyzed in the five NWS.

### 4. Research gaps and research questions

The literature review presented in Sections 2.1, 2.2., and 2.3 was intended as integrative, which is suggested for emerging topics. The discourses on hybridity have not yet undergone a comprehensive or systematic review of the literature. The review is more likely to lead to an initial or preliminary conceptualization of the topic rather than a reconceptualization of previous models (Torraco, 2005). There is a lack of a conceptual model and a comprehensive list of features (spatio-functional, social and digital) and their possible combination.

Hybridization has been investigated at the city and neighborhood level (Krasilnikova & Klimov, 2020; Cho et al., 2016; Cho et al., 2017; Paay et al., 2007); in urban spaces (Castells, 2011, Castell 2004; Carmona, 2010); hybrid workplaces (Halford, 2005; Vartiainen et al., 2010); and more recently, in some coworking spaces among hybrid NWS (Waters-Lynch, 2016; Foth et al., 2020) (see Fig. 1). The hybridity of workplaces has been mainly examined from the disciplines of organizational studies and management, entrepreneurship (see e.g., Orel & Bennis, 2021), innovation, architecture (see e.g., Migliore et al., 2021),

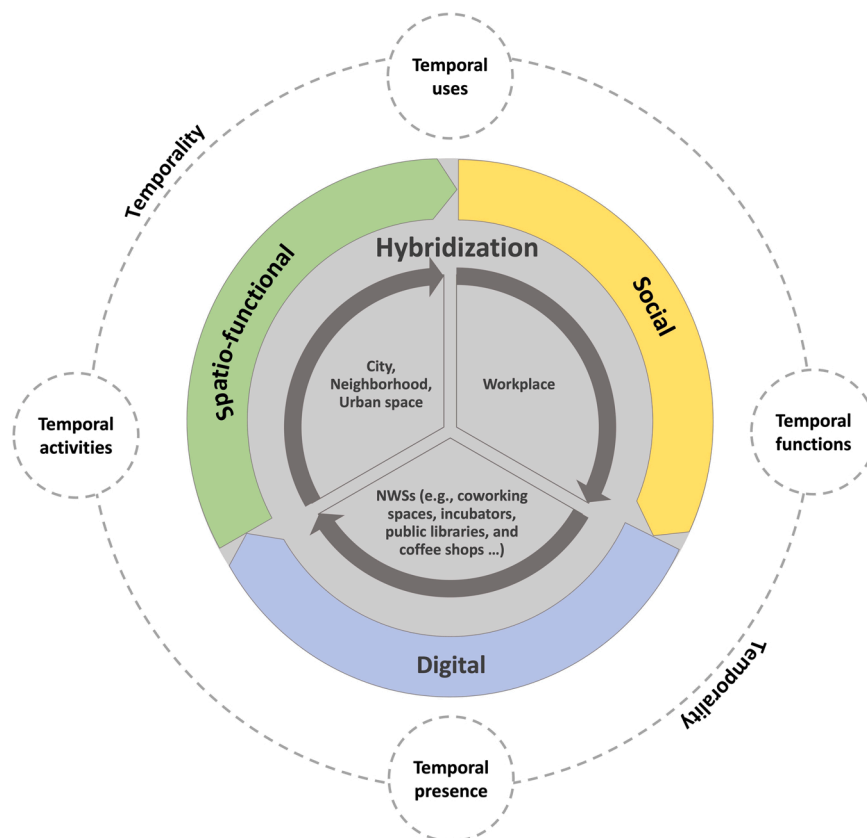


Fig. 1. Conceptual model for hybridization. Source: Authors' elaboration on the literature.



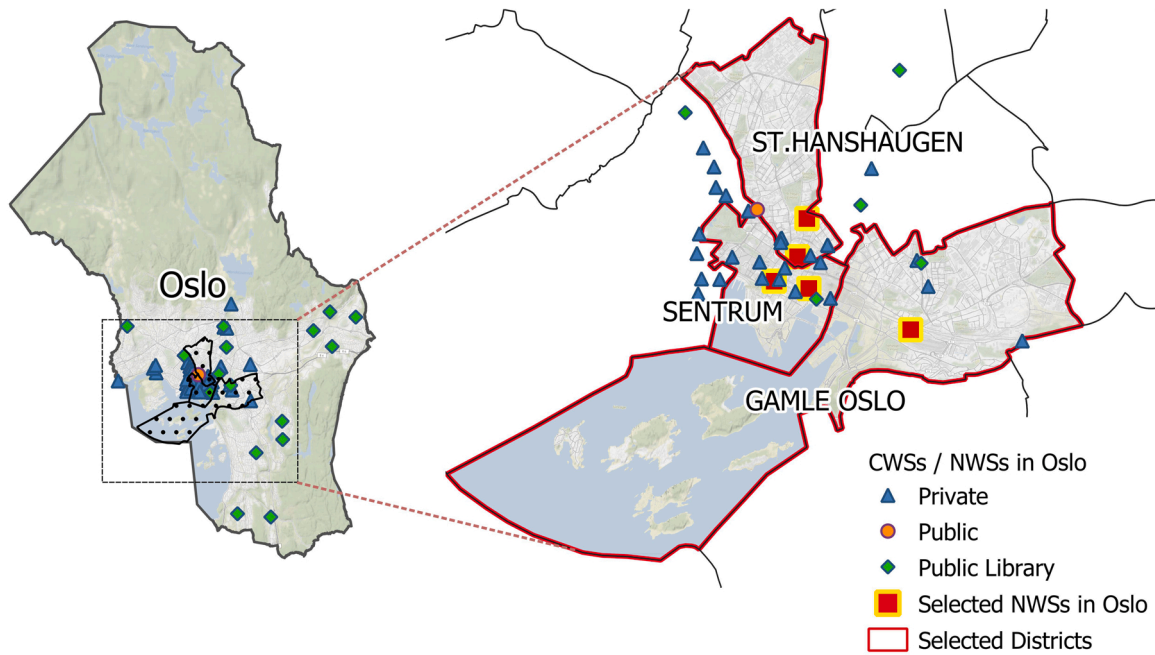


Fig. 2. Location of private and public NWS in Oslo and three selected districts.

and more recently, from planning.

However, existing studies do not provide a comprehensive understanding of the conditions which may support hybrid environments, nor the combination of the three dimensions (spatio-functional, social and digital). Although this interaction seems to be a rather constant factor of hybridization in our cities (among residential, social and recreational activities), it is very much less explored in NWS. In addition, the impacts of COVID-19 (see, for example, current digital acceleration and people’s new lifestyles in our cities) have not yet been investigated in terms of NWS hybridization processes. During the pandemic, there was an increasing number of flexible workers (e.g. home or neighborhood based workers, Zenktele et al., 2022), and nomadic workers (Humpry, 2014; Zenktele et al., 2021). They were searching for new forms of socio-spatial and digital interactions in cities and neighborhoods (such as NWS) to facilitate remote working practices (Zenktele et al., 2021, XXX). However, hybrid NWS are still not yet recognized in formal planning processes (Mengi & Bilandzic, 2020).

Hence, this study addresses the following research questions: RQ1) What are the conditions of neighborhoods that support hybrid spaces? RQ2) How do we understand the hybridization of NWS? RQ3) How is the COVID-19 pandemic impacting hybrid NWS?

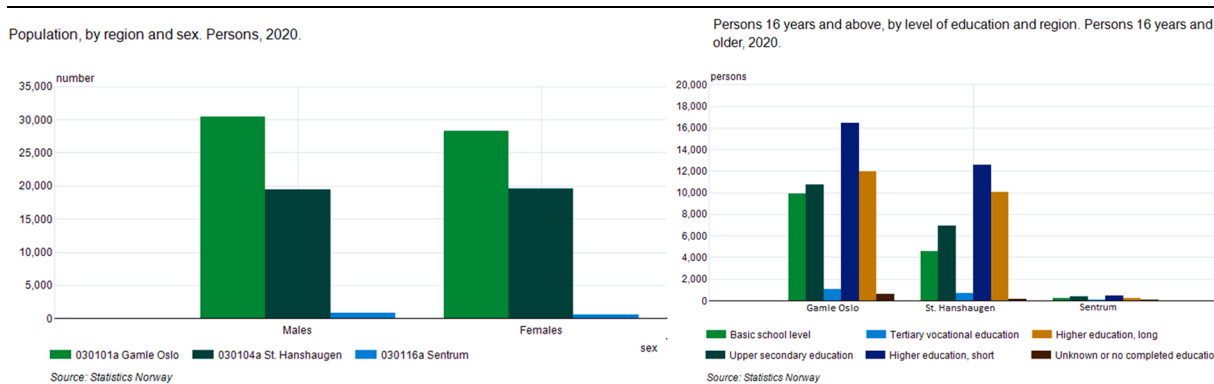
### 5. The hybrid city of Oslo and NWS

The case study concerns the City of Oslo, which is the capital of Norway and the largest municipality amongst the 46 municipalities of Oslo Region. 697,010 inhabitants are currently live in the Oslo municipality (Statistics Norway, 2021). In this section, we briefly introduce: i) the planning contexts and current strategies, including policy on hybrid cities and places; ii) a comprehensive overview of types, location, and business models of NWS; and iii) capacity for remote working.

#### 5.1. The planning context and strategies

Since the 1990 s, the urban development of Oslo has been based on a compact urban form which has determined a high concentration of activities and multiple functions in the central districts (Næss et al., 2011). The City of Oslo is rather monocentric as are most of the Nordic cities with some limited sub-urban centers (Tiitu et al., 2021). The mixed-use development (e.g., combination of groceries, offices, public libraries, and schools) mostly occurs around the main transportation hubs of metro and trains. This model of urban development has also affected the location of workplaces which are mainly concentrated in the central areas (Tiitu et al., 2021).

Table 3  
Population and level of education of inhabitants of the three districts (Source: Statistics of Norway, 2021).



**Table 4**  
Introduction to the 5 NWS (general info). Authors' elaboration.

Name of the NWS	Identity of NWS	Location	Physical (PM) & Digital (DM) Members	Industries/ Sectors	Typology	Membership Costs (NOK)	Opening Hours	Further Premises/ Networks
SoCentral	Collaborative incubator	Slotsgate 3, 0157 Oslo	PM= 210 DM= 20	Social entrepreneurs; innovation in environmental and climate issues Entrepreneurs; consultants; craftsmen	Incubator (civic and social); coworking space	Lowest Digital (500 per month) Highest Fixed space (3.500 per month)	6 a. m. – 12 am	–
HerSpace	Diverse and inclusive community in which women can work, belong, and thrive	Central (Oslo Sentrum) Straundgata 19, 0152 Oslo,	PM= 15 DM= 5 coworking plus 4; community= 4.		Coworking space	• Day pass (250) • Digital (299 per month)	9 am-5 pm; weekends close	New premises in Linderud (peripheral area in Oslo)
Mesh Youngstorget	The leading startup community in Oslo	Central (Oslo Sentrum) Møllergata 6, Møllergata 8, 0179 Oslo	PM= 600 DM= 'Mesh Connect membership' (introduced in 2022)	Entrepreneurs; startups; creative industries	Coworking space	• Digital (free) • Flex/fixd (1190 per month)	9 am- 6 pm. weekends close	further hubs: • Oslo Sentrum • Copenhagen • Trondheim
657 Oslo	Creative collaborative community; Norway's largest Coworking Space for the Creative Industries and Creative Tech	Central (Oslo Sentrum) Fredensborgveien 22 g, 0177 Oslo,	PM = 200 DM = 0 (to consider in the future) Companies= 45	Social entrepreneurs; startups; creative industries (e.g., design, film, media, advertising etc.)	Incubator and accelerator; coworking space	• Day pass (250) Offices (7500 per month)	9 am- 4 pm. weekends close	–
Gamblebyen Loft	Neighborhood development project; factory of workspaces	Gamble Oslo St. Halvards gate 33, 0192 Oslo,	Companies= 30 (3-4 members for each company)	Entrepreneurs; startups; freelancers; small or medium-sized companies in the fields of architecture, design	Office spaces; consultancy; coworking space	Offices (7500 per month)	24 h	–

Despite the high degree of multi-functionality in the central districts, one of the main issues among planners and policymakers is to maintain Oslo city life after working hours. The traditional offices close at 3.30 p. m., while the hybrid NWS are open from 12 to 24/7. These places provide additional services and spaces (such as cafes, restaurants, podcasts, and streaming rooms as well as other IT equipment), and also arrange several activities after 3.30 p.m., for example, conferences, social events, training courses that can contribute to the urban life of the districts (City of Oslo, 2020).

Several of these new workplaces may play a key role in the Oslo Campus Strategy (City of Oslo, 2020). Oslo Campus Strategy (City of Oslo, 2020) is a strategic document developed based on “the municipality’s goals and plans and the City Council’s vision that Oslo will become a greener, warmer, more creative city with room for everyone. It also takes into account the visions and strategies of the city knowledge institutions” (City of Oslo, p.1, translated by the authors from Norwegian). Oslo Strategy has identified three Innovation districts, public institutions, stakeholders, and NWS which contribute to this vision of Oslo’s. The first district is in Oslo Centre, the second is located in Hovinbyen and around the districts of Gaustad, Blindern, Marienlyst and Majorstuen, in the north-eastern and north-western part of the city, respectively (City of Oslo, 2020). This strategy aims to render these three areas more multi-functional by increasing cultural functions, urban functions, and housing. It is important to connect people and actors together—both physically, socially, and digitally, among other things—through securing common meeting places, as well as by developing a strong sharing culture and good physical infrastructures (City of Oslo, 2020, p.4). This would create more attractive, livable, and sustainable districts. “Innovation districts must be developed multi-functionally, with urban living qualities and urban spaces that invite to stay and movement. At the same time, land use planning (arealplanleggingen) must facilitate a high concentration of business in the innovation district. The actors must coordinate their initiatives within an innovation district and use its planning tools to ensure the development of the districts in line with the objectives of the campus strategy” (City of Oslo, 2020, p.58, translated by the authors from Norwegian).

Their long-term transportation planning should contribute to connecting the priority campus areas with each other, with the city and the region, through good public transport connections and through a choice of routes for walking and cycling paths (City of Oslo, 2020, p.48, translated by the authors). At the city level, these aims can be fulfilled with the support of car-free program (City of Oslo, 2019). The Car-free Livability Programme (City of Oslo, 2019) aims to expand “the pedestrianized network in Oslo city centre and moves the focus of urban development away from vehicle accessibility and towards pedestrians, cyclists, public transport, good public spaces and meeting places” (p.18). This should encourage residents and users to further use soft and sharing mobility (bikes and electric scooters) within the city as well as to reach the workplace and NWS.

Simultaneously, post-COVID, Oslo region would need to work harder to bridge the gap between home and workplace due to a relative lack of high-quality coworking spaces outside of the city center of Oslo. This has been recognized as a weakness in the future development of the region (Oslo Business Region, 2021).

Furthermore, policymakers have recently identified several potential aspects for the City of Oslo to become more hybrid. The digital acceleration can contribute to the development of work, access to services, lifestyle, and participation in civic culture. The hybrid city of Oslo should embrace the flexibility that remote working and virtual interactions may provide, yet also offer a variety of public and private spaces for several purposes (such as face-to-face meetings, socializing with friends and relatives, as well as collaborating and inventing in person) (Oslo Business Region, 2021). The aim is to create more inspirational and smarter meeting and workplaces. Oslo is committed to diversifying, innovating, and including everyone (Oslo Business Region, 2021).

## 5.2. Overview of NWS

Despite the above strategies (Oslo Campus strategies in [City of Oslo, 2020](#)) and state agencies in Oslo Region and City of Oslo ([Oslo business Region, 2021](#)), a comprehensive database does not yet exist on the NWS. Thus, two of the four authors of this study merged the fragmented information available from the Oslo region (this database was available until 2019) from the sources of [coworking norge.no](#) and [coworking.com](#), including desk research (google maps). The new database covered several variables (such as accessibility, business model, industrial sectors, building typology, social media, managers' contacts, neighborhood info, land use as current and planned, member fees, and services offered).

In Oslo, 57 NWS have been counted (37 private, 1 semi-private, and 3 public CSs, and 16 public libraries which provide formal and informal workplaces and maker spaces) ([Di Marino et al., 2022](#)). There is a relatively high distribution and diversity of NWS: in the central districts of Sentrum (the less populated district of Oslo), which is characterized by high accessibility and functional mix, as well as Frogner (with high population density) and St Hanshaugen (where the two campuses of University of Oslo and Oslo Met University are located) (XXX). Less NWS are located in Grünerløkka (a gentrified and creative district), Ullern (a very wealthy and residential district), and Gamle Oslo (a multi-cultural district). Monofunctional peripheral districts present a rather low concentration of NWS. Public and private CSs are mainly located in multi-functional buildings, while some of them are in mono-functional science parks of the city ([Di Marino et al., 2022](#)).

About the business model of NWS in Oslo, CSs are for-profit and nonprofit. The semi-public and public CS are owned and managed by public organizations including the universities of OsloMet and University of Oslo, as well as some informal Cs (including maker spaces in some cases) which are provided by public libraries (see Deichman Bjorvika and Deichman Grunerløkka) ([Di Marino et al., 2022](#)). Deichman Tøyen (in Gamle Oslo district) and Deichman Torshov (located in Sagene district nearby Grünerløkka) are very often visited by remote workers. Large private corporates, such as Regus, WeWork and Spaces, have several premises in Oslo. In addition to real estate developers, which provide workspace for rent, in Oslo, the high-tech (fin-tech, art-tech and research-tech) is the most dominant industry ([Sinityna et al., 2022](#)). In addition to the self-employed, a large variety of professionals work in the CSs, including employees who rent a desk in an open space or single office ([Di Marino et al., 2022](#)). Some of the NWS are identified (see e.g., Mesh Youngstorget, SoCentral, TheFactory, Spaces and Deichman Bjorvika in Oslo Sentrum) as being important key actors in the Oslo Campus Strategy.

## 5.3. Remote working

This study also refers to the national trends regarding teleworking

and comparisons with other international contexts. Before the pandemic, in Norway, 37% of people usually used to work remotely (9% as a permanent solution and 27% when necessary) ([Nergaard, 2020](#)). During the first wave, the government and employers recommended social distancing and teleworking from home ([Eurofound, 2020](#) referring to [Opinion, 2020](#)). In the survey conducted at the end of April 2020, it was measured that 80% of the interviewees used home office and digital solutions in Norway ([Nergaard, 2020](#)). Companies and employees have adapted to the rapid changes in the use of digital working tools. During the pandemic, the statistics reported an overall share of 39% in Norway ([Holgersen et al., 2021](#)).

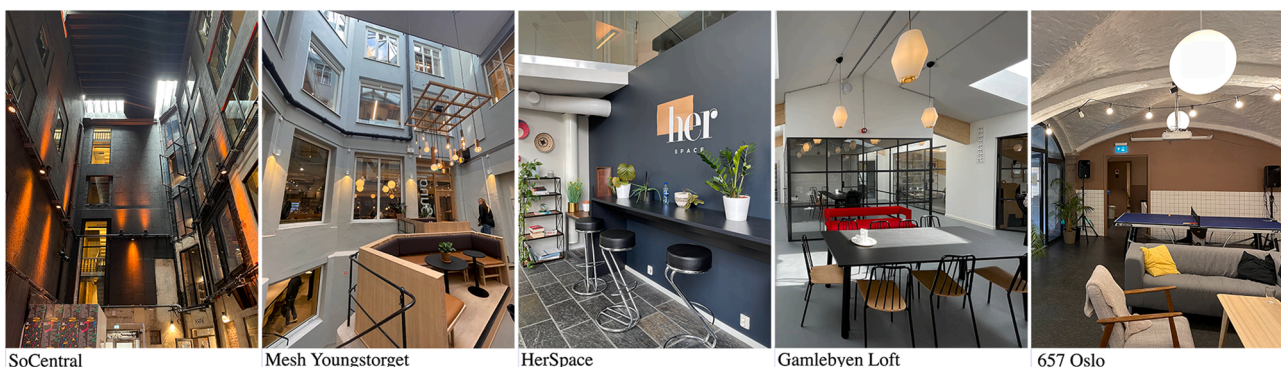
Policymakers and experts are currently debating on the new work life and whether digital trends would continue after the pandemic, as well as future ways of organizing working practices ([Eurofound, 2020](#)). The new working life might lessen the significance of the permanent workplace or perhaps even render it superfluous ([Eurofound, 2020](#)). Nevertheless, in several industries, when considering the high degree of digitalization, the changes to the working practices are considered to be relatively small in Norway. In 2021, it was estimated that 43% of jobs could be carried out remotely from home ([Holgersen et al., 2021](#)). At the time of writing, it is still recommended to work from home due to the Omicron variant of the COVID virus. Except for home, the official statistics and reports present no references to non-traditional workplaces.

To summarize, the Oslo region is very well positioned within the international context in terms of capacity for remote working (the regional share of occupations amenable to remote working). The share of Oslo is 48.25% and in line with other Nordic regions, such as Stockholm (50.65%) and the Helsinki Uusimaa Region (48.82%); while the highest share between Europe and USA is observed in Greater London (54.21%) ([OECD, 2020](#)). This capacity has led regions and cities to adapt to remote working beyond the current health crisis. Such wider acceptance might offer new opportunities for places and those cities which combine high-quality digital infrastructure with relatively large shares of high-skilled occupations ([OECD, 2020](#)).

## 5.4. The five NWS in Oslo

Five NWS (657 Oslo, So Central, HerSpace, Mesh Youngstorget, Gamlebyen Loft) are selected in Oslo and are located in the three districts of Oslo Sentrum, Gamle Oslo, and St. Hanshaugen ([Fig. 2](#)). The study has considered these five NWS as examples, since they are increasingly challenging the traditional model of coworking and/or incubators (see e.g., the possibility of being both virtually and physically in the space, already prior to COVID-19), as well as the concept of hybrid spaces and activities already developed among some of them.

First, the study considered the central and semi-central location of the five NWS and accessibility of the three districts ([Fig. 2](#)). The five spaces are surrounded by other private and public NWS, including public libraries, with some local differences in terms of concentration



**Fig. 3.** Views of the interiors of the five NWS. Authors' pictures.



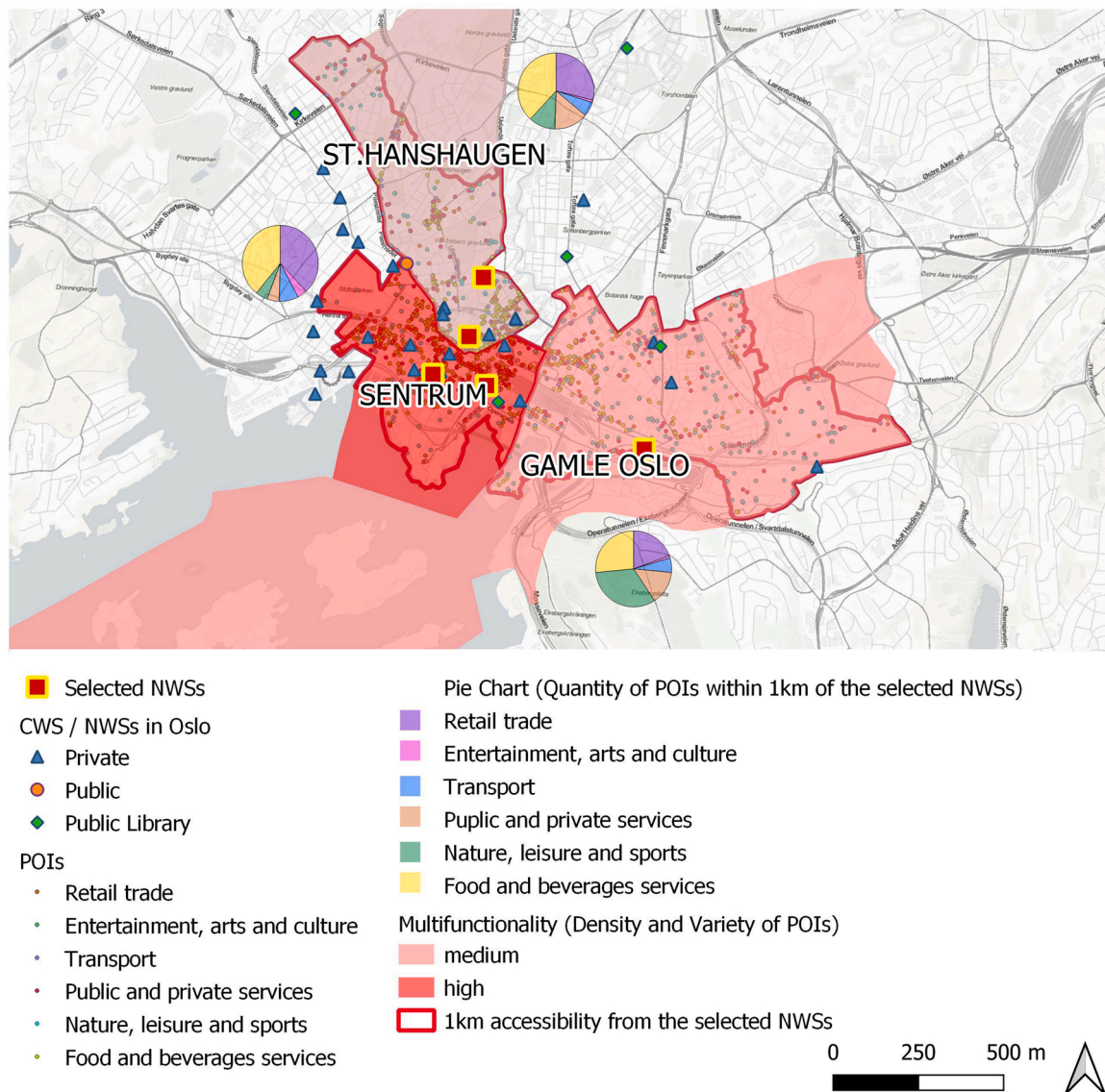


Fig. 4. Multi-functionality of the three neighborhoods and NWS (density and variety of POIs). Authors' elaboration.

and distribution. Nevertheless, both the differences and similarities on the co-location and distribution of NWS are relevant factors with which to explore the hybridity in both central and semi-central locations as well as any mutual influences with the surrounding neighborhoods.

Secondly, Table 3 introduces some specific characteristics of the three districts: population and education. Oslo Sentrum presents a very low concentration of population (1471 inh.), and this is very much related to high housing prizes. In addition, some existing buildings might be emptied in the very near future as some larger cultural institutions and public actors will be re-located to other parts of the city. Thus, several vacant plots will be available for new purposes. (Oslo City, 2020). Due to the very high presence of public as well as private organizations and offices, this is a very attractive area and one of the most visited districts by daily commuters, from the Oslo region and residents from other districts, while, in contrast, city life after working hours is very low (Oslo City, 2020).

The district of St. Hanshaugen is populated by 40,000 inhabitants with mostly young adults and many single residents. The district stretches from east to west, and from central Oslo to Marienlyst (Oslo Kommune, 2021a). It presents a relatively high concentration of highly educated inhabitants. The local community has embraced the motto 'Together in the district of St. Hanshaugen' (*Sammen i Bydel St.*

*Hanshaugen*). The aim is to create a safe and enjoyable local community with good living conditions for all. Gamle Oslo is the second most populous district of Oslo with its 60,000 inhabitants. The city's diversity and great variation in living conditions characterize the district. This provides unique opportunities and challenges to planners, residents, and stakeholders, who are working on a new vision "together on solutions" (*sammen om løsninger*). The priorities of the district identified by Oslo Kommune (2022–2025) concern more comprehensive and accessible services, as well as more mutual and robust partnerships (Oslo Kommune, 2021b).

Thirdly, the selected NWS present mixed typologies and functions, which render the spaces as being very multi-functional. The preliminary data from the database (on the NWS, see Section 3) show that the five NWS act as incubators and/or communities, supporting entrepreneurs growing their start-ups and hosting high-tech companies, and individuals (Table 4, based on desk research).

In addition, the flexibility of the layout, variety of services provided, and social spaces (Fig. 3 introduces the five NWS, while Section 6.4 provides a comprehensive visual overview of these NWS), as well as digital events, which are advertised in the social media, already reveal some relatively important hybrid model and aspects. Thus, these five NWS were chosen to further explore the concept of hybridization.



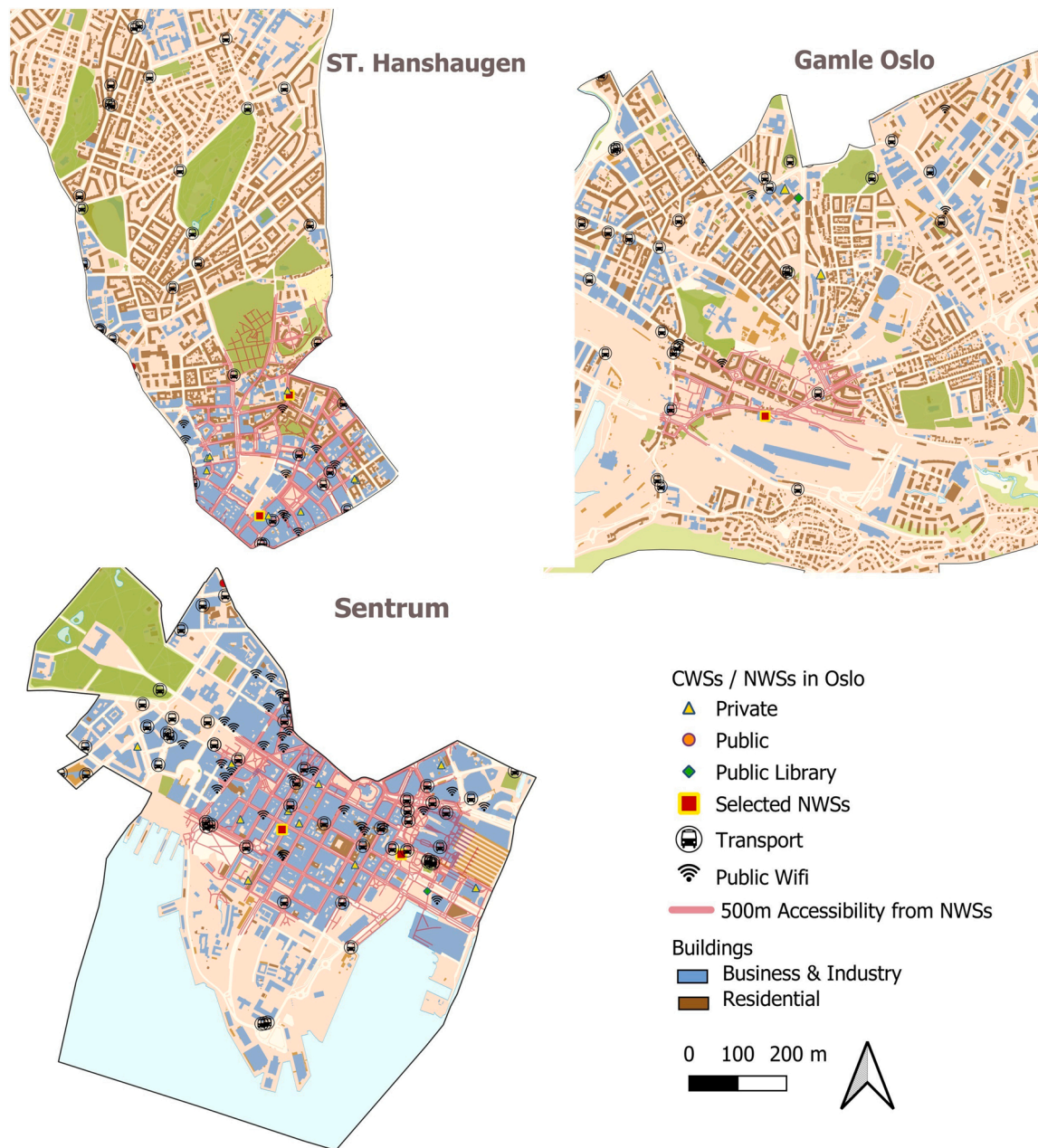


Fig. 5. Oslo Centrum, St. Hanshaugen, and Gamle Oslo: Main functions, accessibility, and IT infrastructures. Authors' elaboration.

The five NWS are privately managed. Several financial supports are based on collaborative research projects. During the first wave of the pandemic, the government established a subsidy scheme of 50 million NOK (Innovation Norge, 2020) for a target group of private innovation and entrepreneurial environments, including incubators, coworking spaces, and accelerators. The government aimed to support this ecosystem, since they offer important services and meeting places for start-up and growth companies, and it is still young and in the development phase. Amongst the 22 winning applicants, there were also three of the five selected NWS. This supported them, for example, to continue offering digital services and new opportunities to users and several entrepreneurs, as well as implementing new activities.

## 6. Methods

### 6.1. Spatial analyses of the three selected districts of Oslo Sentrum, St. Hanshaugen and Gamle Oslo

Spatial analyses using GIS tools helped to explore and map the conditions which provide opportunities for hybrid spaces in the three selected districts of Oslo Sentrum, St. Hanshaugen and Gamle Oslo. This study focuses on the following conditions: i) multi-functionality (concentration and diversity of functions and activities); ii) accessibility to public transport; iii) local amenities and services within 10' walking from the five NWS; iv) mixed land-use; and v) IT infrastructure (such as the provision of Wi-fi spots in public spaces).

The above conditions were selected based on the outcomes from the main relevant studies which discuss features that are desirable in creating hybrid spaces. These features help to explore the conditions for

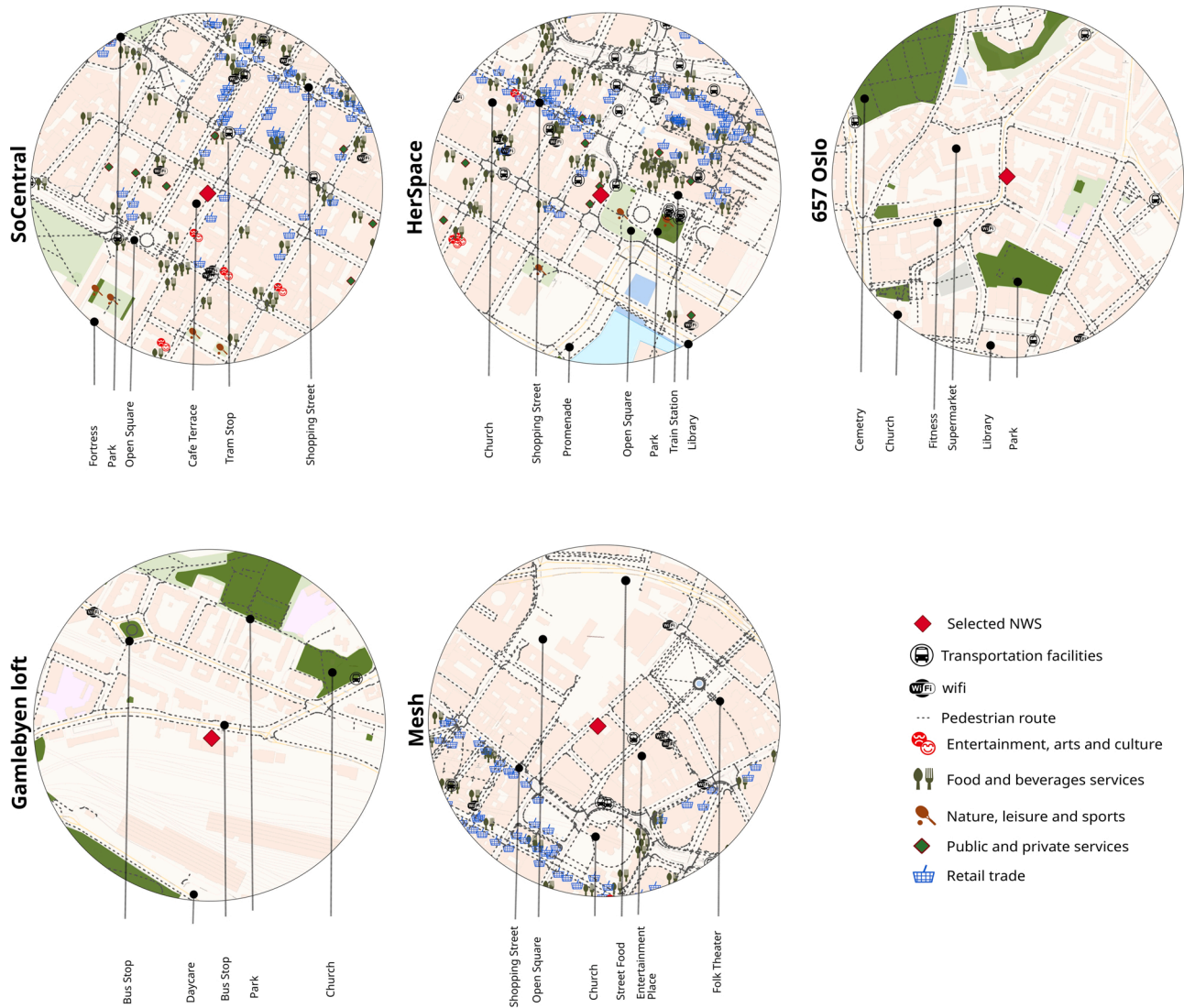


Fig. 6. Authors' elaboration. Local amenities and services around the five NWS (adapted from Cho et al., 2017).

hybridization, considering for example, the multi-functional urban structure, and the diversity and intensity of available services (Krasilnikova and Klimov, 2020; Cho et al., (2016,2017)). In addition, data on digitalization contribute to understanding ways in which both neighborhoods and their public and semi-private spaces are becoming more digitalized, thus supporting the hybridization of urban spaces (Volpi & Opromolla, 2017).

Spatial analyses supported by GIS tools were carried out to examine the diversity of urban functions surrounding the NWS (Fig. 4). To understand the diversity of urban functions occurring in the three districts surrounding the NWS, data are used from the OpenStreetMap road network and Points of Interest (POIs) of September 2021. POIs are classified into six main categories: public and private services, food and beverages services, retail trade, nature, leisure and sports, entertainment, arts and culture, and transportation facilities. These constitute the urban functions under analysis. The diversity of urban functions (POIs) is mapped and analyzed. For each district, the number of each category was normalized (based on the number of all POIs of the districts). In addition, we mapped the density of NWS (private and public), including public libraries, as formal and informal spaces for working (see database described in Section 4).

The data from the current land use, access to public transport (buses,

metro, and trains) and location of some public Wi-fi spots are extracted from the OpenStreetMap (Fig. 5). We calculated the shortest path on the network to find the accessibility within 500 m from each NWS in each district. In addition, we mapped the existing location of NWS around the five selected ones (see Section 4). The data on Wi-fi provide a preliminary overview of the possible points of access to the public IT infrastructures of the city. However, citizens in Oslo can easily move from a public to a private Wi-fi spots considering the very stable and structured IT network.

In addition, Fig. 6 was constructed by analyzing the local amenities and services (including Wifi-spots) which are within 10 min' walking distance from the five NWS. Data were extracted from OpenStreetMap. These maps support the analysis of mixed-land-use development around each NWS, and provide more detailed information about their surroundings, possible influences, and mutual overlaps with nearby neighborhoods. The presence of several activities in a neighborhood can create mutual synergies (Cho et al., 2017). For example, recreational uses in green areas, sport activities, and art and cultural spots may promote several social interactions between people who live and work in the district and the NWS.

**Table 5**  
Basic observational protocol used in the observations of the 5 NWS.

Checklist of observations	Aim of the observations	Type of data collected
What are the spatio-functional, social, and digital features of the spaces? Where does the interaction occur?	This helps to understand the characteristics of the space and possible various interactions To explore the flexibility and multi-functional of the space	Data on the existing features in the space (notes and pictures) Data on more flexible and multi-functional corners which host spatio-functional, social and digital interactions (notes and pictures)
What are the hybrid interactions in the spaces, event/activities?	To explore how individuals are engaged in this layered (interplayed) environment of the spatio-functional, social, and digital features	Data on physical and digital members and how spatio-functional, social and digital interactions occurs (notes and pictures)
What are the functions and activities on the first floor and visibility of the NWS from the outside?	To explore the spatio-functional and social links of the NWS with the neighborhoods and interactions between NWS users and neighborhoods residents or visitors	Data on functions and activities provided at the street level (notes and pictures). This was supplemented by desk-research on digital advertisements about events (through social media)
What are the temporal uses, functions and activities of, and people's presence in the NWS?	To explore the temporal dimension of the NWS	Data on these aspects were limited to the length of our visits (notes and pictures). This was supplemented by the interviews' anecdotes and information

6.2. Cross-case analysis between the 5 NWS

The case study method was used in this study, and in particular cross-case analysis. A case study is “an empirical inquiry that investigates a contemporary phenomenon with its real-life context, especially when the boundaries between phenomenon and real context are not clear and evident” (Yin, 1994, p.13). Unlike a single case, cross-case analysis focuses on a number of towns, professions, families and individuals (Yin, 2003). Cross-case analysis is useful in moving beyond the understanding of a single unit (Khan & VanWynsberghe, 2008, Yin, 2003). In this study, cross-case analysis helps to do the following: understand how relationships may exist among the five NWS, accumulate new knowledge, refine

and develop concepts (Khan & VanWynsberghe, 2008, referring to Ragin, 1993), and test the theory (Khan & VanWynsberghe, 2008, referring to Eckstein, 2002).

The cross-case analysis facilitated the comparison among the five NWS and their surroundings, thus revealing new dimensions and questions for further studies on NWS. First, the context, exteriors and characteristics of the buildings in which the five NWS are located, were observed by the authors in order to contextualize them. As a sub-method within the cross-case analysis, walking interviews with managers of the five NWS were conducted (see Section 6.2.1). The conceptual model (Fig. 1) and the list of hybrid features (Table 2) were tested (see Tables 7 and 8). To this end, the five NWS were investigated considering their

**Table 6**  
Selected content analysis of the semi-structured interviews with the managers.

Category	Code	Excerpts from interviews
Hybrid features, spaces, activities	Inter_3 dim <sub>1</sub>	“We have quite different events, but mostly for female entrepreneurs. Of course, we do not limit males from participating, but we aim to support females in their entrepreneurial journey (...) But very many of them join for our online sessions” (Manager 1, Oslo, August 2021)
Hybrid features, spaces, activities	Inter_3 dim <sub>2</sub>	“We hold online and offline activities and sometimes we have events in both formats. We remove these tables, bring a projector, and do a recording. Very many members and non-members join our sessions and lectures online. This is the way we expand” (Manager 2, Oslo, August 2021)
Hybrid features, spaces, activities	Inter_3 dim <sub>3</sub>	“We are flexible, and we provide flexibility to our customers. As for spontaneous events, then yes, they [members] can do it in principle. For example, we recently had yoga classes. And the trainer was a coworking member. She just said that she would like to deliver a yoga class. And, by the way, very many members came. And we even had the idea of making it permanent” (Manager 2, Oslo, August 2021)
Hybrid features, spaces, activities	Inter_3 dim <sub>4</sub>	“Well, yes, every one of our members can in principle set up their own seminar, and we actually had a few seminars given by our members.” (Manager 4, Oslo, August 2021)
Hybrid features, spaces, activities	Inter_3 dim <sub>5</sub>	“We can have our Friday lunch in two areas. We can sit in the kitchen, or we go outside. We also have a working area on the second floor. Those who need to work, go there. Otherwise, or talking, we stay here [on the first floor]” (Manager 3, Oslo, August 2021)
Hybrid features, spaces, activities	Inter_2 dim <sub>1</sub>	“Actually, we attract [online] only Norwegian people. But we expand our community through the whole of Norway” (Manager 1, Oslo, August 2021)
Hybrid features, spaces, activities	Inter_2 dim <sub>2</sub>	“Flexibility is definitely about online and offline activities. We are used to it and our customers are used to it. We have this digital transformation and will retain it.” (Manager 2, Oslo, August 2021)
Hybrid features, spaces, activities	Inter_2 dim <sub>3</sub>	“We have different areas, indeed. We have a working area upstairs, private offices here [on the ground floor], and even a tennis table and some other games. So, our members can play and have fun” (Manager 3, Oslo, August 2021)
Hybrid features, spaces, activities	Inter_2 dim <sub>4</sub>	“If a female needs to take care of her child, she can always tell us in advance and we will hire a babysitter” (Manger 1, Oslo, August 2021)
Understanding hybridization	Hyb_M_Persp_1	“A hybrid space is based on diversity and inclusion of members which are from very different backgrounds” (Manager 2, Oslo, August 2021)
Understanding hybridization	Hyb_M_Persp_2	“Accessibility for people both in online and in-space modes”. (Manager 3, Oslo, August 2021)
Understanding hybridization	Hyb_M_Persp_3	“We try to be here, find solutions, and we do not make rules” (Manager 5, Oslo, August 2021)

List of codes

Codes used within the content analysis, including episodes and routine activities described by the managers which show an interaction between three dimensions, or two of them (while the third one is more implicit), as well as the managers' understanding of hybridity










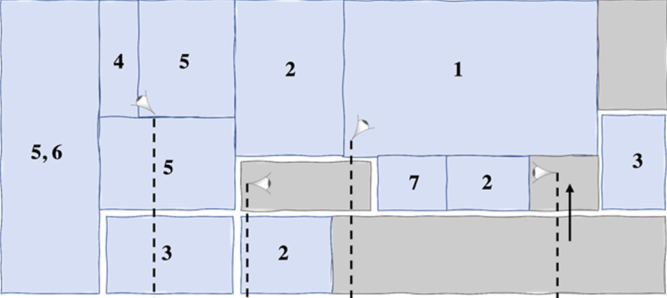




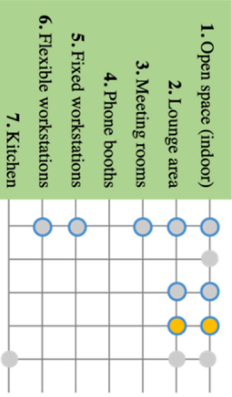
- Hybrid features, spaces, activities – Interaction between three dimensions: Inter\_3 dim= 8
- Hybrid features, spaces, activities – Interaction between two dimensions while the third one is more implicit: Inter\_2 dim= 6
- Understanding hybridization from the managers' perspectives: Hyb\_M\_Persp= 7

**Table 7**  
Cross-analysis among the five NWS and related features.

	SoCentral	HerSpace	657 Oslo	Gamlebyen Loft	Mesh Youngstorget
<b>Spatio-functional features</b>					
Multi-functionality	<b>5<sup>th</sup> floor (main):</b> <ul style="list-style-type: none"> <li>• Open space (indoor)</li> <li>• Lounge area</li> <li>• Meeting rooms</li> <li>• Phone booths</li> <li>• Fixed workstations</li> <li>• Flexible workstations</li> <li>• Kitchen</li> </ul> <b>Other floors:</b> <ul style="list-style-type: none"> <li>• Open space (indoor)</li> <li>• Café bar</li> <li>• Restaurant</li> <li>• Fixed and flexible workstations</li> </ul>	<b>Ground floor:</b> <ul style="list-style-type: none"> <li>• Open space (indoor)</li> <li>• Lounge area</li> <li>• Flexible workstations</li> <li>• Kitchen</li> </ul> <b>1<sup>st</sup> floor:</b> <ul style="list-style-type: none"> <li>• Fixed and flexible workstations</li> <li>• Kids area</li> </ul>	<b>Ground floor:</b> <ul style="list-style-type: none"> <li>• Open space (outdoor)</li> <li>• Lounge area</li> <li>• Playing area</li> <li>• Flexible workstations</li> <li>• Kitchen</li> <li>• Meeting rooms</li> </ul> <b>Other floors:</b> <ul style="list-style-type: none"> <li>• Single offices</li> <li>• Shared spaces</li> <li>• Meeting rooms</li> <li>• Fixed and flexible workstations</li> <li>• Event venues</li> <li>• Sound/ Photography studio</li> </ul>	<b>Ground floor:</b> <ul style="list-style-type: none"> <li>• Open space (outdoor)</li> <li>• Café bar</li> <li>• Restaurant</li> <li>• Event venue</li> <li>• Yoga studio</li> </ul> <b>1<sup>st</sup> floor:</b> <ul style="list-style-type: none"> <li>• Single offices</li> <li>• Lounge area</li> <li>• Shared spaces</li> <li>• Meeting rooms</li> <li>• Sound/ Photography studio</li> <li>• Kitchen</li> </ul>	<b>Ground floor:</b> <ul style="list-style-type: none"> <li>• Open space (atrium)</li> <li>• Café (or Work bar)</li> <li>• Workstations</li> <li>• Quite area</li> <li>• Kitchen</li> </ul> <b>Other floors:</b> <ul style="list-style-type: none"> <li>• Lounge area</li> <li>• Shared spaces</li> <li>• Meeting rooms</li> <li>• Sound studio</li> <li>• Bar</li> </ul>
Flexibility	X	X	X	X	X
Accessibility and connectivity	X	X	X	X	X
Provision of innovative public uses	<ul style="list-style-type: none"> <li>• The combination of a café and area for multi- projection (display and light system) 1<sup>st</sup> floor of the building, as well as a restaurant</li> </ul>			<ul style="list-style-type: none"> <li>• Neighborhood festivals</li> <li>• Jazz night in the café bar</li> </ul>	<ul style="list-style-type: none"> <li>• Work café</li> <li>• ‘Hybrid space’</li> </ul>
Programmatic or functional hybrids	<ul style="list-style-type: none"> <li>• Yoga class</li> <li>• Courses</li> <li>• Other events</li> <li>• Secondhand selling</li> </ul>	<ul style="list-style-type: none"> <li>• Yoga class</li> <li>• Workshops/ courses</li> <li>• Other events</li> <li>• Kids caring</li> </ul>	<ul style="list-style-type: none"> <li>• Workshops</li> <li>• Other events and Pop-ups</li> <li>• Playing (ping pong)</li> <li>• Community breakfast, BBQ lunch, and other after work activities</li> <li>• Podcast</li> </ul>	<ul style="list-style-type: none"> <li>• Festivals</li> <li>• Jazz nights</li> <li>• Podcast</li> </ul>	<ul style="list-style-type: none"> <li>• TV broadcasts, public talks</li> <li>• Other events</li> <li>• Podcast</li> </ul>
<b>Social features</b>					
Diversity and inclusivity of a place	X (including refugees, students, NGOs)	women and mothers oriented	X	X	X
Informal social interactions happen in	Café-restaurants (1st f of the building) Lounge areas Kitchen Shared spaces	Lounge/Sofa areas Kitchen Shared spaces	Playing/relaxing area Lounge areas Kitchen Shared spaces	Café Lounge areas Kitchen Shared spaces	Work café Restaurant Lounge areas Shared spaces
Provision of services and infrastructure	Citizens Companies Visitors	Companies	Companies	Companies Visitors	Citizens Companies Visitors
Offering new places (for business and public support)	Business Public Support	Business	Business	Business	Business
Getting support and attracting stakeholders	X	X	X	X	X
Helping in providing an active image or communication	citizens, leaders, and governments, companies, investors, and visitors	companies and investors,	companies and investors	companies, and investors	leaders, companies, investors, and visitors
Degree of publicness of privatized spaces	X		X	X	X
Management of space	Private-public partnership	Private	Private	Private	Private
Spontaneous and temporary appropriation of place	X	X			X
Time regulations	18 h	8 h	7 h	24 h	9 h
Psychological support to the customers	X	X		X	
Social support for independent professionals	X	X	X	X	X
Self-organized and ‘soft’ forms of governance	X				
<b>Digital features</b>					
Digital solutions	X	X	X	X	X
Virtual spaces to socialize and communicate,	X	X	X	X	X
Virtual spaces to cooperate	X	X	X	X	X
Moving from one virtual space to another	X	X			X
Flexibility within online membership	X	X			X
Digitalization and supporting customers’ preferences	X	X			X

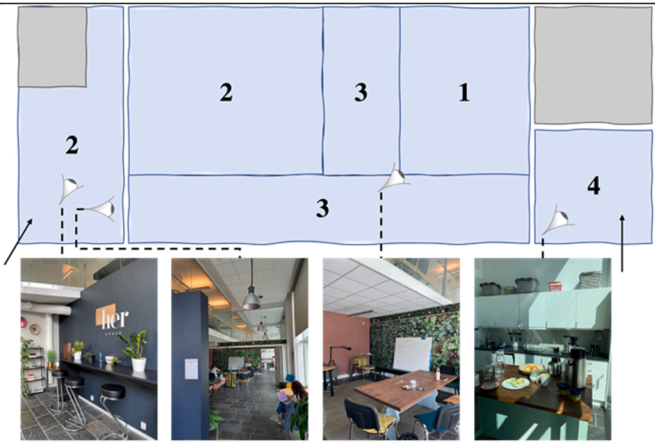
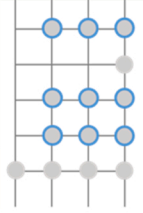
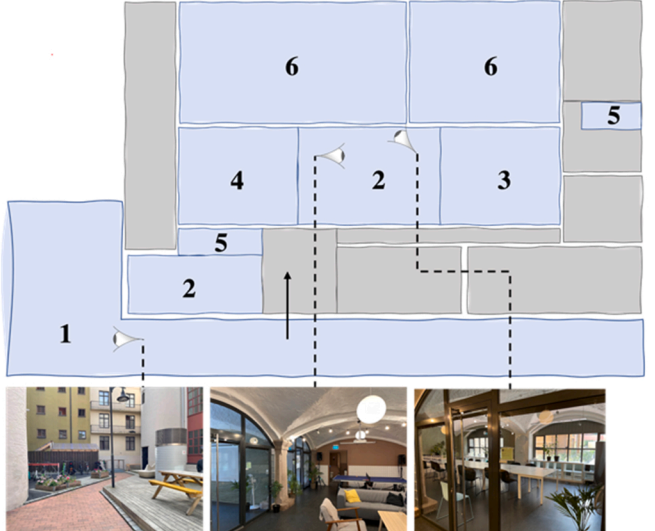
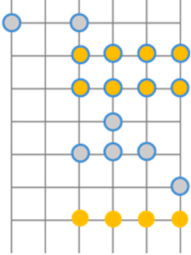
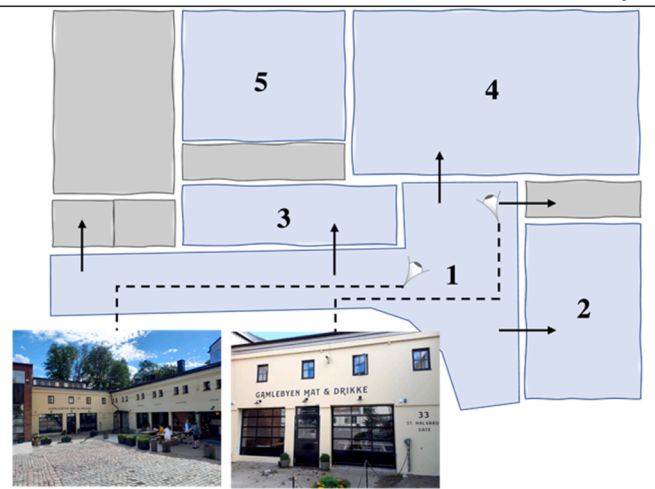
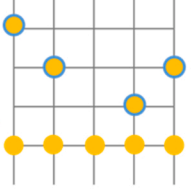


**Table 8**  
Visualization of spatio-functional features and combination of selected spatio-functional, social, and digital features.

Visualization of spatio-functional areas	Diagrams showing the combination of selected spatio-functional, social and digital features
<b>Legends</b>	
<ul style="list-style-type: none"> <li> <b>Spatio-functional areas</b></li> <li> <b>Other service areas</b> (e.g., entrance filter, transient spaces, toilet, reception, storage, stairs, etc.)</li> <li> <b>Entrance</b></li> <li> <b>View direction for images</b></li> </ul>	<ul style="list-style-type: none"> <li> <b>Spatio-functional features</b> (Multifunctionality; Flexibility; Programmatic and functional hybrids)</li> <li> <b>Social features</b> (Informal social interactions happen in)</li> <li> Degree of publicness of the privatized spaces</li> <li> <b>Digital features</b> (Digital solutions; Virtual spaces to socialize and communicate)</li> <li> <b>Private access</b></li> </ul>
<i>Spaces which are numbered in the maps correspond to the numbers on the adjacent diagrams</i>	
<b>SoCentral</b>	
 <div data-bbox="164 1491 764 1683" style="display: flex; justify-content: space-around;">     </div>	<div data-bbox="858 1225 1361 1623" style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p><b>1. Open space (indoor)</b></p> <p><b>2. Lounge area</b></p> <p><b>3. Meeting rooms</b></p> <p><b>4. Phone booths</b></p> <p><b>5. Fixed workstations</b></p> <p><b>6. Flexible workstations</b></p> <p><b>7. Kitchen</b></p> </div>  </div>

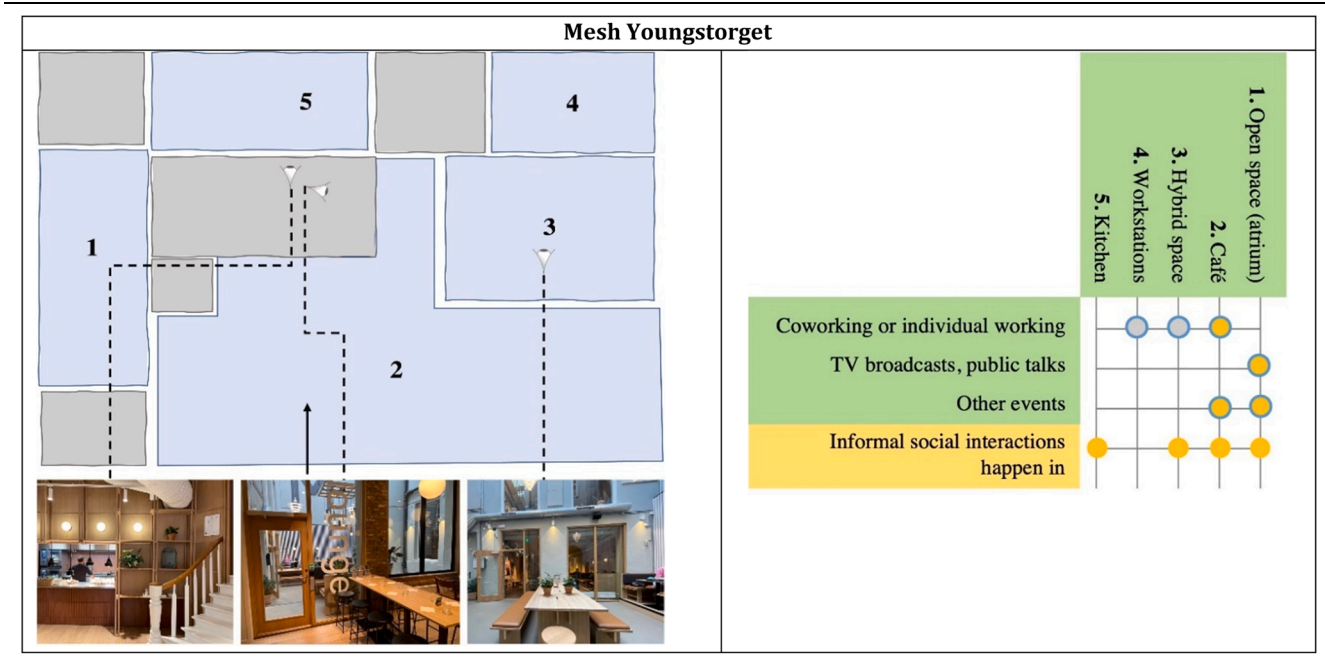
(continued on next page)

Table 8 (continued)

<b>HerSpace</b>	
	<div style="display: flex; flex-direction: column; align-items: flex-end;"> <div style="background-color: #c8e6c9; padding: 5px; margin-bottom: 5px;"> <p>1. Open space (indoor) 2. Lounge area 3. Flexible workstations 4. Kitchen</p> </div> <div style="display: flex; align-items: center; gap: 10px;"> <div style="background-color: #c8e6c9; padding: 5px; flex: 1;"> <p>Coworking/ individual working Yoga Workshops/ courses Other events</p> </div> <div style="background-color: #fff9c4; padding: 5px; flex: 1;"> <p>Informal social interactions happen in</p> </div> </div> <div style="margin-top: 10px;">  </div> </div>
<b>657 Oslo</b>	
	<div style="display: flex; flex-direction: column; align-items: flex-end;"> <div style="background-color: #c8e6c9; padding: 5px; margin-bottom: 5px;"> <p>1. Open space (outdoor) 2. Lounge area 3. Playing area 4. Flexible workstations 5. Kitchen 6. Meeting rooms</p> </div> <div style="display: flex; align-items: center; gap: 10px;"> <div style="background-color: #c8e6c9; padding: 5px; flex: 1;"> <p>Coworking Workshops Other Events and Pop-ups Playing (ping pong) Community breakfast BBQ lunch</p> </div> <div style="background-color: #fff9c4; padding: 5px; flex: 1;"> <p>Informal social interactions happen in</p> </div> </div> <div style="margin-top: 10px;">  </div> </div>
<b>Gamlebyen Loft</b>	
	<div style="display: flex; flex-direction: column; align-items: flex-end;"> <div style="background-color: #c8e6c9; padding: 5px; margin-bottom: 5px;"> <p>1. Open spaces (outdoor) 2. Café bar 3. Restaurant 4. Event venue 5. Other spaces</p> </div> <div style="display: flex; align-items: center; gap: 10px;"> <div style="background-color: #c8e6c9; padding: 5px; flex: 1;"> <p>Yoga Festivals Jazz nights</p> </div> <div style="background-color: #fff9c4; padding: 5px; flex: 1;"> <p>Informal social interactions happen in</p> </div> </div> <div style="margin-top: 10px;">  </div> </div>

(continued on next page)

Table 8 (continued)



spatio-functional, social and digital features, similarities and differences (Table 7). This was supplemented by comparing the maps of the surroundings of the 5 NWS, and diagrams about hybridization (Table 8), as well as by presenting the outcomes from interviews (managers’ quotations and anecdotes) (see Table 6 and Sections 7.2.3, 7.2.4 and 7.2.5). The interviews with managers also provided some relevant info about the temporal use, control, activities and presence of users in the five NWS (Section 7.2.6).

6.2.1. Walking interviews in the five NWS

The cross-case analysis used the go-along walking interview as sub-method that consists of a mixture of an interview and participant observation. This method allows the interviewer and participants to walk side-by-side rather than being situated directly face-to-face in an ordinary interview (Kinney, 2017). It is also used to encourage spontaneous talking that becomes easier with walking and is aimed at reducing any power imbalance (Kinney, 2017).

As researchers, we accompanied the participants in their natural environment to explore and discuss the hybridity of NWS. Thus, the walking interview aimed to analyze in which circumstances the combination of the three dimensions (Table 2) happens (e.g., among whom and how, and how long this interaction lasts, for more prolonged time or temporally). The walking interviews also aimed to probe the connections between hybrid spaces, people, their habits, and community.

The method had three stages; initially, we met the participants in a warm-up interview. Secondly, we walked along the building and visited

the various floors and spaces, during which we asked questions dealing with several topics. The walking interviews lasted around 2 h in each NWS. Open-ended questions were prepared and asked, although ad hoc questions were raised as the interview progressed (Kinney, 2017).

The interviews were conducted with the 5 managers of the spaces dealing with the following topics: i) general info about and concept of the NWS (background of users and activities, whether they have embedded the hybrid space as a concept); ii) changes to the NWS under the pandemic, the types of interactions and services provided; and iii) managers’ perspectives on the hybridization of NWS (including activities and functions).

Thirdly, as participant-observers, we focused on: i) the spatio-functional, social, and digital features of the spaces; ii) where and how the combination of the three dimensions occurs (in the space and through activities); iii) how individuals are engaged in this layered (interplayed) environment of spatio-functional, social, and digital features; iv) links of the NWS to the neighborhoods (functions at the street levels and interactions between NWS users and neighborhoods residents or visitors); and vi) temporal dimensions of uses, functions, activities (Table 5). An extensive visual documentations and notes were taken, which support the analysis and interpretations of the main outcomes. Some of them are represented into the maps and diagrams of Table 8.

At the end of the tour, we discussed with the managers about what we had seen and their opinions about the future challenges of NWS after the pandemic, with us then concluding the interviews.

For each NWS, we collected information on place, date, time. Three

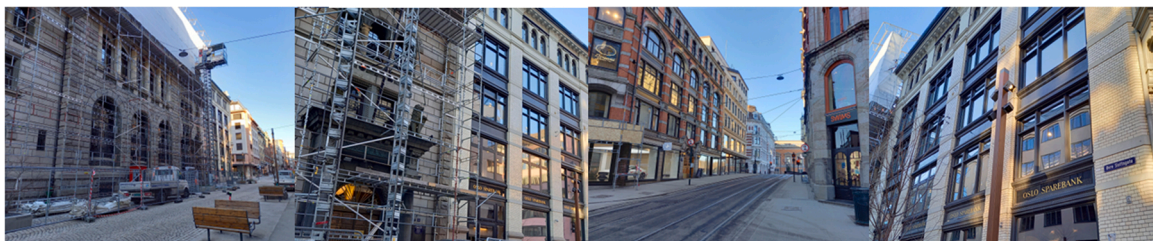


Fig. 7. Surroundings of SoCentral. Authors’ pictures.



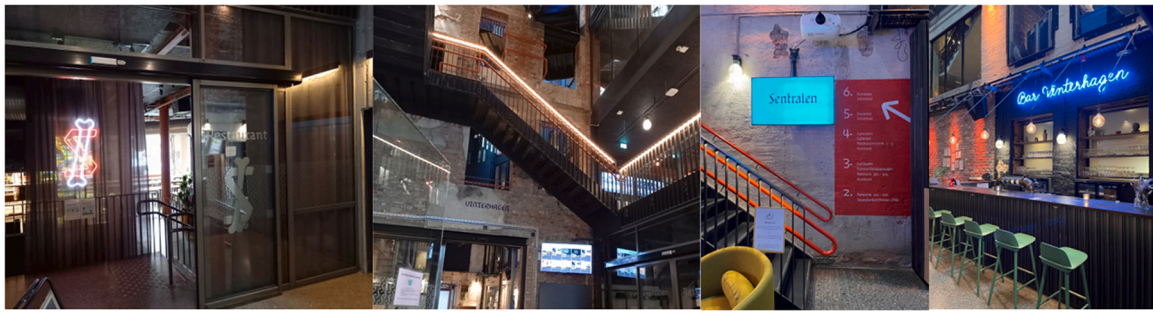


Fig. 8. Interiors of SoCentral – building and ground floor. Authors' pictures.



Fig. 9. Surroundings of HerSpace. Authors' pictures.

out of the four authors of the paper were present in the walking interviews of 4 NWS, whereas two of them visited the fifth one. In each place, there was a manager to interview who walked with the researcher along the spaces and floors of the buildings.

### 6.3. Data analysis

#### 6.3.1. Qualitative content analysis

The qualitative content analysis seeks to understand the interaction among features belonging to the three dimensions, and ways in which hybridization occurs in these 5 NWS. During the walking interviews, the managers were also asked about their own understanding of hybridization. Thus, similarities and differences among the managers on the interpretation of hybridization were also explored.

The theme of hybridity was explored by analyzing the qualitative content of the five manager interviews (2 h duration each), by transcribing and selecting notes taken during the interviews, and by coding statements provided (see Table 6).

Within the qualitative content analysis, two categories were identified: i) hybrid features, spaces, activities and interaction; and ii) understanding of hybridization. These categories were considered to be relevant topics for further discussions and conclusions, since they are based on the findings from the literature review presented in this study. Hence, we selected these topics deductively (Mayring, 2014). The codes refer to: (i) the explicit interaction between the three dimensions (spatio-functional, social and digital, see Table 2) described by the managers; ii) the interaction among two dimensions while the third one is more implicit; and iii) managers' perspectives on hybridization (Table 6).

The qualitative content analysis helped to produce descriptions (with anecdotes and quotations from the managers, see Table 6). The outcomes also contributed to contextualizing and interpreting the hybridization of the five NWS and discussing similarities and differences among them (see Sections 7.2.3, 7.2.4 and 7.2.5).

#### 6.3.2. Data analysis from observations

The data collected from the participant observations were reported as field notes and supported by pictures. The spatio-functional, social and digital features listed in Table 2 were observed and are reported in Table 7. The maps were constructed considering some spatio-functional features (see Table 7), while the diagrams show some interactions and synergies among spatio-functional, social and digital features that were observed in the five NWS (Table 8).

The maps focus on the spatio-functional areas that support the understanding of multi-functionality and flexibility (see Table 8). The shared spaces and their uses – both silent areas for individual workers and more flexible spaces for teamwork – were mapped (Bilandzic et al., 2018), since the latter, for example, offer more opportunities for socializing on-site. We also mapped places where other interactions between spatio-functional, social and digital practices may occur (e.g. meeting rooms and lounge areas). An understanding of multi-functionality and flexibility can also support analyses about informal social interactions (Bilandzic et al., 2018; Bilandzic & Johnson, 2013). We also mapped the places where main encounters may occur and where events are organized (e.g. meetings rooms).

The diagrams (in Table 8) show some interactions among selected spatio-functional, social and digital features. Three features of the spatio-functional dimension (multi-functionality, flexibility, and programmatic and functional hybrid), two features of the social dimension (degree of publicness of privatized spaces, and informal social interactions), and two digital features (digital solutions, and virtual spaces to socialize and communicate) are analyzed and included in the diagrams. The aim of these diagrams is to better understand the relationships between the activities and spaces, as well as the combination of the above features. This is a pioneering study method which expands knowledge on how to illustrate the interaction between various features. This study can be further developed by integrating other features and other floors in the five NWS.



Fig. 10. Surroundings of 657 Oslo. Authors' pictures.



Fig. 11. Courtyard of 657 Oslo. Authors' pictures.

## 7. Results

### 7.1. Results from the spatial analysis of the neighborhoods

The outcomes of the spatial analyses of the three neighborhoods illustrate conditions that may increase the opportunity for hybrid spaces in these districts. The three districts present several conditions, such as multi-functionality, concentration, and diversity of functions and activities (including NWS); accessibility to public transport; amenities and services within 10 min' walking distance; mixed land-use; and access to public Wi-fi spots. Clearly, there are several local variations among the districts (Fig. 4).

Fig. 4 shows the geographic concentration of the NWS in the three districts. The analysis of the distribution of the NWS within the three urban districts of Oslo reveals that the Oslo Sentrum hosts 28.94% of the total number of NWS in Oslo, St. Hanshaugen has 21.05%, whereas Gamle Oslo 13.15%. The higher concentration of NWS in Oslo Sentrum and the southern part of St. Hanshaugen is related to the higher concentration of jobs and proximity to other businesses. In Oslo, the relatively monocentric structure of the city has rendered the city center very multi-functional and provides several public transport services.

Fig. 4 also illustrates the density and diversity of the classified POI and their distribution within the three city districts. NWS in Oslo Sentrum are within the proximity of more diverse amenities and services, but NWS have very limited access to green space, while the NWS in Gamle Oslo are more in proximity to green spaces rather than more diverse amenities and services. In Oslo Sentrum, there are less private and public services (e.g., libraries, churches, banks) compared to the other two districts.

Furthermore, the concentration of functions within the 10' (from the NWS) is higher in Oslo Sentrum than the other two districts St. Hanshaugen and Gamle Oslo. The diversity of functions is similar among St. Hanshaugen and Gamle Oslo, except for green spaces, as well as food and beverage services.

Most of the NWS are accessible by public transport in all three

districts, although in the eastern district of Gamle Oslo, there is low accessibility due to the internal structure and several physical barriers (roads and railway) (Fig. 5). The most prevalent functions in Oslo Sentrum are business and industry, while in St. Hanshaugen and Gamle Oslo there are more residential uses (Fig. 5). However, the southern part of St. Hanshaugen presents a high concentration of businesses. This may also explain the high concentration of NWS in that part of the city closer to Oslo Sentrum. Oslo Sentrum is closer to the harbor, in which many social events and activities happen; it is also very attractive to citizens and visitors. The Sentrum is in proximity to the main railway station; thus, rendering it more accessible to the NWS users than Gamle Oslo.

The public Wi-fi spots are more predominant in public spaces such as in squares and streets in Oslo Sentrum and the southern part of St. Hanshaugen, while they are very scattered in Gamle Oslo (Fig. 5). The higher concentration of public Wi-fi spots may increase the integration of uses, forms and activities in creating hybrid urban environments (see Cho et al., 2017; Hampton et al., 2009), as the pioneering international cases showed (Dundas Square in Toronto, Bryant Park in New York, hybrid café in Rochester) (Section 2.4). These conditions and users' habits can increase the level of hybridization in public spaces. Diverse people and activities may interact in synergic and efficient ways and create new hybrid spaces.

In addition to traditional public spaces, we considered amenities and services within 10 min' walking distance of the five NWS and identified spaces where there are opportunities for integration of different uses, activities and interactions among people, both on-site and digitally. These spaces include coffee shops, restaurants (see Food and Beverage services) and public libraries (see Public and Private Services) (Fig. 6). These places are also surrounded by conditions that can support hybrid environments (such as Wifi, transportation, services and retail trade).

Fig. 6 shows that there is a high presence of amenities and services, as well as close proximity to other hybrid urban spaces and NWS (Fig. 4, Fig. 5) and within 10 min' walking distance of the selected NWS (Fig. 6) – especially in Oslo Sentrum and in the southern part of St. Hanshaugen. In other words, the surroundings of SoCentral, HerSpace and Mesh





Fig. 12. Surroundings of Gamlebyen Loft. Authors' pictures.



Fig. 13. The exterior of Gamlebyen Loft. Authors' pictures.



Fig. 14. Surroundings of Mesh Youngstorget. Authors' pictures.

Youngstorget are more multi-functional and diverse than those around 657 Oslo and Gamlebyen Loft. Thus, we can assume that these two districts are more attractive to remote workers, coworkers, and digital nomads, while Gamle Oslo is less appealing.

To supplement the spatial analysis presented in this study (Figs. 4, 5 and 6), we recommend that further systematic spatial observations of the urban spaces in the three districts are required (in terms of intensity and diversity of uses and users, social activities, spatial variety and flexibility, time and regulations, sense of privacy, and other hybrid features – see Cho et al., 2017) and interviews with users. For example, further observations and analyses should be conducted at the building level for public libraries, cafés and other NWS, their immediate surroundings, as well as in squares and parks. The combination of these observations and interviews would contribute to providing a comprehensive overview of the hybrid districts, their attractiveness and users' preferences.

## 7.2. Results from the cross-case analysis of the five hybrid NWS

### 7.2.1. Surroundings, exteriors and interiors of buildings of the five NWS

The spatial analyses reported above are supplemented by

observations of the surroundings of the five NWS, including exteriors of buildings. This provides a more comprehensive overview of the five places, including a preliminary understanding of some differences and similarities among them. The NWS are located in buildings which have been recently transformed (in terms of functions and layouts). SoCentral occupied the 5th and 6th floor of a completely renovated historic building in Oslo Sentrum district, which functioned as a bank for over a hundred years (Fig. 7). SoCentral is located in the most historical district of Oslo and 10' walking by Oslo central Station. The historic district of Oslo Sentrum is characterized by an established urban structure with few vacant plots over the last decades.

Outside the coworking space, in the public-private transitory hallway, there are sitting spots, next to a deep void of the building (Fig. 8). For SoCentral, we also show the interiors of the building, considering its location on the upper floors and varied spaces accessible by the NWS users at the ground floor.

Her Spaces occupies the first floor (including the loft) of a very central and modern building facing the Oslo Station (2' walking), used previously as a traditional office. The building characterized by very large glass windows. The façade makes the place visible from the outside and is visually connected with the surrounding public spaces (Fig. 9).



Nonetheless, visitors may have some difficulties recognizing it since the space sign is not obviously displayed.

657 Oslo is located in Oslo Sentrum, in one of the most historic parts of the district characterized by medieval and classical buildings, narrow and hilly (steep) streets, as well as original paved paths. Despite its central location, it is placed in a quieter area and is a 15' walk from the Oslo station (Fig. 10).

The premise of 657 Oslo which occupies three floors is the result of significant renovations (both structural and aesthetic). The entrance to 657 Oslo is inside a beautiful courtyard surrounded by other historic buildings (Fig. 11).

Gamlebyen Loft is located in Gamle district which is 10' by bus (20' by bike) from Oslo Central Station (Fig. 12). It is one of the projects for urban development and place-making for the Gamlebyen district. As 657 Oslo, the premise is a result of structural and aesthetic renovation of the building.

The development of the L-shaped building block concerns expanding to the surrounding buildings and creating one community. Extensions started working from spring 2021. Historically, the building was used as a horse stable. Street food production, community and social neighborhood engagement are among the main objectives of building such a place. The community spaces are mainly at the street level, which consists of a café, indoor event space, with the middle section housing a pizza place, local cider production, and a central outdoor open-air space (for larger events, such as festivals with concerts and photography) (Fig. 13).

Mesh Youngstorget is one of the five hubs of the Mesh Community, and it is located in a very live road (Møllergata 6), with a 5' walk directed to the Oslo city center and 10' from the National Theatre, where Mesh Youngstorget, has another premise, a more traditional coworking space which is more private (members-only). The urban functions around the building are mainly commercial and offices (Fig. 14). The building of Mesh Youngstorget, was originally conceived as an office and commercial building and was recently reconverted. The NWS occupies five floors of the building, including the basement.

### 7.2.2. Spatio-functional, social and digital features of the five NWS: similarities and differences

Table 7 shows which spatio-functional, social and digital features are present in each NWS, based on observations conducted by the authors and descriptions provided by the managers. The findings presented in Table 7 also test the suggested list of features (see Table 2).

This cross-analysis supports an understanding of the similarities and differences among the five NWS and the interaction among the features that occur in the five NWS. For example, Table 7 shows that the time regulations (one of the social features) are rather varied among the five NWS. SoCentral and Gamlebyen Loft are the most open to the users. This may be related to the fact that they provide a combination of innovative public spaces (one of the spatio-functional features) which attract users in the evening (or late in the night). The flexibility with on-line membership is not found in all five NWS. Table 7 shows that features which support the hybridization can be varied from place to place, as well as their interaction. The comparison among the five NWS and their features is thoroughly discussed in Section 7.2.3., 7.2.4 and 7.2.5.

In Table 8, the spatio-functional areas of each NWS (main or ground floors, see Table 7) are presented as maps and supplemented by diagrams. The maps were compiled using data from the walking interviews. They are in the form of a sketch, showing an overview of the interiors of the five hybrid NWS, focusing on the ground floors. In the maps, rectangles represent the physical spaces and the gaps show the official spatial separation between them and walls or other architectural elements. These spaces are separated mainly by furniture. The word 'kitchen' sometimes implies a tea or coffee station, where social interactions may also occur. The maps aim to show the connectivity and consistency of some spaces and functions, by means of attached lines. Spaces which are numbered in the maps correspond to the numbers on

the adjacent diagrams.

In addition, the conceptual model of the interaction between the three dimensions (Fig. 1) is tested in Table 8. The diagrams in the right-hand column of Table 8 describe some interactions among selected spatio-functional, social and digital features which occur in the main or ground floors of each NWS. Overall, this is an experiment to show some spatio-functional characteristics of selected floors, and the interactions between some features. By following the same approach, other maps of the spatio-functional areas on other floors of the NWS can be compiled, as well as additional diagrams with the inclusion of other features (see Table 7) to visualize further combinations.

The interactions (shown by the dots) are based on data collected during the walking interviews (as well as observations, pictures of the NWS, and in some cases, social media posts). For example, a TV broadcasting event was taking place in the atrium of Mesh Youngstorget while we were interviewing the manager; a painting workshop in the outdoor open space at Oslo 657 was described by the manager and posted on their Facebook page.

The extent of digitalization (see the dots in the diagrams) is due to the fact that most of the events organized by the managers were announced by the NWS via social media or their official websites. The diagrams also show that the workshops depend on digital solutions such as projectors, live streams social media posts, all of which play an important role in running the hybrid NWS. The 'Informal social interactions happen in' feature refers to the spaces in which socio-physical interactions occur between people, such as lounge areas, cafés, restaurants and kitchens, and the coffee machine. This refers to the temporal dimension (of uses, activity, function and presence).

This combination of analyses (using pictures, maps, diagrams and text) reflects the challenges in reporting on the hybrid features of a place. There are hybrid features that cannot be represented by means of maps and pictures, but perhaps described only through diagrams and words.

The analysis of hybrid features (represented as maps and diagrams in Table 8) is further interpreted in Sections 7.2.3, 7.2.4 and 7.2.5, and supplemented by data from the manager interviews. For clarity, the order of the hybrid features (spatio-functional, social and digital) presented in Sections 7.2.3, 7.2.4 and 7.2.5 follows the structure of Table 7. The three sections discuss some of the features listed in Table 7. For each dimension, the findings reflect upon the interaction with the other two dimensions.

### 7.2.3. Spatio-functional features and interaction with the other two dimensions

The five NWS present some significant common spatio-functional features, such as multi-functionality and flexibility, which contribute to supporting their hybridization (Table 7). However, SoCentral, Mesh Youngstorget, 657 Oslo and Gamlebyen Loft are more multi-functional compared to HerSpace, considering the broader variety of functions provided (Table 7). Among the multi-functional spaces observed, one of the most pioneering is the so-called 'hybrid space' which occupies a portion of the first floor at Mesh Youngstorget and is used for unscheduled activities. The space is conceived of as a sort of transitory place that connects two areas of the building (see map in Table 8).

Physical flexibility is supported by digital solutions in all five NWS. The physical spaces are adjusted to enable socio-digital interactions among users and visitors. One of the managers in SoCentral stated that "We hold online and offline activities and sometimes we have events in both formats. We remove these tables, bring in a projector, and do a recording. Very many members and non-members join our sessions and lectures online." All five NWS display an expansion of the social dimension (and the whole network) by supporting digital services and adopting flexible physical spaces and facilities. This echoes the interaction between multi-functionality, flexibility, informal social interactions, as well as virtual spaces for cooperation and socialization (see Table 8).

The provision of *innovative public spaces* is observed in SoCentral, Mesh Youngstorget and Gamlebyen Loft, while the other two NWS do not provide any type of public/semi-public spaces. The first floor of the SoCentral building is a versatile event space that is publicly accessible. There are facilities which include a restaurant, a café, a bar, as well as a screen monitoring the time and date of meetings and events. In addition, there are several sitting areas for the use of SoCentral co-workers. Several of these spaces are characterized by an 'event spot' with a pre-installed projector and lighting system; thus, revealing a temporal use of the space for both work and socialization (Fig. 8), and showing the interaction between spatio-functional and virtual areas.

One of the main factors that renders the Mesh Youngstorget a very public and livable type of place is the café called the 'Workbar', which has a direct connection to the street, and is open to the public. A large part of the floor is occupied by the Workbar, in which co-workers and guests can have lunch and coffee meetings (Table 8). Non-members can use the Workbar, and order food and beverages using QR codes, thus getting free 'digital membership' for a maximum of two hours. The members (renters) of the spaces provided in Gamlebyen Loft can network at the neighborhood level, merely by visiting the café and joining the events (e.g., neighborhood festivals and jazz nights) in the café bar downstairs. The workspace is also very close to public spaces that are open to the neighborhood residents. The manager stated: "This also makes the street floor part act as an after-work activity hub that it is considered by Gamlebyen Loft important for the identity and economy of the neighborhood". The social dimension and the emergence of new ideas and spaces for coworking have clearly transformed the district into a hybrid built environment.

The presence of innovative public spaces makes these three NWS strong hybrid spaces, since there is a clear interaction with social features, such as the degree of publicness (of privatized spaces), informal social interactions, temporary and spontaneous appropriation of the space, as well as digital features such as virtual spaces in which to socialize and promote events.

*Programmatic and functional hybrid spaces* are found in all five NWS. Hybrid activities consist of yoga classes (SoCentral and HerSpace), selling secondhand goods (SoCentral), kid's areas (HerSpace), festival and jazz events (Gamlebyen Loft), broadcasting TV events and podcasts (Mesh Youngstorget), as well as arranging events and pop-ups (in all NWS). These spatio-functional features are supported by digital solutions, as well as virtual spaces for cooperation and socialization (Table 8).

#### 7.2.4. Social features and interaction with the other two dimensions

The social dimension *diversity and inclusivity* is found in all five NWS. For most of the managers interviewed, this means that the NWS are open to people with different cultures and backgrounds, thus providing working environments that are multicultural and international. SoCentral is a particularly inclusive and diverse place, organizing events on-site and digitally, such as the so-called 'Inclusion Days'. This NWS acts as a partner on several projects that develop ideas and solutions for sustainable city development, climate change, inclusion and diversity, in both the public and private sectors. The partnerships consider not only the diversity of the projects they work on (e.g. environmental issues and refugee crises), but also the background of professionals and organizations with whom they work (including social entrepreneurs, NGOs, startups and students).

Mesh Youngstorget is the largest of the NWS in size, capable of hosting events for around 600 people at any one time. Among them, 'Media Mondays' events require collaboration with the managers, directors, speakers and users of other coworking spaces in Oslo (including some of those in this study, such as 657 Oslo and HerSpace). This provides evidence of various hybridization dimensions (e.g., diversity, inclusivity and digital preferences) that identify Mesh Youngstorget as a hybrid NWS. Since Mesh Youngstorget is the leading startup community in Oslo, 75% of its members are involved in startup initiatives. Other

user backgrounds vary, including, for example, creatives such as filmmakers and designers). The diverse and inclusive environment of 657 Oslo is also characterized mostly by technical startups and entrepreneurs (e.g. social entrepreneurs). Gamlebyen Loft also demonstrates the social features of inclusivity and diversity, despite having less variety in terms of user backgrounds and types of fees.

On the contrary, HerSpace as the name implies is oriented mainly around women and mothers. To this end, HerSpace is the only NWS showing an evident combination of diversity and inclusivity with features such as informal interactions (both physical and virtual) for cooperation and socialization; social and psychological support to customers; and multi-functionality of the space. The manager remarked: "We have quite different events, but mostly for female entrepreneurs. Of course, we do not limit males from participating, but we aim to support females in their entrepreneurial journey (...)". The manager mentioned that many members join the online sessions, while others are physically in the space. This reflects the hybrid format of sessions, and the adaptation of physical spaces to meet the specific needs of members. Moreover, the childcare service is managed digitally, supporting the work lifestyle of co-workers, as the manager highlighted: "If a female needs to take care of her child, she can always tell us in advance, and we will hire a babysitter". Multi-functionality and psychological support to customers are fundamental for promoting a diverse and inclusive working environment.

*Informal social interactions* occur in the lounge areas, cafés, restaurants and kitchens, (as well as at the coffee machine). Lounge areas are particularly hybrid spaces, since people can meet physically and/or digitally and interact with each other, whereas the kitchen and in front of the coffee machine offer mainly socio-spatial encounters (Table 8). This is common among the five NWS. In particular, Mesh Youngstorget provides a café (the so-called Workbar) where both on-site and digital interactions (formal and informal) occur. The members (and renters) of Gamlebyen Loft can network on the first floor at the neighborhood level (through the neighborhood festivals; jazz nights in the café bar). The manager of Gamlebyen Loft explained that on Fridays, the NWS users usually gather for special drinks during what are called 'community events'. This helps them to engage in conversations and get to know each other. Thus, the shared spaces of all five NWS become hybrid according to the socio-digital activities that the managers lead (through events and pop-ups), which reflect the preferences and habits of users.

The *provision of services and infrastructures* in the five NWS is oriented mainly towards companies and visitors. SoCentral and Mesh Youngstorget also provide services and infrastructures to support citizens and leaders from the public sector (Table 7). In terms of the *management of space*, the 5 NWS are managed mainly by private investors. Some public-private partnerships are emphasized by SoCentral since they have several on-going partnerships with the public profit sector.

*Spontaneous and temporary appropriations of the space* were described by the managers. For example, ad-hoc yoga sessions are often arranged spontaneously in SoCentral. These are short breaks from digital working that usually occur around 2 p.m., consisting of 15 min of yoga and stretching exercises. The manager said: "We are flexible, and we provide flexibility to our customers. As for spontaneous events, then yes, they [members] can do it in principle (...). The trainer was a coworking member. She just said that she would like to deliver a yoga class. And, by the way, very many members came. And we even had the idea of making it permanent". This is possible in SoCentral since the space is very flexible and can be used for a variety of activities and new practices. Similarly, spontaneous appropriation of the space occurs in HerSpace when arranging yoga classes, whereas in Gamlebyen Loft there is a dedicated room for yoga.

*Time regulations* show that the space most open to members and companies is Gamlebyen Loft (24 h per day); SoCentral is accessible for 18 h per day, while the other NWS are open between 7 and 9 h per day. Both Gamlebyen Loft and SoCentral have some evident interaction with their own neighborhoods, since they provide facilities (such as cafés and

restaurants) to workers, visitors and citizens. The time regulation aspect has some evident links with the innovative public spaces and degree of publicness of (privatized spaces) features that are observed in the five NWS.

In terms of *psychological support to customers*, HerSpace offers workshops for guiding coworking members through the various phases of parenthood, as well as a variety of classes (such as pre-natal, postpartum care, yoga, and art classes for children). In SoCentral, yoga classes are provided only on site, while in Gamlebyen Loft, they are offered both digitally and physically (Table 8). This is a form of psychological support provided to the customers that impacts on the areas of well-being and wealth (Table 2). The other NWS do not provide similar services to their users. In Her Space and Gamlebyen Loft, this social feature is clearly intertwined with spatio-functional and even digital features.

*Social and professional support for independent professionals* is offered to the users of all five NWS. In HerSpace, this is oriented more to entrepreneurial female coworkers who receive professional aid from the female community, as well as social support from other female professionals. *Self-organized and soft forms of governance* are emphasized mainly in SoCentral, in which there are several partnerships with the public profit sector and with startups from NAV (the Norwegian Labour and Welfare Administration). These soft forms of organization and governance are not observed in the other NWS.

#### 7.2.5. Digital features and interaction with the other two dimensions

*Digital solutions* consist of platforms such as Slack, Google chats, Zoom, Google Meet, as well as live streaming and other types of technological support. These solutions provided by the five NWS are supplemented by *virtual spaces* for both *socializing and cooperating*. During the COVID-19 pandemic, SoCentral organized more digital courses and events. “The high degree of digitalization and IT expertise in-house were fundamental for the further development of our virtual activities”, as the manager highlighted. This helped to improve several digital solutions and open the space to more members (both physically and digitally – depending on the impacts of the various COVID-19 waves). Digital solutions recently adopted by HerSpace have improved the quality of the virtual space for both working and socializing – especially since the network has been extended across Norway and worldwide. HerSpace has opened their physical and virtual spaces to international members and both women and men from very diverse communities (e.g., consultants, nutritionists and craftsmen, but not many people from universities). 657 Oslo and Mesh Youngstorget have continued to implement digital solutions (as they did prior to COVID-1), and have provided further digital events such as seminars, workshops and training to their members. A similar situation is also observed in Gamlebyen Loft. This combination of the digital dimension supporting new forms of social interactions will continue to occur in the future.

*Flexibility with online membership* is evident in different ways among the five NWS. In HerSpace, there are five types of access, among which is a ‘Day Pass’ membership (access cannot be less than a day). If the member has the ‘Coworking Plus’ type of membership, they may bring guests to join the space and activities. To this end, the community lunch on Fridays is an opportunity for members to sit at round tables and enjoy mutual discussions. In Mesh Youngstorget, memberships are mostly monthly based, and the coworking space does not offer a day pass. Nevertheless, the manager believes that they offer flexible membership, due to the ‘price upon request’ option, as well as the networking opportunities provided. In 657 Oslo, the space cannot be used for a specific number of hours, since the membership is only on a daily or monthly basis; nevertheless, hot desks allow the most flexible ways of working. In SoCentral, guests can participate in meetings and events organized by other members without paying for access to the space. In Gamlebyen Loft, there is less flexibility in terms of online memberships since the activities of the renting companies take place mainly on-site. These results show an interesting form of interaction among multi-functional spaces, the digitalization that supports customers’ preferences, as well

as formal and informal interactions that take place in virtual and physical spaces.

#### 7.2.6. Temporal uses, spaces, presence and activities

Temporal activities take place quite often in all five NWS. The clear combination of the features of the three dimensions can also occur between activities, and within limited temporal periods. As the managers described, the temporal use of spaces and the temporal presence of members are related to temporal activities (such as events, seminars and courses) which are organized in various forms. Attendees are both online and offline members. In some activities, there is a larger number of online attendees.

In addition to members and invited speakers, events can also be attended by people who are not part of the NWS, as visitors. Simultaneously, as one manager remarked: “There are members who are still very much related to the location, especially those who are routine users and managers that used to visit the space before the pandemic and have continued visiting it in-between the different phases of the pandemic”. Temporality is an important factor of the hybridization scenario. This type of study on temporality should be extended by observing the five NWS for more prolonged periods of time and by conducting interviews with users of the spaces.

#### 7.2.7. Understanding of hybridization by the managers

In addition to discussing the hybrid features and their interaction in the NWS based on the conceptual model (see Table 8 and Sections 7.2.3, 7.2.4 and 7.2.5), the notion of hybridization is interpreted here, by considering the personal points of view on hybridization provided by the managers. The concept of hybridization for SoCentral is interpreted mainly from social and professional spheres. “A hybrid space is based on diversity and inclusion of members which are from very different backgrounds”, as one of the managers highlighted. In HerSpace, one of the managers interpreted hybridity by referring to the combination of the three dimensions, and by highlighting accessibility for people in both online and in-space modes. Hybrid space encompasses the diversity of their community, in terms of the background and professions of their coworkers (who are mainly entrepreneurs or individual coworkers).

Referring more explicitly to the social and digital dimensions, one of the managers at Mesh Youngstorget interpreted hybridity from the working perspective: “Hybrid working means that their members can meet and connect”. Another manager at 657 Oslo, who was asked to reflect on whether their NWS is a hybrid space, focused mainly on the socio-spatial dimension. During our visit, one of the buildings was being renovated on the first floor, claiming an extra portion from the outdoor space. “The reason why we are remodeling is to create a more hybrid and flexible environment”, she said. The manager believes that this intervention is particularly important in order to enhance the atmosphere of the NWS, as well as to offer a more welcoming impression for users and visitors to 657 Oslo.

Gamlebyen Loft supports the idea of hybridity by considering the interaction between after-work events, free public activities (e.g., yoga sessions, outdoor festivals, and other socio-cultural activities), and multi-functional spaces (or ‘building blocks’). These building blocks include sound and photography studios which can be used according to the user’s needs and background; shower rooms; a food and drink production block; a café; and a jazz night block.

#### 7.2.8. Impacts of COVID-19 on the five NWS

The effects of the COVID-19 pandemic were rather varied among the five spaces. The manager of HerSpace confirmed that “during the first waves of COVID-19, most of the events were online, with no events being held in the space”. However, coworking spots (on the second floor) were open and they were used mostly by individual coworkers. At the time of the study, HerSpace was experiencing a larger network of participants attending their online events, not only from Oslo, but from other regions in Norway. Thus, the pandemic has helped them to expand



coworking and related activities. Another premises will soon be opened in the peripheral district of Linderund in Oslo, showing the impact of intensive socio-digital events and services.

Mesh Youngstorget was closed during the COVID-19 lockdowns, with the staff and members being to work only digitally and remotely. In the light of this, the opening of their new premises in Drammen had to be postponed. COVID-19 did not impact 657 Oslo as heavily as it did the other NWS. Even before the pandemic, the users resided mostly in Oslo and joined their teammates from other parts of the world virtually.

COVID-19 did not overly impact Gamlebyen Loft, as initially they had mainly private offices, and no open spaces. But, as the manager stated: "To adapt to the required hygiene measures, we have adjusted the kitchen space, separated it into smaller spaces, and organized a timed rota for when members may use the kitchen". They did not lose any members, since they provide only long-term contracts. During the pandemic, several indoor events and activities were replaced with outdoor arrangements. This rendered the NWS rather attractive to the residents of Gamle Oslo. In SoCentral the managers realized that, due to the COVID-19 pandemic, they needed to expand their network around Norway and the world, "but without opening any new premises in other regions or countries".

## 8. Discussion

The outcomes from this study of NWS in Oslo City contribute to an understanding of the conditions in three selected neighborhoods (Oslo Sentrum, St. Hanshaugen and Gamle Oslo) which create opportunities for hybrid spaces (see RQ1 – *What are the conditions of neighborhoods that support hybrid spaces?*). Moreover, the findings about the combination of hybrid features provides an interpretation of the hybridization of five particular NWS (SoCentral, HerSpace, 657 Oslo, Gamlebyen Loft and Mesh Youngstorget) (see RQ2 – *How do we understand the hybridization of NWS?*). The data collected also help to understand the ways in which COVID-19 has been affecting the selected hybrid NWS (see RQ3 – *How is the COVID-19 impacting hybrid NWS?*). In addition, the study contributes to knowledge of new hybrid spaces and new models of working in Oslo, which might be applicable to other cities with similar characteristics. This discussion focuses on both the theoretical and practical implications of the findings of the study.

### 8.1. Theoretical implications

From the theoretical perspective of NWS and their hybridization, the study has developed a new conceptual model (Fig. 1), based on the combination of the three dimensions (spatio-functional, social, and digital) and their particular features, including the temporal dimension. Both the conceptual model and the list of hybrid features (Table 2) were tested in the analysis of urban spaces, in order to explain and understand the phenomenon of hybridization (see the results presented in Tables 7 and 8 and Sections 7.2.3, 7.2.4, 7.2.5).

The outcomes from the literature review show that this interaction can be relevant to the understanding of hybridity at the level of city, neighborhood, urban space and workplace – and this understanding continues to evolve. However, misinterpretations and a lack of understanding persist (e.g., *What is hybridization and what is a hybrid NWS?*).

To this end, the notions of hybrid second-third places and the evolving concept of third place (Yang et al., 2019; Morisson, 2018) are preferable in the current debate on NWS. These places are, to some extent, more familiar to researchers in the field of planning and architecture (see Section 2.3.1). These places are considered hybrid thinking of the possible functions that can be performed and different interactions among the users, as well as the mixed typologies and services that the space may include. Similarly, when these NWS are compared with fourth places (a combination of first, second, and third place), the major focus is on the blurring borders among social and private life (and dynamics) (Morisson, 2018). On the other hand, only a few studies on

NWS have noted that hybridization is about the physical milieu in which social interactions occur, in both physical and digital modes (Foth et al., 2020; Bilandzic et al., 2018; Marchegiani & Arcese, 2018; Wayvs-Lynch, 2016).

The new approach to hybridization proposed in this study is not yet used among most scholars when identifying NWS as hybrid spaces. The study suggests that hybridization can offer a spatio-functional, social and digital package of working life (and not only a 'spatial package' as proposed by Halford, 2005). The use of the proposed conceptual model of hybridization may help researchers and users to move beyond current misinterpretations (extending to third, fourth and fifth places).

### 8.2. Contribution to current empirical studies

Second, compared to previous empirical studies, this study provides a more systematic and empirical approach to the understanding of hybridization. Unlike one or two dimensions (e.g., spatial hybridization and/or socio-spatial interactions, see Migliore et al., 2021), this research highlights the importance of exploring hybridization by examining features that belong to three dimensions: spatio-functional, social and digital, keeping in mind also temporal aspects (see temporal use, activity, and functions in Section 7.3.5). The empirical approach in this study is also pioneering in that it represents the hybridization data collected from walking interviews by combining different tools and methods at the level of buildings and urban spaces (see maps, diagrams, tables and text, in Section 7). It also highlights some challenges in collecting and presenting such data.

### 8.3. Practical implications in planning

#### 8.3.1. Conditions for hybrid spaces

The study focuses on exploring the conditions at the neighborhood level that may support the development of hybrid spaces and their synergies and interactions. These conditions include multi-functionality; accessibility; access to Wi-fi and local amenities within 10 min' walking distance (see Figs. 4 and 5); and surroundings of the five selected NWS (see Fig. 6). The case of Oslo confirms the current tendency to provide more flexible and multi-functional spaces, as well as public Wi-fi spots in public squares and streets (see outcomes from empirical studies presented in Section 2.3, and Figs. 4, 5 and 6). The outcomes from the three urban districts in Oslo (selected for this study) help to interpret hybrid models of working and support an understanding of conditions for hybridity at the neighborhood level. However, further observations, interviews and spatial analyses at the levels of buildings and urban spaces should be conducted to understand more details about the hybridization of each place which can form and shape a hybrid district.

In addition, the above conditions may support the development of other hybrid urban spaces that can be used as alternatives to the office – considering the proliferation of users who make flexible use of urban districts (home/neighborhood-based workers, coworkers, remote workers and digital nomads) (Zenkteleer et al., 2022).

#### 8.3.2. Role of managers of NWS in the hybridization processes

Hybridization is perceived in different ways by the managers of the five NWS (when we asked them if their space is 'hybrid'), with each possessing their own interpretation of hybridity. For example, some of them highlighted diversity and inclusivity (multi-cultural environments, diversity of backgrounds), while others focused on the combination of two or three dimensions (spatio-functional, social and digital). This study reveals some evident differences among the theoretical understanding (combination of three dimensions) and practical approaches to hybridity of the managers of the five NWS (see Table 6).

The transformation of these urban spaces is clearly characterized by the role of their staff who have been able to design hybrid spaces and think of ways in which ICTs and digitalization can really support this transformation (Volpi & Opromolla, 2017), within a temporal

dimension (Willis & Aurigi, 2011). These elements have played a key role in shaping the five hybrid NWS and possible hybrid models of working and living within the three neighborhoods analyzed. Hence, among the practical implications, this study recommends further investigation of the variety of interpretations of hybridization, not only among researchers and practitioners in the field of planning and architecture (and related fields), but also among managers and other staff who play important roles.

### 8.3.3. Mutual influences and interactions between hybrid NWS and neighborhoods (and beyond)

The interaction among the provision of innovative public spaces (see spatio-functional features), the degree of publicness of privatized spaces (see social features), and digital spaces for socializing and communicating (see digital features), which are found in some of the NWS, show that there are important links between them and their neighborhoods, as well as mutual influences and interactions. On the one hand, SoCentral (e.g. the café, multi-projection area and restaurant) and Mesh Youngstorget (e.g. the Workbar) overlap with the provision and diversity of services, functions and spaces, which is rather high in Oslo Sentrum and St. Haugesen (Fig. 6). On the other hand, Gamlebyen Loft suffers from a more evident lack of services in its neighborhood (see Fig. 6), so they provide outdoor and indoor activities that aim to attract the neighborhood residents. These three cases confirm that hybrid NWS are capable of generating new interactions with the neighborhood and its users (Zenkteleer et al., 2021). These interactions are important practical implications of hybridization that should be further observed in planning strategies. Thus, this study shows that some hybrid NWS can offer flexible solutions, as well as multiple and adaptive approaches to re-energizing the whole urban system (Volpi & Opromolla, 2017).

In addition, the findings show that the COVID-19 pandemic impacted the five selected hybrid NWS by producing several new dynamics within the places themselves, within the neighborhoods, as well as regionally, nationally and globally (e.g., more digital events, activities and networks were developed). Due to the pandemic, some hybrid NWS created new links with their neighborhoods and local residents through activities open to all (see the case of Gamlebyen Loft, Mesh Youngstorget and SoCentral). The hybrid characteristics of the five NWS helped them to adapt to changes during and after COVID-19, as well as to prepare for future challenges.

### 8.3.4. Lesson learnt

The main lesson learnt from the case of Oslo is that there is emerging knowledge and understanding of hybridization that should be transferred into city planning strategies and initiatives. The five hybrid NWS investigated act as hubs for users and local communities (in some cases), but they are not yet integrated into official strategies for the hybrid city (Oslo Business Region, 2021). The hybrid city of Oslo already embeds several aspects – such as flexibility, remote working, and virtual interactions in public and private spaces, but it should embed a clearer concept of hybridization for planners, business owners, staff and users. The interaction among spatio-functional, social and digital features is not yet recognized by planning practitioners, nor integrated into the master plan of Oslo.

Another lesson learnt from the methodological perspective, the hybridization can be explored by analyzing building by building (or urban space by urban space), while at the city and neighborhood levels, available methods can reveal favorable conditions for creating hybrid environments. It is important to add other qualitative and quantitative methods in order to understand the hybridity of neighborhoods in greater depth. In addition, both at the level of the neighborhood and urban spaces, the spatial analyses provided could be supplemented by participants' observations and interviews in urban spaces (in order to add a more in-depth analysis of the temporal dimension). This would provide a more comprehensive overview of the more layered and complex structure of hybrid cities and urban spaces.

This overview of hybrid NWS and other hybrid urban spaces should support a more comprehensive understanding of hybrid models of living and working. At present, these hybrid models of working are not yet fully acknowledged in the spatial agenda of Oslo, nor its planning strategies. Despite new policies for the future hybrid city of Oslo (Oslo Business Region, 2021), more still needs to be done to explore the variety of spatio-functional, social and digital features provided in hybrid spaces, and to transfer some of this knowledge into land-use and planning strategies.

## 9. Conclusions

The aim of this study was to understand the conditions which may create hybrid urban environments at the neighborhood level, the ways in which we understand hybridization in NWS, and the impacts of COVID-19 on hybrid NWS. The study provided a novel analysis of hybridization in the city of Oslo, by selecting five NWS and the related three neighborhoods. The findings reveal new ways in which hybridization can be explored, both conceptually and empirically.

The type of analyses presented in this study have never been conducted in the city of Oslo before. Moreover, similar studies recorded in the literature are very limited, and have not yet developed recommendations from the planning perspective. The mapping and analysis of the selected NWS in this study reveal some mutual influences and overlaps with their surrounding neighborhoods. This section concludes by highlighting the i) limitations of this study; and ii) future research paths and insights for planning practitioners.

### 9.1. Limitations of the study

The limitations of the current analyses concern mainly the tools available for interpreting and mapping the complexity of hybridization at the neighborhood level. At this level, the study identifies several features that help to understand the conditions for the hybridization of a space, for example, multi-functionality (such as the concentration and diversity of functions and activities; mixed land-use) and IT infrastructure (such as the provision of Wi-fi spots in public spaces). However, it remains challenging to examine a more comprehensive combination of the three dimensions (spatio-functional, social and digital) at the neighborhood level. It would be necessary to integrate the analyses presented in this study (about the conditions for creating hybrid urban environments) with more extensive datasets about socio-digital interactions in urban spaces.

In addition, the study has focused on central NWS, while a larger number of NWS can be analyzed both in the central and semi-central, as well as in peripheral and rural locations (which are not yet analyzed from the perspective of hybridity). This would help to frame the hybrid habits and need of residents and visitors in varied locations of the city and our regions, as well as to explore the different levels and degree of hybridization of NWS and neighborhoods.

Although the results naturally cannot be generalized to all contexts, this study is an opportunity to discuss future planning approaches that further recognize the hybridization in our cities, as well as analyze the combination of the three dimensions (spatial, social, and digital) including the temporary use in different urban settlements.

### 9.2. Future research paths and insights for planning strategies

This study suggests exploration of new research paths linked to the following points: i) conducting further studies on hybridization that move from the small scale (urban spaces) to the intermediate scale (neighborhoods) and large scale (city); ii) expanding the three hybridization dimensions and their associated features (Table 2 and Fig. 1) by reviewing new theoretical and empirical studies iii) analyzing differences between central, peripheral and rural hybrid locations; iv) combining additional methods for hybridization, such as surveys and

further interviews of users and residents, in addition to managers, as well as spatial analyses based on new data set (collected based on spatio-functional, social and digital features).

Among the new research questions to arise, future studies may address the following: i) How can knowledge on hybridization be transferred and incorporated into planning strategies and practices? ii) What new concepts on hybridity are emerging in the fields of urban planning and architecture? (see the evolving interpretation of 'hybrid' in this study that can be further developed); iii) What are the overlaps (and/or misunderstandings) among third, fourth and fifth places (often conceived as hybrid spaces) and the hybrid spaces based on the three dimensions proposed in this study?

New insights for planning practitioners and policymakers are related mainly to the need to develop further strategies for hybrid cities and more concrete planning of flexible neighborhoods (including new services and hybrid functions). It will be necessary to map all the hybrid public and semi-private hubs in the city, including public libraries, squares and parks, cafés and hybrid NWS. In order to develop planning practices and concrete programs for hybrid cities and spaces, further collaboration among NWS managers and/or founders and official planners is needed, as has already been partially initiated in Oslo (City of Oslo, 2020). This cooperation may identify emerging hybrid ways of living, working and moving around the city, and from different perspectives (e.g. space management, planning, IT and mobility). Hybridization is not a matter of only one discipline, but is instead an interdisciplinary perspective, necessitating collaboration among many stakeholders.

To conclude, NWS users are increasingly transient, as well as being residential. Although such practices – both during and after the COVID-19 pandemic – are becoming more relevant to planning. Hybrid urban typologies are emerging increasingly in the mixed structure of spatial interactions between several types of land-use planning – such as residential, social, and recreational – and more recently, working functions.

This new knowledge on hybridization should become a catalyst for sustainable urban strategies when developing new urban spaces and districts (including hybrid NWS), that can be recognized as new centers in the master plan for Oslo. It is important to recall that hybrid urban spaces are not only a combination of residential, social and recreational functions and related interactions, but working functions are playing an increasingly important role, considering people's new habits and preferences. The role of the planner is to further examine this complex phenomenon, since hybrid NWS are linked not only to the city and its peripheries, but they are also relevant in rural and regional contexts.

#### CRediT authorship contribution statement

**Mina Di Marino:** Conceptualization, Methodology, Investigation, Data curation, Writing – original draft preparation, Writing – review & editing, Validation. **Helyaneh Aboutalebi Tabrizi:** Conceptualization, Methodology, Investigation, Data curation, Visualization, Writing – original draft preparation, Writing – review & editing. **Seyed Hossein Chavoshi:** Methodology, Investigation, Data curation, Visualization, Writing – review & editing. **Anastasia Sinitsyna:** Investigation, Writing – original draft preparation, Data curation.

#### Declaration of Interests

None.

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#### References

- Abd Elrahman, A. S. (2021). The fifth-place metamorphosis: the impact of the outbreak of COVID-19 on typologies of places in post-pandemic Cairo. *Archnet-IJAR*, 15(1), 113–130.
- Abdel-Aziz, A. A., Abdel-Salam, H., & El-Sayad, Z. (2016). The role of ICTs in creating the new social public place of the digital era. *Alexandria Engineering Journal*, 55(1), 487–493.
- Akhavan, M., Di Vita, S., & Mariotti, I. (2021). Introducing the worldwide phenomenon of flexible workplaces. Mariotti, S. Di Vita, & M. Akhavan (Eds.). *New Workplaces—Location Patterns, Urban Effects and Development Trajectories*, 1–9.
- Arvidsson, A. (2018). Value and virtue in the sharing economy. *The Sociological Review*, 66(2), 289–301.
- Avdikos, V., & Iliopoulou, E. (2019). Community-led Coworking spaces: From co-location to collaboration and collectivization. In *Creative Hubs in Question* (pp. 111–129). Springer.
- Avdikos, V., & Merkel, J. (2020). Supporting open, shared and collaborative workspaces and hubs: Recent transformations and policy implications. *Urban Research and Practice*, 13(3), 348–357.
- Bähr, U., Biemann, J., Hentschel, P., & Lietzau, J. (2021). Rural Coworking. People, Models, Trends. Bertelsmann Foundation. (<https://www.bertelsmann-stiftung.de/de/publikationen/publikation/did/rural-coworking-en#detail-content-7302-4>).
- Bakke J.W. & Yttri B. (2003). Hybrid infrastructures for knowledge work. Proceedings. 4th International Space Syntax Symposium London 2003.42\_BakkeYttri (spacesyntax.net) (AVAILABLE AT <https://www.spacesyntax.net/symposia-archiv/SS4/fullpapers/42Bakke-Yttripaper.pdf>).
- Banai, R. (2020). Pandemic and the planning of resilient cities and regions. *Cities*, 106, Article 102929.
- Banerjee, T. (2001). The Future of Public Space: Beyond Invented Streets and Reinvented Places. *Journal of the American Planning Association*, 67(1), 9–24.
- Batty, M. (2020). The Coronavirus crisis: What will the post-pandemic city look like? *Urban Analytics and City Science*, 47(4), 547–552.
- Batty, M. (2021). Science and design in the age of COVID-19. *Environment and Planning B: Urban Analytics and City Science*, 48(1), 3–8. <https://doi.org/10.1177/2399808321989131>
- Bazzanella, L., Roccasalva, G., Valentini, S., et al. (2014). Physical public space approach: a case study in Volpiano. *Interaction Design and Architecture (States) Journal*, 20, 23–32.
- Benkler, Y., Roberts, H., Faris, R., Solow-Niederman, A., & Etlings, B. (2015). Social mobilization and the networked public sphere: Mapping the SOPA-PIPA debate. *Political Communication*, 32(4), 594–624.
- Bilandzic, A., Casadevall, D., Foth, M., & Hearn, G. (2018). Social and Spatial Precursors to Innovation: The Diversity Advantage of the Creative Fringe. *Journal of Community Informatics*, 14(1), 160–182. <https://doi.org/10.15353/joci.v14i1.3408>
- Bilandzic, M., & Foth, M. (2013). Libraries as coworking spaces: Understanding user motivations and perceived barriers to social learning. *Library Hi Tech*, 31(2), 254–273. <https://doi.org/10.1108/07378831311329040>
- Bilandzic, M., & Johnson, D. (2013). Hybrid placemaking in the library: Designing digital technology to enhance users' on-site experience. *The Australian Library Journal*, 62(4), 258–271. <https://doi.org/10.1080/00049670.2013.845073>
- Bilandzic, M., & Foth, M. (2017). Designing hubs for connected learning: social, spatial and technological insights from coworking spaces, hackerspaces, and meetup groups. In M. de Laat, L. Carvalho, & P. Goodyear (Eds.), *Place-based Spaces for Networked Learning* (pp. 191–206). Routledge. <https://doi.org/10.4324/9781315724485>.
- Brown, J. (2017). Curating the "Third Place"? Coworking and the mediation of creativity. *Geoforum*, 82, 112–126. <https://doi.org/10.1016/j.geoforum.2017.04.006>
- Calderon, R. (2016). *Third-Placeness: Supporting the Experience of Third Place with Interactive Public Displays*. Vancouver: University of British Columbia.
- Capdevila, I. (2017). A typology of localized spaces of collaborative innovation. In M. van Ham, D. Reuschke, R. Kleinhans, C. Mason, & S. Syrett (Eds.), *Entrepreneurial Neighbourhoods* (pp. 80–97). Edward Elgar Publishing. <https://doi.org/10.4337/9781785367243.00013>.
- Carmona, M. (2010). Contemporary public space: critique and classification, part one: critique. *Journal of Urban Design*, 15(1), 123–148.
- Carmona, M. (2021). Public Places Urban Spaces. *The Dimensions of Urban Design*. New York: Routledge.
- Castells, M. (2001). Virtual Communities or Network Society?. in *The Internet Galaxy: Reflections on the Internet, Business, and Society* (pp. 116–136). Oxford: Oxford University Press.
- Castells, M. (2004). 'Space of Flows, Space of Places: Materials for a Theory of Urbanism in the Information Age'. In S. Graham (Ed.), *The Cybercities Reader* (pp. 82–93). London: Routledge.
- Castells, M. (2011). *The Rise of the Network Society: The Information Age: Economy, Society, and Culture* (Second edition., Volume 1). Oxford: Wiley & Backwell.
- Cho, I. S., Heng, C. K., & Trivic, Z. (2016). *Re-Framing UrbanSpace Urban Design for Emerging Hybrid and High-Density Conditions*. London: Routledge.
- Cho, I. S., Trivic, Z., & Nasution, I. (2017). New high-density intensified housing developments in Asia: qualities, potential and challenges. *Journal of Urban Design*, 22(5), 613–636.



- Christensen, K.(ed) (2003). *Introduction to Encyclopedia of Community*, available at ([http://www.sagepub.com/upm-data/9677\\_035762Intro.pdf](http://www.sagepub.com/upm-data/9677_035762Intro.pdf)), (last access January 22nd 2013).
- Ciolfi, L., & Pinatti de Carvalho, A. F. (2014). "Work Practices, Nomadicity and the Mediatonal Role of Technology.". *Computer Supported Cooperative Work (CSCW)*, 23, 119–136. <https://link.springer.com/article/10.1007/s10606-014-9201-6>.
- City of Oslo, 2019, The Car-free Livability Programme 2019. (<https://daf9627eib4jq.cloudfront.net/app/uploads/2020/01/The-Car-free-Livability-Programme-2019.pdf>).
- Clifton, N., Füzi, A., & Loudon, G. (2022). Coworking in the digital economy: Context, motivations, and outcomes. *Futures*, 135, Article 102439.
- Crotti, S. (1997) Interspaces: From Public Site to Common Places, Architecture of Public Space: *Forms of the Past, Forms of the Present*, Electa, Milano.
- Czarniawska, B. (2014). "Nomadic Work as Life-story Plot." *Computer Supported Cooperative Work (CSCW)*, 23, 205–221.
- Di Marino, M., & Lapintie, K. (2015). Library as transitory workspaces and spatial incubators. *Library and Information Science Research*, 37, 118–129.
- Di Marino, M., & Lapintie, K. (2017). Emerging workplaces in the post-functional cities. *Journal of Urban Technology*, 4(3), 5–25.
- Di Marino, M., & Lapintie, K. (2018). Exploring multi-local working: challenges and opportunities in contemporary cities. *International Planning Studies*, 25(1), 1–21.
- Di Marino, M., Lilius, J., & Lapintie, K. (2018). New forms of multi-local working: Identifying multi-locality in planning as well as public and private organizations in Helsinki Region. *European Planning Studies*, 26(10), 2015–2035.
- Di Marino, M., Rehunen, A., Tiiu, M., & Lapintie, K. (2021). New working spaces in the Helsinki Metropolitan Area: Understanding location factors and implications for planning. *European Planning Studies*. <https://doi.org/10.1080/09654313.2021.1945541>. [https://www.tandfonline.com/doi/abs/10.1080/09654313.2021.1945541?fbclid=IwAR3Y9jF3shEUGY\\_DeHdWphdVMOOrdAZnHPwB8MRBEOdrXKNI3ZEIYbAFAWg&journalCode=ceps20](https://www.tandfonline.com/doi/abs/10.1080/09654313.2021.1945541?fbclid=IwAR3Y9jF3shEUGY_DeHdWphdVMOOrdAZnHPwB8MRBEOdrXKNI3ZEIYbAFAWg&journalCode=ceps20)
- Di Marino, M., Tomaz, E., Henriques, C., & Chavosh, H. S. (2022). 15 Minute City Concept and New Working Spaces: A Planning Perspective From Oslo And Lisbon. *European Planning Studies*. <https://www.tandfonline.com/doi/full/10.1080/09654313.2022.2082837>.
- Eckstein, Harry (2002). Case study and theory in political science. In Roger Gomm, Martyn, In Hammersley, & Peter Foster (Eds.), *Case study method: Key issues, key texts* (pp. 119–163). London: Sage Publications.
- Ellin, N. (2006). *Integral Urbanism*. New York: Routledge,.
- Eurofound (2020). Industrial relations and social dialogue Norway: Working life in the COVID-19 pandemic 2020, Norway: Working life in the COVID-19 pandemic 2020 (euagenda.eu).
- Fenton J., 1985. Pamphlet Architecture 11: Hybrid Buildings - Joseph Fenton - Google Books.
- Florida, R., Rodríguez-Pose, A., & Storper, M. (2021). Cities in a Post-COVID World. *Urban Studies*, 1–23.
- Forlano, L., (2008b) Anytime? Anywhere?: Reframing Debates Around Municipal Wireless Networking in the Journal of Community Informatics, Vol 4, No 1.
- Forlano, L., 2008a, When Code Meets Place: Collaboration and Innovation at WiFi Hotspots Submitted in partial fulfillment of the Requirements for the degree of Doctor of Philosophy under the Executive Committee of the Graduate School of Arts and Sciences COLUMBIA UNIVERSITY.
- Foth, M., & Sanders, P. (2008). Impacts of Social Computing on the Architecture of Urban Spaces. In F. A. Aurigi, & F. De Cindio (Eds.), *Augmented Urban Spaces: Articulating the Physical and Electronic City* (pp. 73–91). Ashgate.
- Foth, M., Forlano, L., & Bilandzic, M. (2020). Mapping New Work Practices in the Smart City. In H. Friese, M. Nolden, G. Rebane, & M. Schreiter (Eds.), *Handbuch Soziale Praktiken und Digitale Alltagswelten* (Vol. 50, pp. 169–181). Springer. [https://doi.org/10.1007/978-3-658-08357-1\\_33](https://doi.org/10.1007/978-3-658-08357-1_33).
- Freire, Juan, & Brunet, Karla (2012). Métodos y procesos de las narrativas digitales colaborativas: Aplicación a dos comunidades costeras. *Revista electrónica Deleótt Conocimiento Libre York Licenciamiento (CLIC) - Mérida – Venezuela* (Vol 1,(No 3), 77–85).
- Frith, J. (2012). Splintered Space: Hybrid Spaces and Differential Mobility. *Mobilities*, 7 (1), 131–149.
- Gandini, A., & Cossu, A. (2021). The third wave of coworking: 'Neo-corporate' model versus 'resilient' practice. *European Journal of Cultural Studies* 2021 (Vol. 24,(2), 430–447).
- Gordon, E., & de Souza e Silva, A. (2011). *Net Locality: Why Location Matters in a Networked World*. West Sussex: Blackwell Publishing,.
- Gratton, L. (2021). Four principles to ensure hybrid work is productive work. In *MIT Sloan Management Review*, 62 pp. 11A–16A).
- Green, N. (2006). On the Move: Technology, Mobility, and the Mediation of Social Time and Space. *The Information Society*, 18(4), 281–292.
- Halford, S. (2005). Hybrid workspace: Re-spatialisations of work, organisation and management. *New Technology, Work and Employment*, 20(1), 19–33.
- Hampton, K. (2002). Place-based and IT Mediated "Community". *Planning Theory & Practice*, 3(2), 228–231.
- Hampton, K. N. (2007). Neighborhoods in the Network Society the e-Neighbors study, *Information, Communication & Society*, 10(5), 714–748.
- Hampton, K. N., & Livio, O. (2010). Sessions Goulet L., The Social Life of Wireless Urban, Spaces: Internet Use, Social Networks, and the Public Realm. *Journal of Communication*, 60(4), 701–722.
- hang Y., Wang L., Ocansey D.K.W., Wang B., Wang L., Xu Z. Mucin-Type O-Glycans: Barrier, Microbiota, and Immune Anchors in Inflammatory Bowel Disease. *J Inflamm Res* 2021;14:5939–5953.
- Herzog, L. A. (2006). *Return to the Center: Culture, Public Space, and City Building in a Global Era*. Austin, TX, USA: University of Texas Press,.
- Holgerson, H., Jia, Z., & Svenkerud, S. (2021). Who and how many can work from home? Evidence from task descriptions. *Journal for Labour Market Research*, 55(1), 4.
- Houghton, K., Foth, M., & Miller, E. (2015). Urban Acupuncture: Hybrid Social and Technological Practices for Hyperlocal Placemaking. *Journal of Urban Technology*, 22 (3), 3–19. <https://doi.org/10.1080/10630732.2015.1040290>
- Houghton, K., Foth, M., & Hearn, G. (2018). Working from the other office: Trialling coworking spaces for public servants. *Australian Journal of Public Administration*, 77 (4), 757–778. <https://doi.org/10.1111/1467-8500.12317>
- Humphreys, L. (2010). Mobile social networks and urban public space. *New Media and Society*, 12(5), 763–778.
- Humphry, J. (2014). "Officing: Mediating Time and the Professional Self in the Support of Nomadic Work.". *Computer Supported Cooperative Work (CSCW)*, 23, 185–204.
- Hunter, A. (1985). Private, parochial and public social orders: the problem of crime and incivility in urban communities. In G. D. Suttles, & M. N. Zald (Eds.), *The Challenge of Social Control: Citizenship and Institution Building in Modern Society* (pp. 230–242). Norwood, NJ: Ablex.
- Ijsselstein, W. A., & Riva, G. (2003). Being There: The experience of presence in mediated environments. In G. Riva, F. Davide, & W. A. Ijsselstein (Eds.), *Being There - Concepts, Effects and Measurements of User Presence in Synthetic Environments* (pp. 3–16). Amsterdam: IOS Press.
- Ijsselstein, W. A., de Ridder, H., Freeman, J., & Avons, S. E. (2000). Presence: Concept, determinants and measurement. *Proceedings of the SPIE, Human Vision and Electronic Imaging*, V, 3959–3976.
- Innovation Norge (2020). Tilskudd til private innovasjons- og gründermiljøer (Grants to private innovation and entrepreneurial communities. ([https://www.innovasjon norge.no/no/tjenester/utlysninger/tilskudd-til-private-innovasjons-og-grundermiljoer/?utm\\_source=Facebook&utm\\_medium=organisk\\_post&utm\\_campaign=korona&utm\\_content=utlysning-innovasjonsmiljoer](https://www.innovasjon norge.no/no/tjenester/utlysninger/tilskudd-til-private-innovasjons-og-grundermiljoer/?utm_source=Facebook&utm_medium=organisk_post&utm_campaign=korona&utm_content=utlysning-innovasjonsmiljoer)).
- Ivaldi, S., & Scaratti, G. (2019). Coworking hybrid activities between plural objects and sharing thickness. *TPM: Testing, Psychometrics, Methodology in Applied Psychology*, 26 (1).
- Jacobs, N., & Cooper, R. (2018). *Living in Digital Worlds: Designing the Digital Public Space*. New York: Routledge,.
- Johnson, L., C. (2003). *The Co-Workplace: Teleworking in the Neighbourhood*. UBC Press,.
- Kallus, R. (2001). From abstract to concrete: subjective reading of urban space. *Journal of Urban Design*, 6(2), 129–150.
- Khan, Samia, & VanWynsberghe, Robert (2008). Cultivating the Under-Mined: Cross-Case Analysis as Knowledge Mobilization [54 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 9(1), 34. (<http://nbn-resolving.de/urn:nbn:de:0114-fqs0801348>).
- Kinney, P. (2017). Walking interviews. *Social Research Update*, 67(1–4).
- Krajcik, V., & Formanek, I. (2015). Regional startup ecosystem. *European Business & Management*, 1(2), 14–18.
- Kraslinikova, E., & Klimov, D. (2020). Design principles of hybrid spaces in terms of urban planning regeneration. K. Hadjri, & L. Madrazo, Ramon (Eds.). *Global Dwelling: Approaches to Sustainability, Design and Participation*, 89–100.
- Leclercq, B., & Pojani, D. (2020). Private, hybrid, and public spaces. Urban design assessment, comparisons, and recommendations. *Companion to Public Space*, 249–266. (<https://www.taylorfrancis.com/chapters/edit/10.4324/9781351002189-20/private-hybrid-public-spaces-els-leclercq-dorina-pojani>).
- Lee, A., Toombs, A. L., Erickson, I., Nemer, D., Ho, Y. S., Jo, E., & Guo, Z. (2019). The social infrastructure of co-spaces: Home, work, and sociable places for digital nomads. *Proceedings of the ACM on Human-computer Interaction*, 3(CSCW), 1–23.
- Lofland, L. H. (1998). *The public realm*. New York: Aldine de Gruyter.
- Madaleno, M., Nathan, M., Overman, H. G., & Waights, S. (2018). Incubators, Accelerators and Regional Economic Development. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3261715>
- Madaleno, M., Nathan, M., Overman, H., & Waights, S. (2021). Incubators, accelerators and urban economic development, 00420980211004209. <https://doi.org/10.1177/00420980211004209>.
- Madanipour, A. (2006). Roles and Challenges of Urban Design. *Journal of Urban Design*, 11(2), 173–193.
- Marchegiani, L., & Arcese, G. (2018). Collaborative spaces and coworking as hybrid workspaces: Friends or foes of learning and innovation?. *Learning and innovation in hybrid organizations* (pp. 51–71). Springer,.
- Mariotti, I., Pacchi, C., & Di Vita, S. (2017). Coworking Spaces in Milan: ICTs, Proximity, and Urban Effects. *Journal of Urban Technology*, 24(3), 47–66.
- Mariotti, I., Di Vita, S., & Akhavan, M. (2021). *New Workplaces—Location Patterns, Urban Effects and Development Trajectories: A Worldwide Investigation*. Springer Nature,.
- Marks, S. (1994). Intimacy in the public realm: The case of co-workers. *Social Forces*, 72 (3), 843–858.
- Matern, A., Binder, J., & Noack, A. (2019). Smart regions: insights from hybridization and peripheralization research. *European Planning Studies*, 28(10), 2060–2077.
- Maturana, B., Salama, A. M., & McInnery, A. (2021). Architecture, urbanism and health in a post-pandemic virtual world. *Archnet-IJAR International Journal of Architectural Research*, 5(1), 1–9.
- Mayring P. (2014). Qualitative content analysis - theoretical foundation, basic procedures and software solution. Klagenfurt, URN: (<http://nbn-resolving.de/urn:nbn:de:0168-ssoor-395173>).
- Mehta, V. (2014). Evaluating Public Space. *Journal of Urban Design*, 19, 53–88.
- Memarovic, N., Fels, S., Anacleto, J., Calderon, R., Gobbo, F., & Carroll, J. M. (2014). Rethinking third places: contemporary design with technology. *Journal of Community Informatics*, 10(3), 2–13.

- Mengi, O., Bilandzic, A., et al. (2020). Mapping Brisbane's Casual Creative Corridor: Land use and policy implications of a new genre in urban creative ecosystems. *Land Use Policy*, 97, Article 104792. <https://doi.org/10.1016/j.landusepol.2020.104792>
- Merkel, J. (2015). Coworking in the city. *Ephemera*, 15(2), 121–139.
- Middleton A. (2008). ICT Infrastructure as Public Infrastructure: Connecting Communities to the Knowledge-based Economy & Society available at (<http://digitalcommons.ryerson.ca/>).
- Migliore, A., Ceinar, I. M., & Tagliaro, C. (2021). Beyond Coworking: From Flexible to Hybrid Spaces. In *The Flexible Workplace* (pp. 3–24). Springer.
- Migliore, A., Ceinar, I. M., & Tagliaro, C. (2021). Beyond Coworking: From Flexible to Hybrid Spaces. In *The Flexible Workplace* (pp. 3–24). Springer.
- Montanari, F., Mattarelli, E., & Scapolan, A. C. (Eds.). (2020). *Collaborative Spaces at Work: Innovation, Creativity and Relations*. Routledge. <https://doi.org/10.4324/9780429329425>.
- Moriset, B. (2013). Building new places of the creative economy. The rise of coworking spaces. (<https://halshs.archives-ouvertes.fr/halshs-00914075>).
- Morisson, A. (2018). A Typology of Places in the Knowledge Economy: Towards the Fourth Place. In *International Symposium on New Metropolitan Perspectives ISHT 2018: New Metropolitan Perspectives*, 444–451.
- Müller, A. (2016). The digital nomad: Buzzword or research category? *Transnational Social Review*, 6(3), 344–348.
- Murphy, O. (2018). Coworking Spaces, Accelerators and Incubators: Emerging Forms of Museum Practice in an Increasingly Digital World. *Museum International*, 70(1–2), 62–75. <https://doi.org/10.1111/muse.12193>
- Mutz, D. (2006). *Hearing the Other Side*. Cambridge, U.K: Cambridge University Press.
- Nadler, R. (2016). Plug and Play Places: Subjective Standardization of Places in Multilocal Lifeworlds. In P. Pucci, & M. Colleoni (Eds.), *In Understanding Mobilities for Designing Contemporary Cities* (pp. 109–128). London: Springer.
- Næss, P., Strand, A., Næss, T., & Nicolaysen, M. (2011). On their road to sustainability? The challenge of sustainable mobility in urban planning and development in two Scandinavian capital regions'. *Town Plan Rev*, 82(3), 287–315.
- Németh, J., & Schmidt, S. (2011). The Privatization of Public Space: Modelling and Measuring Publicness. *Environment and Planning B: Planning and Design*, 38(1), 5–23. <https://doi.org/10.1068/b36057>
- Nergaard, K. (2020). Hjemmekontor og digitale løsninger. Fafo Faktaflak, april 2020. Oslo: Fafo. Opinion (2020), Norsk koronamonitor. (Norwegian Corona Monitor).
- Neuhauss, F. (2015). *Emergent Spatio-temporal Dimensions of the City. Habitus and Urban Rhythms*. New York: Springer.
- Nissen, S. (2006). 'Die Privatisierung des öffentlichen Raums.'. in *Eigentum und Handlungsrechte im Zeitalter der Propertization*, edited by Hannes Siegrist (pp. 130–145). Leipzig: Leipziger Universitätsverlag.
- Nissen, S. (2008). 'Urban Transformation from Public and Private Space to Spaces of Hybrid Character.'. *Czech Sociological Review*, 44(6), 1129–1149. [https://www.jstor.org/stable/pdf/41132666.pdf?refreqid=excelsior%3A31935226582f2dfdb7b8aa04d6ae23ef&ab\\_segments=&origin=&acceptTC=1](https://www.jstor.org/stable/pdf/41132666.pdf?refreqid=excelsior%3A31935226582f2dfdb7b8aa04d6ae23ef&ab_segments=&origin=&acceptTC=1).
- OECD (2020). Policy Responses to Coronavirus (COVID-19). Capacity for remote working can affect lockdown costs differently across places. (<https://www.oecd.org/coronavirus/policy-responses/capacity-for-remote-working-can-affect-lockdown-costs-differently-across-places-0e85740e/>).
- Oldenburg, R. (1997). Our vanishing third places. *Planning Commission Journal*, 25(4), 6–10.
- Oldenburg, R. (1999). *The great good place: Cafes, coffee shops, bookstores, bars, hair salons, and other hangouts at the heart of a community*. Da Capo Press. (<http://public.ebookcentral.proquest.com/choice/publicfullrecord.aspx?p=903814>).
- Oldenburg, R. (2001). *Celebrating the Third Place, Inspiring Stories about the "Great Good Places" at the Heart of Our Communities*. Marlowe & Company.
- Orel, M., & Kubátová, J. (2019). Coworking as a model for conscious business. *Journal of Global Responsibility*.
- Orel, M., & Dvouletý, O. (2020). Transformative Changes and Developments of the Coworking Model: A Narrative Review. In V. Ratten (Ed.), *Technological Progress, Inequality and Entrepreneurship* (pp. 9–27). Springer International Publishing. [https://doi.org/10.1007/978-3-030-26245-7\\_2](https://doi.org/10.1007/978-3-030-26245-7_2).
- Orel, M., & Bennis, W. M. (2021). Classifying changes. A taxonomy of contemporary coworking spaces. *Journal of Corporate Real Estate*.
- Orlikowski, W. J., & Scott, S. V. (2021). Liminal innovation in practice: Understanding the reconfiguration of digital work in crisis. *Information and Organization*, 31(1), Article 100336. <https://doi.org/10.1016/j.infoandorg.2021.100336>
- Oslo Business Region (2021). Oslo: State of the City 2021 (<https://www.stateofthecity.no/place#4.2-Places-and-spaces>).
- Oslo Kommune, 2021a, Bydel St. Hanshaugen (District of St. Hanshaugen). (<https://www.oslo.kommune.no/bydeler/bydel-st-hanshaugen/#gref>).
- Oslo Kommune, 2021b, Bydel Gamle Oslo (District of Gamle Oslo) (<https://www.oslo.kommune.no/bydeler/bydel-gamle-oslo/#gref>).
- Paay, J., Dave, B., & Howard, S. (2007). Understanding and Representing the Social Prospects of Hybrid Urban Spaces. *Environment and Planning B: Urban Analytics and City Science*. <https://doi.org/10.1068/b3239>.
- Per, A.F., Mozas, J. & Arpa, J. (2014). This is Hybrid. Vitoria-Gasteiz: a+t Architecture Publishers.
- Petani, F. J., & Mengis, J. (2021). Technology and the hybrid workplace: the affective living of IT-enabled space. *The International Journal of Human Resource Management*. <https://doi.org/10.1080/09585192.2021.1998186>
- Purnell, D., & Breede, D. C. (2018). Traveling the Third Place: Conferences as Third Places. *Space and Culture*, 21(4), 512–523.
- Putnam, R. D. (2000). *Bowling alone, The Collapse and Revival of American Community*. New York: Simon & Schuster.
- Pyöriä, P. (2003). Knowledge work in distributed environments: issues and illusions. In *New Technology, Work and Employment*, 18(3), 166–180.
- Ragin, Charles (1993). Introduction to qualitative comparative analysis. In Thomas Janoski, & Alexander Hicks (Eds.), *The comparative political economy of the welfare state* (pp. 299–319). New York: Cambridge University Press.
- Rahaman M.S., Kudo S., Rawling T., Yongli R., & Salim F. (2020). Seating preference analysis for hybrid workplaces. NFW '20: Symposium on New Future of Work, August 03–05, arXiv:2007.15807, (<https://arxiv.org/abs/2007.15807>).
- Reuske, D., & Ekinsmyth, C. (2021). New spatialities of work in the city. *Urban Studies*, 58(11), 2177–2187.
- Salinas, L., Coulton, P., & Dunn, N. (2016). Using Game Design as a Frame for Evaluating Experiences in Hybrid Digital/Physical Spaces. *Architecture and Culture*, 4(1), 115–135.
- Samadi Ahari, A., & SattarZadeh, D. (2017). "Third Place", A Place for Leisure Time and its Relationship with Different Social Setting in Tabriz, 27 pp. 95–103. Iran: IJAUP.
- Santos (2022) Santos, João Rafael, 2021, Tokyo, Japan – urbanistic hybridity in a networked metropolis, Journal of Place Management and Design, Vol. ahead-of-print No. ahead-of-print, ISSN: 1753-8335. (<https://doi.org/10.1108/JPM-D-2021-0015>).
- Schmidt, S. (2019). In the making: Open Creative Labs as an emerging topic in economic geography? *Geography Compass*, 13(9). <https://doi.org/10.1111/gec3.12463>
- Scullica, F., & Elgani, E. (2019). The "Living, Working and Travelling: Interior Design for New Scenarios Between Work and Hospitality Field" Research Project DevelopmentF. Scullica, & E. Elgani (Eds.). *Living, Working And Travelling New Processes of Hybridization for the Spaces of Hospitality and Work*, 11–14.
- Setti, G. (2013). Beyond Public Spaces: Shared Spaces in the Contemporary City. *Journal of Civil Engineering and Architecture*, 7(7), 833–840.
- Shao, Z. (2015). *The New Urban Area Development*. Springer-Verlag.
- Shearmur, R. (2017). The Millennial urban space economy: Dissolving workplaces and the de-localization of economic value-creation. In *The Millennial City* (pp. 65–79). Routledge.
- Simões Aelbrecht, P. (2016). 'Fourth places': The contemporary public settings for informal social interaction among strangers. *Journal of Urban Design*, 21(1), 124–152.
- Sinitsyina, A., Sinitsyina, A., Di Marino, M., & Paas, Tiit (2022). Virtual Coworking and Remote Working: Corona Lessons and Perspectives from Estonia and Norway. In I. Mariotti, M. Di Marino, & P. Bednar (Eds.), *The COVID-19 pandemic and Future of Working Spaces* (pp. 153–164). Routledge.
- Soukup, C. (2006). Computer-mediated communication as a virtual third place: building Oldenburg's great good places on the world wide web. *New Media & Society*, 8(3), 421–440.
- de Souza e Silva, A. (2006). From Cyber to Hybrid: Mobile Technologies as Interfaces of Hybrid Spaces. *Space and Culture*, 9(3), 261–278. <https://doi.org/10.1177/1206331206289022>
- Spiegel, D. (2007). Testimony to the New York City Broadband Advisory Committee Broadband Advisory Committee Testimony (Dec 12 2007) ([wordpress.com](http://wordpress.com)).
- Spinuzzi, C. (2012). Working Alone Together: Coworking as Emergent Collaborative Activity. *Journal of Business and Technical Communication*, 26(4), 399–441. <https://doi.org/10.1177/1050651912444070>
- van Sprang, H., & Groen, B. (2021). Work from hotels: Is hybrid the future? *The Future of Real Estate*, 191–221.
- Statistics of Norway (2021) Population. 10826: Population, by sex and age (UD) 2001 - 2022. Statbank Norway ([ssb.no](http://ssb.no)).
- Strauss, A. L. (1961). *Images of the American city*. New York: The Free Press of Glenco.
- Tiitu, M., Naess, P., & Ristimäki, M. (2021). The urban density in two Nordic capitals – comparing the development of Oslo and Helsinki metropolitan regions. *European Planning Studies*, 29(6), 1092–1112. <https://doi.org/10.1080/09654313.2020.1817865>
- Torraco. (2005). Writing Integrative Literature Reviews: Guidelines and Examples. *Human Resource Development Review*, 4(3), 356–367.
- Townsend, A. M. (2000). *Life in the Real-Time City: Mobile Telephones and Urban Metabolism*, in 7 pp. 85–104). Journal of Urban Technology.
- Tredinnick, L., & Laybats, C. (2021). Blended workplaces. *Business Information Review* 2021 (Vol. 38,(3), 108–110.
- Tripathi, N., & Oivo, M. (2020). The Roles of Incubators, Accelerators, Co-working Spaces, Mentors, and Events in the Startup Development Process. In A. Nguyen-Duc, J. Münch, R. Prikladnicki, X. Wang, & P. Abrahamsson (Eds.), *Fundamentals of Software Startups* (pp. 147–159). Springer International Publishing. [https://doi.org/10.1007/978-3-030-35983-6\\_9](https://doi.org/10.1007/978-3-030-35983-6_9).
- Vallas, S., & Schor, J. B. (2020). What do platforms do? Understanding the gig economy. *Annual Review of Sociology*, 46, 273–294.
- Vartiainen, M., & Hyrkkänen, U. (2010). "Changing Requirements and Mental Workload Factors in Mobile, Multi-locational Work.". *New Technology, Work and Employment*, 25(2), 117–135.
- Vartiainen, M., Hakonen, M., Mannonen, P., Nieminen, M. P., Ruohomäki, V., & Vartola, A. (2007). *Distributed and Mobile Work – Places, People and Technology*. Tampere: Otatiето.
- Vartiainen, M., 2021, Mobile Multilocal Work: Benefits and Drawbacks. In C. Korunka (ed.), *Flexible Working Practices and Approaches*, 117–148 [https://doi.org/10.1007/978-3-030-74128-0\\_7](https://doi.org/10.1007/978-3-030-74128-0_7).
- Volpi, V., & Opromolla, A. (2017). The role of design in supporting the continual emergence of hybrid spaces of interaction within the city. *The Design Journal*, 20: sup1, S3569–S3577. <https://doi.org/10.1080/14606925.2017.1352859>
- Waters-Lynch J. (2016). 'It's more like a hive than a hub' Stigmatic activity and governance dilemmas in contemporary Coworking spaces Conference Paper:

- Standing Conference on Organisational Symbolism (SCOS), July 14, 2016, Uppsala, Sweden.
- Waters-Lynch, J. M., Potts, J., Butcher, T., Dodson, J., & Hurley, J. (2016). Coworking: A Transdisciplinary Overview. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2712217>
- Weise, F. (2004). Being there: The library as place. *J Med Libr Assoc*, 8.
- Willis, K. (2008). Sensing Place: New Media Technologies and Urban Space. In L. Frers, & L. Meier (Eds.), *Encountering Urban Places; Visual and Material Performances in the City*. UK: Ashgate Press.
- Willis, K. S., & Aurigi, A. (2011). Hybrid Spaces: Presence, Rhythms and Performativity. *IE*, 2011, Intelligent Environments, International Conference on, Intelligent Environments. *International Conference on, 2011*, 100–106. doi:10.1109/IE.2011.70.
- Woodcock, J., & Graham, M. (2019). The gig economy. *A critical introduction*. Cambridge: Polity.
- Yang, E., Bisson, C., & Sanborn, B. E. (2019). Coworking space as a third-fourth place: Changing models of a hybrid space in corporate real estate. *Journal of Corporate Real Estate*, 21(4), 324–345. <https://doi.org/10.1108/JCRE-12-2018-0051>
- Yin, R. (2003). *Case study research: Design and methods* (3rd ed.,.). Thousand Oaks, CA: Sage Publications,.
- Zanni, F. (2012). *Urban Hybridization*. Milano: Politecnica,.
- Zenkeler, M., et al. (2022). Home-based work in cities: In search of an appropriate urban planning response. *Futures*, 135, Article 102494. <https://doi.org/10.1016/j.futures.2019.102494>
- Zenkeler, M., Foth, Marcus, & Hearn, Gregory (2021). The role of residential suburbs in the knowledge economy: insights from a design charrette into nomadic and remote work practices. *Journal of Urban Design*, 26(4), 422–440. <https://doi.org/10.1080/13574809.2020.1860673>
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