ORIGINAL ARTICLE

A review of the physical context of creativity: A three-dimensional framework for investigating the physical context of creativity

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Abstract

Many organizations are investing considerable resources in building and designing what are termed 'creative offices'. In this paper, we bring together two lines of academic enquiry that have attracted the interest of scholars from different disciplines: organizational creativity and the physical space of organizations. These lines of study use different concepts and lean on different ontologies; consequently, their relation is underexplored in the extant literature. To provide a better understanding of the ways in which physical space relates to creativity, we offer an integrative review based on a three-dimensional framework comprising (i) the elements of workspace, (ii) the social dynamics of space and (iii) the relation between space and creativity. This framework is used to review the physical context of creativity literature. Based on this framework and our review, we outline three directions for future studies on the physical context of creativity. These directions are based on a broader understanding of physical space that aligns better with the contemporary conception of creativity as a process.

INTRODUCTION

Designing offices or corporate facilities to encourage employee creativity has become increasingly popular in recent times. Despite its popularity, the paucity of generalizable research findings on how to design offices that enhance creativity has become evident (Meinel et al., 2017). Some scholars have suggested that owing to the scarcity of generalizable research findings, companies have relied on stereotyped models of creativity in designing their offices (De Paoli & Ropo, 2017; De Paoli et al., 2017). Consequently, the simplified understanding of creativity excludes or restricts ways of being in the office, for example, by masking social division and heterogeneity (Alexan-

dersson & Kalonaityte, 2018). Given the significant interest among practitioners, the scarcity of generalizable research findings and the central role played by office design in many aspects of employee behaviour (Brown et al., 2010; Elsbach & Pratt, 2007; Hatch & Cunliffe, 2006; Kornberger & Clegg, 2004), the physical context of creativity merits refined research interest.

Considering creative spaces requires integrating two heterogeneous lines of academic enquiry: physical space and creativity. This segregation of disciplines makes it almost impossible for any single scholar to acquire deep expertise in all potentially relevant academic discourses. Thus, in practice, scholars perceive their topic of interest from a certain discipline, which applies to some extent

to this particular paper. Accordingly, our analysis mainly leans on the perspective of organizational studies.

Although several classical organizational studies have links to physical space (Kornberger & Clegg, 2004), organizational theorists have shown surprisingly little interest in it (Elsbach & Pratt, 2007). According to Hatch and Cunliffe (2006), it was not until the 1970s and 1980s that organizational theorists recognized the importance of the physical space. Moreover, the physical contexts of organizations were long treated 'as neutral settings; in Foucault's terms, fixed, dead, and immobile containers or settings' (Taylor & Spicer, 2007, p. 325). However, recent years have witnessed a growing interest in organizational spaces and materiality more broadly, as illustrated by the increasing number of contributions about the topic (e.g. Alexandersson & Kalonaityte, 2018; Burrell & Dale, 2014; Clegg & Kornberger, 2006; Dale & Burrell, 2008; De Paoli & Ropo, 2017; Kornberger & Clegg, 2004; Tyler & Cohen, 2010; Weinfurtner & Seidl, 2019) and related special issues, such as Chan et al. (2019) in the *Scandinavian Journal of Management*, Delbridge and Sallaz (2015) in *Organization Studies* and Cutcher et al. (2016) in *Organization*. The interest in physical space and materiality in organizational studies has increased to the extent that it is fair to talk about the material and spatial turn (Chan et al., 2019; van Marrewijk & Yanow, 2010).

Although creativity and physical space have been actively studied over the years, the two have only recently been brought together explicitly. In this paper, we perform a review that lies at the intersection of two literatures—organizational creativity and the physical space of organizations. More specifically:

1. We offer an integrative framework comprising three dimensions that can serve to guide research on the physical organizational space.
2. Using the three-dimensional framework as an analytical lens, we review the extant literature on the physical context of creativity and critically discuss some of its main findings and theoretical assumptions.
3. Based on the review, we suggest three research avenues that could guide future theorizing on the physical context of creativity.

We focus on creativity in an organizational context and follow the widely accepted definition of organizational creativity by Woodman et al. (1993, p. 293), that is 'the creation of a valuable, useful new product, service, idea, procedure, or process by individuals working together in a complex social system'. To provide a broader conception of creativity that emphasizes its social and processual nature, we complement the above-mentioned definition with one that conceptualizes creativity as a social and relational process inherently entwined with material aspects, such as tools, objects and space (Carlsen et al., 2012; Gaim et al., 2018; Håkonsen Coldevin et al., 2019).

In the next section, we begin our review by identifying the roots of the two lines of study—organizational creativity and the physical space of organizations—and continue by discussing why scholars have only recently shown interest in studying them together. In the third section, we introduce a three-dimensional framework comprising (i) the elements of workspace, (ii) the social dynamics of space and (iii) the relation of space and creativity that we argue is a useful way to synthesize the current theorizing on physical space. Using the three-dimensional framework to inform categorization, we analyse studies dealing with organizational creativity and physical space. Based on our review, we identify three directions for future theorizing that are rooted in a broader conception of physical space. We end this paper by offering our conclusions.

CHALLENGES IN STUDYING THE PHYSICAL CONTEXT OF CREATIVITY

One of the difficulties in studying the physical context of creativity is its multidisciplinary nature. The topic can be approached from the perspectives of organization studies, creativity and innovation studies, architecture and environmental psychology. As the two themes, which have traditionally been kept apart but individually studied under numerous fields of academic enquiry, are brought together, a multitude of concepts, theories, perspectives and so on have emerged.

One of the inconveniences of studying a multidisciplinary topic is conceptual confusion, which is obvious in this case. To begin with, the vocabulary used to refer to the physical organizational context is diverse (Weinfurtner & Seidl, 2019), and the publications cited in this paper alone use various terms and phrases when referring to the physical space of organizations, including 'place' (Kristensen, 2004), 'physical context' (Kristensen, 2004), 'physical space' (Kornberger & Clegg, 2004), 'spatial structure' (Kornberger & Clegg, 2004), 'spatial arrangements of organizations' (Kornberger & Clegg, 2004), 'spatial configuration' (Sailer, 2011), 'spatial location' (Moultrie et al., 2007), 'workplace layout' (Moultrie et al., 2007), 'operating environments' (Moultrie et al., 2007), 'physical environment' (Franck, 1984), 'physical structure' (Hatch & Cunliffe, 2006), 'physical press' (Williams, 2009), 'physical setting' (Ceylan et al., 2008; McCoy & Evans, 2002; Vithayathawornwong et al., 2003), 'physical facilities' (Lewis & Moultrie, 2005; Magadley & Birdi, 2009), 'physical layout' (Sailer, 2011), 'physical work environment' (Martens, 2011) and 'office design' (Martens, 2011). This underlines

TABLE 1 A three-dimensional framework for analysing physical organizational space

The focus of analysis	Elements of workspace	Social dynamics of space	Relation of space and behaviour
Aspects identified	*Spatial organization* (size, shape, allocation and division of space)	*Instrumental* (physical settings as 'tools' for organizational goals and productivity)	*Direct effect*
	Architectonic details (aesthetics, materials and ornaments used to enhance workspace)	*Symbolic* (physical settings as reflections of meanings and symbolism)	*Interaction effect*
	Views (observable features visible within or from the work area)	*Aesthetic* (sensory, affective and emotional sensations elicited by physical settings)	*Indirect effect* (via intra- or interpersonal variables)
	Resources (access to equipment, physical fitness areas, parking facilities, etc.)	*Political* (physical settings as both socially produced and socially producing)	*Co-constitutive*
	Ambient conditions (heating, illumination, ventilation and acoustics)		*Entwined*

Kristensen's (2004, p. 90) point when he states 'Concepts of space are often thought of in "vernacular" terms because of the difficulty of their articulation'.

Moreover, as hinted at by the conceptual variety, physical space can be viewed from various angles, at different levels of analysis and, ultimately, based on diverse ontological assumptions. The next subsection offers a framework with three dimensions to aid understanding of the organizational physical environment. This three-dimensional framework will be used when reviewing the literature on the physical context of creativity.

A three-dimensional framework for understanding the physical organizational space

Based on our analysis of the literature, we identified three dimensions relevant when analysing the organizational physical environment (Table 1). These dimensions explain which *element* of workspace is studied, what *social dynamics* are targeted, and how space and creativity and their *relations* are conceived.

In terms of the first dimension—elements of workspace—McCoy (2005) suggests that physical space can be analysed based on five distinct but intertwined elements: spatial organization, architectonic details, views, resources and ambient conditions. The second dimension is the social dynamics of space. Along this dimension, Rafaeli and Vilnai-Yavetz (2004) suggest that in order to understand people's reactions to physical space, three perspectives should be taken into account: instrumentality, aesthetics and symbolism. Thus, physical space not only influences people instrumentally by

guiding their behavioural or interaction patterns, but also provides a variety of symbolic meanings and evokes aesthetic experiences. Due to the sometimes contradictory tensions that arise from the interaction of these perspectives, and in order to account for the political nature of organizational spaces, the three perspectives are complemented with a fourth—the political perspective (Dale, 2005; Dale & Burrell, 2008; Lefebvre, 1991). Together, the four perspectives make up the second dimension of physical space that is here labelled *the social dynamics of space*. The third dimension concerns the relation between space and behaviour. Here, Franck's (1984) model is a useful starting point for illustrating the different effects that the physical environment may have on behaviour. However, being several decades old, Franck's (1984) model is complemented with more recent thinking about the relation between the physical context and behaviour. Next, we elaborate the three above-mentioned dimensions in studying organizational physical space (Table 1).

Elements of workspace

The first and most straightforward dimension to aid understanding physical space is to conceptualize the *elements of physical workspace*. According to McCoy (2005), *spatial organization*, that is, the size, shape, allocation and division of space, defines the spatial aspects of the work environment. The organization of these spatial conditions determines several important factors, such as the level of enclosure, adjacency and territoriality, thus further affecting privacy, control, flexibility and so on. Consequently, the design of spatial conditions possesses tremendous, if somewhat implicit, power over several social aspects of the

work environment (Elsbach & Bechky, 2007). According to McCoy (2005), performance, satisfaction, communication, collaboration, organizational culture and identity are factors connected to spatial organization. It is therefore no coincidence that organizational studies have a long tradition of analysing organizational behaviour from the perspective of the spatial layout (see e.g. Hatch, 1987; Oldham & Brass, 1979; Oldham & Rotchford, 1983).

According to McCoy (2005), fixed or stationary aesthetics and the materials or ornaments used to embellish the workspace belong to the *architectonic details* of the environment, which include decorative styles, signs, colours and artwork. Becker and Steele (1995) suggested that architectonic details are important from the standpoint of a group's identity and purpose, while the use of specific items is secondary to the way that they are used. Office or workstation *views*, including what can be seen from windows and adjacent workspaces, have an explicit connection to work environment aesthetics and can be considered to possess either restoration or stress qualities, for instance. As recognized status symbols, they are also symbolically charged (Elsbach & Bechky, 2007). Workplace *resources*, such as access to equipment, parking and food services, are clearly related to the instrumental aspects of the work environment, while also performing a symbolic role because people who are considered important are typically given their own equipment, such as printers. Although *ambient conditions*, including heating, illumination, ventilation and acoustics, are important aspects of the work environment, they are often explicitly noted only if something goes wrong (McCoy, 2005).

Social dynamics of space

An organization's physical environment not only defines how and where people perform their tasks and interact with one another in an instrumental sense, but also evokes aesthetic experiences (Gagliardi, 1990; Rafaeli & Vilnai-Yavetz, 2004), provides a rich symbolic landscape (Brown & Humphreys, 2006; Elsbach, 2003, 2004; Hatch, 1990; Stang Våland & Georg, 2019; Zhang & Spicer, 2013) and produces power effects, which lend it a political aspect (Dale & Burrell, 2008; Lefebvre, 1991). Together, the four perspectives form the second dimension of physical space, here labelled *the social dynamics of space*.

Instrumentally focused studies examine whether the physical environment enables working effectively and attaining organizational objectives (Vilnai-Yavetz et al., 2005). Worker efficiency and productivity are central viewpoints from which work conditions, such as lighting and ergonomics, have traditionally been examined (see e.g. Hollnagel, 2014; Veitch & Gifford, 1996). From the instrumental perspective, office design effectively influences two

areas of social behaviour in particular: worker interaction and group collaboration (see e.g. Hatch, 1987; Kraut et al., 2002; Oldham & Brass, 1979; Oldham & Rotchford, 1983). The importance of physical space and distance for employee interaction has been found in several studies (see e.g. Allen, 1977; Hatch, 1987; Oldham & Brass, 1979; Oldham & Rotchford, 1983); when the physical distance between workstations increases, it decreases employee interaction. Increasing the distance between workstations reduces spontaneous communication in particular. It is reported that even just a few extra metres can have a dramatic negative influence (Allen, 1977). However, some physical barriers, such as walls, have been found to increase communication (Hatch, 1987), which has been explained by increased privacy and opportunities for personal communication (Oldham & Brass, 1979). Spatial design also influences work relationships through proximity, privacy and having or lacking an assigned workspace (Khazanchi et al., 2018).

When examining collaboration among different work groups, some researchers have found that distance and physical obstacles, such as walls or floors, have negative consequences because informal and spontaneous interactions become more difficult (Kraut et al., 2002). The influence of barriers can be reduced by introducing boundary objects, such as shared workspaces, games and devices, and places that encourage informal interaction among the groups (Elsbach & Bechky, 2007; Fayard & Weeks, 2007). Thus, the instrumental view on physical space is typically concerned with how the physical space organizes people's behaviour, movement and flow of communication and allows efficient and productive work.

The *symbolic* dynamics of physical space relate to the symbolism and meanings attached to physical space (Byron & Laurence, 2015; Elsbach & Bechky, 2007; Gagliardi, 1990; Vilnai-Yavetz et al., 2005). Elsbach and Bechky (2007) suggested that office design and its artefacts constitute the visible part of an organization's culture. In addition to transmitting aspects of organizational culture, office design signals the importance, the status (Hatch, 1990; Sundström et al., 1980) and the identity of people (Brown, 2017; Brown & Humphreys, 2006; Brown et al., 2005; Byron & Laurence, 2015; Crevani, 2019; Stang Våland & Georg, 2019; Wasserman & Frenkel, 2011). The symbolic of physical space also explains why satisfaction with the workspace is relative. If private offices are available, people tend to be dissatisfied if they do not have one, while an open office arrangement does not produce the same dissatisfaction if everybody shares the same open space (Hatch, 1990). While many aspects of physical space are often beyond employee control, the members of an organization can, to various extents, influence office symbolism by bringing in personal objects that represent certain values or identities (Brown, 2017; Brown et al.,

2005; Byron & Laurence, 2015). However, physical spaces always carry symbols, representations and meanings, whether deliberate, unintended or even involuntary (Dale & Burrell, 2008; Lefebvre, 1991).

The *aesthetic* dynamics of physical space consider the aesthetic experiences of the space's users and involve the sensory, affective and emotional reactions elicited by the organizational environment (Rafaeli & Vilnai-Yavetz, 2004). Vilnai-Yavetz et al. (2005) suggested that aesthetics is independent of instrumentality but not of organizational goals. To illustrate their point, the authors cited the plain example of a black leather chair, which could be equally functional in both a senior manager's office and a flower shop, but would obviously be more aesthetically pleasing in the former.

Instrumental, symbolic and aesthetic dynamics largely overlap; thus, the issue is more a question of choosing a perspective than a specific set of features. A feature of physical space, such as a hallway, may be instrumental in guiding people to use a certain route instead of another. It can be interpreted as symbolizing proximity or distance, prestige or degradation, to name a few, and it may be experienced as aesthetically pleasing, unpleasant, oppressive or something else (Vilnai-Yavetz et al., 2005). The instrumental, symbolic and aesthetic dynamics can also be in tension with each other (Elsbach & Pratt, 2007). Elsbach and Pratt (2007) illustrate that an aesthetically pleasing office may be instrumentally horrible to work in. An aesthetic feature, such as a messy desk, can give the impression that a person is intelligent but simultaneously unsociable, and symbolism within an environment can encourage both affiliation with a group and the exclusion of others.

These potential tensions lead to the fourth dynamic of organizational space, that is, the political. This refers to perceiving spaces as both socially produced and socially producing and thus political (e.g. Alexandersson & Kalonaityte, 2018; Dale, 2005; Dale & Burrell, 2008; Tyler & Cohen, 2010). This perspective has been strongly influenced by the work of Lefebvre (1991), who connects the physicality of space to its 'imaginary' aspects that carry the cultural, social and historical meanings associated with spaces (Dale & Burrell, 2008). Lefebvre (1991) theorizes space via a triad of perceived, conceived and lived space. Perceived space refers to 'spatial practice', that is, the specific use of a particular space, such as a marketplace or a street corner, which expresses and constitutes a quite routinized and habitual use of the space based on a 'spatial code' (Lefebvre, 1991, pp. 16, 33). The second element, conceived space, refers to 'representations of space'; spaces that are deliberately planned by architects, designers and environmental planners based on knowledge and ideology, such as functionality or efficiency. The third element, 'lived space or representational space', refers to space as

lived and experienced through its symbols, images and signs (Lefebvre, 1991, pp. 38−40). Baldry et al. (1998, p. 164) argued that buildings are all about control, suggesting that physical environments both easily obscure power relations and make changing them seem difficult owing to the immobility of physical environments. According to Dale and Burrell (2008), space has power effects that can be intended and deliberate, as well as unintentional. Built spaces have power effects related to instrumentalism, for instance, by creating boundaries, including and excluding, as well as to symbolism, by establishing taken-for-granted assumptions and norms, enforcing meanings and embodying different identities. Aesthetics is political because it makes certain aspects perceivable while excluding or confining others (Alexandersson & Kalonaityte, 2018) and may contain markers of ideology and inequality (Wasserman, 2012; Wasserman & Frenkel, 2015).

Relation between space and behaviour

The third dimension for understanding physical space concerns the nature of the physical environment's influence on behaviour, labelled here as the *relation between space and behaviour*. Franck (1984) provided an analysis of the different influences that a physical environment may have on human behaviour. According to Franck (1984), scholars disagree on whether the physical environment has direct effects on behaviour and, if so, whether it is a meaningful topic to study. Franck (1984) concluded that although the direct effects of the physical environment are likely to be theoretically less important than the indirect effects, they constitute a meaningful topic of a social study.

Franck (1984) also suggested that the effects of various intervening variables and the interactionist effects of independent variables on behaviour are more theoretically important. Franck (1984, p. 417) defined an intervening variable as 'the effect that an independent variable exerts on a dependent variable that is transmitted via an intervening variable', where the intervening variable helps explain *why* the environment influences behaviour. As Franck (1984) highlighted, an intervening variable needs to be a *consequence* of the environmental feature. If the intervening variable is not a consequence but exists independently of the environment, they must be labelled as other influences or *interaction effects* of two or more independent variables. Interaction effects refer to independent variables that, together with certain environmental features, influence behaviour. For instance, in Brunson et al.'s (2001) study, a neighbourhood was experienced as safer by those spending more time outdoors than those who spend less time outdoors. Therefore, the time spent outdoors mediated the effect of the physical environment on the

experiences of safety. The effect of an environment's physical features thus depends on the presence of some other variable.

Although Franck's (1984) examination of the physical environment's potential influence on behaviour is insightful, it was published a few decades ago; thus, it does not reflect more recent developments in conceptions about the relation between the physical and the social. While acknowledging the possibility for users to modify a space, Franck (1984) assumed that the space exists as an entity separate from the social and that the chain of influence between the physical environment and behaviour is unidirectional. However, much of the recent literature recognizes that the relation is far more complex and multidirectional (Clegg & Kornberger, 2006; Dale & Burrell, 2008; de Vaujany & Mitev, 2013; Kornberger & Clegg, 2004). Clegg and Kornberger (2006, p. 144) stated: 'we constitute space through the countless practices of everyday life as much as we are constituted through them', an assertion which expresses that while organizational space is enacted through our occupation of and movement within it, the space also constitutes the people inhabiting it. This perspective treats the relation of the physical and social worlds as *co-constitutive*.

This approach shares many similarities with that of sociomateriality (e.g. de Vaujany & Mitev, 2013; Orlikowski & Scott, 2008), which emphasizes the entwinement of the social and the physical. Franck's (1984) theorization—similarly, we believe, to most theorizations on physical space and behaviour—leans on a 'being' ontology and thus assumes the existence of ontologically distinct entities. However, sociomaterial thinking leans on a different ontology, that relying on the premise that the world is constituted by relational enactments and material configurations (Hultin, 2019). Therefore, the approach goes beyond looking at space, material elements and humans as separate entities and perceives their relations and boundaries as enacted in practice (e.g. Orlikowski & Scott, 2008). Although physical organizational spaces are material and play a profound role in co-constituting organizations together with the social, the physical space is often located at the margin of sociomaterial theorizing and is thus not often expressly discussed (de Vaujany & Mitev, 2013). From the viewpoint of sociomaterial literature, the question of how the physical environment influences behaviour is misleading, as 'the material environment does not act on the social environment or vice versa; one cannot be defined and described without the other' (Bansal & Knox-Hayes, 2013, p. 63). The social and the material, and thus the physical organizational space, are *entangled* and melded in everyday life.

When examining the three-dimensional framework as a whole, we can identify a significant permutation of potential avenues for research. The extant literature directs attention to some approaches while neglecting others. This issue will be discussed in the Findings section, where we review the research on the physical context of creativity using the three-dimensional framework discussed above. Beforehand, we briefly explain the review process.

METHOD

The methodological approach of this paper can be described as a state-of-the-art review (Jesson et al., 2011; cf. Danese et al., 2018; Shrivastava, 2007) that integrates the literatures on organizational creativity and the physical space of organizations. It also extends the body of knowledge by offering three directions for future theorizing based on a broader conception of space. Here, the style of theorizing is topological, with an attempt to categorize the literature to offer 'a set of theoretical coordinates for empirical research' (Cornelissen, 2017, p. 6). The literature review of this paper represents a 'miner' approach in that it synthesizes a field of study and categorizes the related literature, while also presenting elements of the 'prospector' approach by proposing an alternative conceptual understanding of physical space and identifying emerging research streams based on the refined conceptual understanding (cf. Breslin & Gatrell, 2020).

The material included in the review consisted of peer-reviewed journal articles published in scholarly journals and scholarly books or book sections. The first round of searches for relevant literature was conducted in January 2018 through the EBSCO Academic Search Premier and ABI/INFORM collection databases. The searches were conducted several times in both databases with slightly different keywords. The articles gathered through the searches were skimmed through, and their titles, keywords and abstracts were read to determine whether they dealt with the physical context of creativity. If they did, they were included in the analysis. Due to the variety of terminology used in reference to physical space, it was quickly realized that a keyword search in databases did not cover all relevant sources. Therefore, the next stage of the search was to read the reference lists of the articles included in the review to find books and articles that were not accessed via the database search. The search was renewed in March 2020 to ensure an updated review. The search and selection process conducted in March 2020 is explicated in Appendix 1.

The articles to be analysed were first read to generate an overview of the material. Second, the material was analysed more carefully using the three-dimensional framework to facilitate understanding physical space presented in the previous section (Table 1) as our analytical lens. Then, the literature on organizational space was analysed

to identify its topical discussions, and based on that, future research avenues for the study of the physical context of creativity were formulated.

REVIEWING THE STUDIES ON THE PHYSICAL CONTEXT OF CREATIVITY

This section reviews the extant literature using the three-dimensional framework as an analytical lens (Table 1). We begin the review by discussing the studies using the first dimension—the elements of workspace—for categorization. The studies will also be reviewed from the viewpoint of the second dimension, the social dynamics of space. We continue by analysing the third dimension, the relation of physical space and creativity.

Elements of workspace in the research on the physical context of creativity

Spatial organization, that is, the size, shape, allocation and division of space, is the first element in McCoy's (2005) categorization and is the element of space that has attracted the most interest among researchers. Spatial organization's popularity is naturally understandable because many issues, such as privacy, flexibility, communication and collaboration, are linked to spatial organization while being central to creativity. For example, Ajis and Naka (2015) conducted a case study exploring how physical space supports knowledge creation by fostering a communicative environment. They defined creativity as the creation of new knowledge and concluded that creativity-enhancing communication occurs in segregated and integrated workspaces. Using mixed methods, Sailer (2011) studied creativity by examining interaction patterns and highlighted the need to bring people together and facilitate communication to enhance creativity—a theme echoed in many studies (e.g. Allen, 1977; Allen & Henn, 2007; Haner, 2005; Kornberger & Clegg, 2004; Manca et al., 2018; Oksanen & Ståhle, 2013).

Another organizational feature influenced by spatial layout is organizational culture. In their longitudinal qualitative case study, Kallio et al. (2015) found that an open spatial layout that facilitates open communication and symbolizes equality and collectiveness enhances creativity. In their study, Vithayathawornwong et al. (2003) noted that the physical environment indirectly influences organizational creativity by facilitating dynamism and freedom, which are considered important features of a creativity-enhancing social work environment. Drawing on experience as the general manager of the design firm IDEO, Kelley (2001) described how its physical space is used to create a culture of creativity and celebrate teamwork. Kelley (2001) also highlighted that the design needs to enable random encounters and concentrated working. In a historical study, Crawford (2018) analysed advertising agencies' layouts and illustrated how office design reflects the changing meanings and importance attributed to creativity in the course of history. The author concluded that agency spaces have simultaneously been informed by these meanings and informed them.

The spatial layout is also the focus of Kornberger and Clegg's (2003, 2004) theoretical studies, although they also addressed architectonic details and symbolic, aesthetic and political dynamics. Kornberger and Clegg (2003) complemented what they call the dominant organizational theory by illustrating how corporate buildings generate complexity by structuring movements and interactions. They concluded that spaces designed to encourage creativity should provide an interplay of order and disorder and inside/outside relations. In another study, Kornberger and Clegg (2004) proposed a generative building where individuals can interact and exchange ideas freely, and surprises can happen. They criticized the arguments that structure follows strategy and form follows function, which leads to a terminal architecture (see Pawley, 1998), characterized as stable, secure, defendable and impersonal. By contrast, generative building requires a certain randomness and unintended encounters, combined with the protection of privacy. In their qualitative case study of architectural firms, Gaim et al. (2018) provided an empirical illustration of generative space, concluding that spatial conditions conceptualized as organized chaos, boundary(less)ness, premeditated spontaneity and (re)framing evoke a paradoxical way of thinking and thus facilitate creativity.

A group of studies that analyses the relation of physical space and creativity using different stage models of creativity also targets spatial organization. They shared the assumption that creativity consists of distinctive phases that impose different demands on facilities (Allen & Henn, 2007; Haner, 2005; Kristensen, 2004; Martens, 2011; Meusburger, 2009; see also McCoy & Evans, 2002; Sailer, 2011; Wanqing et al., 2020). In his qualitative case study, Kristensen relied on the phase model devised by Wallas (1926, cited in Kristensen, 2004), which comprises preparation, incubation, elaboration and evaluation, in organizing his research findings related to the physical context of creativity. He concluded that the preparation and elaboration phases require a combination of communal and private spaces, while the incubation and insight phases need private spaces. Using a combination of theoretical and case analyses, Haner (2005) distinguished between the divergent and convergent phases, concluding that the space design should accommodate both types of action. He studied the effects of the spaces as indirect, that is, as

influencing interaction, knowledge sharing, collaboration and concentration.

In their longitudinal qualitative study, Coradi et al. (2015) found that proximity and visibility facilitate both explorative and exploitative activities, although proximity is more important for exploitation, while exploration—typically connected with creativity—requires a balance of proximity and visibility without too many interruptions.

The second element on McCoy's (2005) list, *architectonic details*, has been studied far less than spatial organization in the extant literature. Architectonic details operate more on symbolic and aesthetic levels, while being less influential from the instrumental perspective. In their experimental laboratory study on how various features of the physical environment are experienced in relation to creativity, McCoy and Evans (2002) identified five features that predict greater creativity. These are the complexity of visual detail, natural environment, use of natural materials, use of fewer cool colours and less use of manufactured or composite materials in the environment. Haner (2005) also mentioned the use of colours and materials in the design of creativity-supporting facilities, but offered no direct instructions on what they should be. In their quantitative survey study, Dul and Ceylan (2014) categorized colours into those that create a relaxing experience, such as green and blue, and those that stimulate, such as yellow, orange and red. Creative and inspiring moods can also be pursued with fun, unusual and surprising interior designs (Lee, 2016; van der Lugt et al., 2007), although according to van der Lugt et al. (2007), unconventionality needs to be balanced with functionality in order not to become irritating. Although architectonic details are powerful symbols of identity and purpose (Becker & Steele, 1995) and are widely described in the case descriptions of empirical studies (e.g. Haner, 2005; Kallio et al., 2015; Lewis & Moultrie, 2005; van der Lugt et al., 2007), it is not easy to draw conclusions on their relation to creativity.

Office or workstation *views*, referring to what can be observed from windows and workspaces, have an explicit link to aesthetics, symbolism and politics, as they are widely recognized status symbols (Elsbach & Bechky, 2007). The importance of having a view from a window is mentioned in a few studies (Ceylan et al., 2008; Dul & Ceylan, 2014; Hoff & Öberg, 2015; Kristensen, 2004; Lukersmith & Burgess-Limerick, 2013; Martens, 2011; van der Lugt et al., 2007). However, there does not seem to be consensus on what kind of view could influence creativity, or how it might do so. It is argued that a view of the natural environment facilitates concentration (Martens, 2011) and a window view, a view of the natural environment and transparency in general enhance creativity (Dul & Ceylan, 2014; Hoff & Öberg, 2015; Lukersmith & Burgess-Limerick, 2013; McCoy & Evans, 2002). Prior research thus

suggests a somewhat direct effect between a feature of the physical environment and creativity. Visibility in general is an element that appears to be central in the study of the physical context of creativity. Visibility of workstations is empirically found to promote both intra-team and inter-team interaction (Haner, 2005; Hatch, 1987; Martens, 2011), and also to increase communication, particularly informal communication (Coradi et al., 2015) and thus to indirectly influence creativity.

While the fourth aspect, *resources*, is a less tangible form, such as time, often discussed in the organizational creativity literature (Blomberg et al., 2017), workplace resources have received surprisingly little attention in studies on the physical context of creativity. In addition, the literature reveals only brief mentions of ambient conditions (e.g. Hoff & Öberg, 2015; Kallio et al., 2015; Wanqing et al., 2020) or inclusions of them as items in questionnaires, together with other measures (e.g. Chaubey & Sahoo, 2018; Dul & Ceylan, 2014; Dul et al., 2011).

To summarize, among the elements of physical space mentioned by McCoy (2005), spatial organization has received the most attention. This is understandable, as its influence on everyday organizational activities is probably the most obvious. Spatial layout has a powerful instrumental capacity, for example, in the form of pathways or connecting spaces that effectively lead movements (Kristensen, 2004), but it also carries a wide variety of symbolic meanings and evokes aesthetic sensations. It is political in that it embodies different interests, makes power relations seem immutable and consists of structures that influence people's actions and movements (Dale & Burrell, 2008). However, the prevalence of spatial layout in extant studies does not mean that the other elements of physical space are less important to study.

The studies dealing with special innovation laboratories (i.e. spaces designed for creative ideation) frequently mention that being away from the everyday office facilitates creativity by diluting hierarchies and distancing people from their everyday framework (e.g. Lewis & Moultrie, 2005). However, these special innovation laboratories constitute a topic that is quite different from creativity in everyday work environments, as they can be regarded as liminal places (see Söderlund & Borg, 2018), dedicated to producing creative ideas and symbolizing a creativity-fostering culture (Lee, 2016). Accordingly, studies focusing on special 'creativity spaces' or 'innovation labs' (see Haner, 2005; Lewis & Moultrie, 2005; Magadley & Birdi, 2009; Osario et al., 2019; van der Lugt et al., 2007) are more or less limited from the perspective of everyday work environments. For instance, while Magadley and Birdi's (2009) study participants find the unconventional physical design of an innovation laboratory stimulating, the study indicates not only the effects of physical design on creativity, but also the idea

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of temporarily escaping from the everyday environment in general (cf. Söderlund & Borg, 2018). Therefore, it is difficult to assess the effects that the physical designs described in, for instance, Magadley and Birdi's (2009) study would have in relation to everyday work facilities. Thus, despite the above-mentioned studies' interesting findings, their value for the design of offices for everyday tasks remains controversial.

To conclude, as pointed out by Martens (2011), the majority of the literature on creativity and physical space has studied space using interaction and communication as intervening variables. Studies on spatial layout and creativity appear to favour qualitative methods, while those interested in architectonic details or views and their effect on creativity typically favour quantitative methods or laboratory experiments. Closer analysis of the literature reveals differences not only in the elements of space that are targeted, but also in how scholars conceive the relation of physical space and creativity. Next, we conduct a more systematic examination of the different approaches taken by scholars to the relation of physical space and creativity and discuss the theoretical assumptions underpinning those approaches.

The relation between physical space and creativity

The third dimension of the framework, the relation of space and creativity (see Table 1), is a central issue in studying the physical context of creativity, as it entails making ontological assumptions. To make sense of the relation of physical space and creativity, we review the literature using the typology of relations of space and creativity presented in Table 1.

Our review establishes that research examining creativity and physical space can be categorized into five groups based on how they view the relation of physical environment and creativity (Table 2).

Research (e.g. Ceylan et al., 2008; Chaubey & Sahoo, 2018; Dul et al., 2011; McCoy & Evans, 2002) positioned in the first group (Table 2) shares the belief that the physical environment affects creativity directly. Some scholars (e.g. McCoy & Evans, 2002) contend that certain environmental features—including the complexity of visual detail, view of the natural environment, use of natural materials, use of fewer cool colours and less use of manufactured or composite materials—directly affect creativity. In the case of direct effects on creativity, one might think of factors such as immediate access to resources—information, documents or prototypes—that are crucial to creativity (Ceylan et al., 2008; Hatch, 1987). Similarly, individuals' ability to endure long working hours has been

suggested as conducive to creativity (McCoy, 2005). If the required resources are absent or the ergonomics (for a review, see Hollnagel, 2014), noise, temperature (Chaubey & Sahoo, 2018) or physical design do not support long working hours, the creative process might be disrupted, even thwarted. Allowing concentrated work and the availability of basic tools may be the rare few factors whose direct effect on creativity is somewhat incontestable—they either allow a person to work on a task or prevent the person from doing so. For factors other than those mentioned, the direct effects of the physical environment on creativity are relatively difficult to find. Accordingly, this group of studies appears to represent a somewhat traditional view, while most contemporary studies tend to perceive the relation of the physical environment and creativity as more complex.

The second and third groups of research (e.g. Hoff & Öberg, 2015; Kallio et al., 2015; Vithayathawornwong et al., 2003) do not believe in the direct influence of physical space on creativity, while they recognize the importance of studying the relation. They perceive the effects of space mediated by other factors. According to this research, there is little sense in trying to discover direct causal connections between physical space and behaviour, let alone between physical space and creativity, since the analyses required tend to become both complex and somewhat implicit and to deliver rather obscure conclusions. Consequently, it becomes more or less impossible to demonstrate that physical space either positively or negatively directly influences organizational creativity. In contrast, this research assumes that the influence of physical space on creativity occurs via intervening variables or the interaction effects of environmental features and some independent variables.

If the variables exist independently of the physical environment and are not its consequence, their influences are called the *interaction effects* of two or more independent variables (Group 2, Table 2). *Interaction effects* are caused by the independent variables that interact with the physical environment and thus modify behaviour. For example, an environmental feature, such as an open-plan office, may be interpreted in various ways by different professional groups or in a different cultural environment. The environment's potential effect depends on the presence of some other variable. A rare example of this type of study is Veitch and Gifford's (1996) investigation of the effect of perceived control over the physical environment on cognitive and creative task performance. They found that subjects who were provided choices concerning the physical environment performed more poorly on creative tasks than those who were not offered choices.

The third group (Table 2) views the influence of the physical context on creativity as mediated by intervening variables. As discussed earlier, an intervening variable

TABLE 2 Relation of physical space and creativity

1. Direct effect	
Assumptions: The physical environment is separate from and exists independently of its users. The physical environment is fixed and immobile. The physical environment and its features directly affect creativity.	Examples of studies: Ceylan et al. (2008); Chaubey and Sahoo (2018); Dul et al. (2011); McCoy and Evans (2002)
2. Interaction effect (of an independent variable)	
Assumptions: The physical environment is separate from its users. Interaction effects are caused by *independent variables* (existing independently of the physical environment) that interact with the physical environment and thus modify behaviour.	Examples of studies: Stokols et al. (2002); Veitch and Gifford (1996)
3. Indirect effect	
Assumptions: The physical environment is separate from its users. The physical environment can be interpreted differently depending on the social environment. The physical environment and its features influence creativity through *intervening* variables, such as communication, social interaction, encounters or culture.	Examples of studies: Ajis and Naka (2015); Bjerke et al. (2007); Coradi et al. (2015); Haner (2005); Kallio et al. (2015); Sailer (2011); Wineman et al. (2009)
4. Co-constitutive	
Assumption: Space influences action and emerges from action. Its proponents have a *dynamic* view of space. The relation between space and creativity is co-constitutive.	Examples of studies: Gaim et al. (2018); Kornberger and Clegg (2003, 2004); Kristensen (2004)
5. Entwined	
Assumptions: The material and the social are perceived as *melded*. Material artefacts mediate creative practices and materiality, as established by actors, is regarded as a product of the social. Its proponents hold a *relational* view of space, in which space is a relational property of various actors.	* The search conducted in this review yielded sociomaterial studies on creativity and physical space but not any that would explicitly connect the two topics.

is a *consequence* of the environmental feature and thus explains why the environment influences behaviour. In the case of creativity, facilitated communication and social interaction patterns (Ajis & Naka, 2015; Allen, 1977; Allen & Henn, 2007; Haner, 2005; Kallio et al., 2015; Osorio et al., 2019; Sailer, 2011), an enhanced knowledge exchange (Ajis & Naka, 2015), a more equal and participative culture (Kallio et al., 2015; Osorio et al., 2019) and a culture facilitating dynamism and freedom (Vithayathawornwong et al., 2003) have been studied as intervening variables because they—at least to a certain extent—are consequences of the spatial configurations. As the spatial layout effectively influences patterns of circulation, co-presence and co-awareness (Coradi et al., 2015; Wineman et al., 2009), encounters (Wineman et al., 2009) and interaction and communication (Bjerke et al., 2007; Coradi et al., 2015; Kallio et al., 2015; Sailer, 2011), they provide a set of potential intervening variables in studies on the physical context of creativity. Based on the review, this stream of studies has been the most prominent so far, mostly

examining communication, encounters, culture or social interaction as antecedents of creativity.

The fourth group (Table 2) is a small yet likely emerging stream of research that relies on a more processual view of creativity and physical space, in which both can be regarded as involved in a co-production process (Gaim et al., 2018). This view leans on the idea of cognition being grounded in different modalities of the context and connected to bodily engagement with physical space (Carlsen et al., 2012, p. 147; Kristensen, 2004), as well as the notion of cognition and imagination as embodied and situated (Johnson, 2007). Therefore, creativity is also perceived as grounded in the material world (Kristensen, 2004). According to Johnson (2007, p. 62), our schematic structures constantly operate when we move through space, perceive it and manipulate its objects, thus highlighting the physically embedded nature of imagination and other cognitive processes. These studies highlight the *co-constitutive* and dynamic nature of the relation between physical space and creativity. While not yet

prominent based on our review, this line of research has presented some interesting openings, such as Kornberger and Clegg's (2004) work on generative building, which encourages the freedom of both movement and thinking. Along similar lines, Gaim et al. (2018, p. 13) highlighted the co-constitutive nature of the physical and the social by illustrating how the space organizes idea work 'within and in relation to' the space and evokes paradoxical ways of thinking.

A more dynamic view of space as emerging from action (Gaim et al., 2018), combined with a processual conception of creativity (cf. Stierand et al., 2019), leads to studies comprising the fifth group (Table 2), which come close to the stream of sociomateriality and emphasize the *entwinement* of creativity with physical space. This view builds on the idea of space as fluid, relational and continuously reproduced in organizing processes (de Vaujany & Mitev, 2013).

Despite the growing interest in the material entanglement of creativity (Carlsen et al., 2012; Håkonsen Coldevin et al., 2019; Stierand, 2014; Stierand et al., 2019) and similarly sociomateriality in organization studies in general (e.g. Orlikowski & Scott, 2008), the physical environment still occupies a marginal position in both streams of literature (de Vaujany & Mitev, 2013). Although this example is quite far from the world of office design, Dopers and Strannegård (2004) interestingly illustrated how an artefact, in this case the Cocoon chair, can be differently translated and contextualized throughout its travels. The designer's original intention was soon forgotten, and the empty space around the Cocoon was filled with changing content, highlighting the independence of the meanings from its material form. Consistently, Beyes and Steyaert (2011, p. 56) suggested that research on organizational spaces should move from treating space as a noun to thinking of spacing as a verb, viewing space 'as an excessive composition of multiple forces'.

The above analysis indicates that extant research on the physical context of creativity varies considerably in terms of the perception of the relation of space and creativity. How we understand that relation depends on the perception of space and the related assumptions, which are presented in Table 2. The understanding of space and the relation of space and creativity is discussed relatively rarely, but that understanding has profound effects on how we study the physical context of creativity, on how we report it and on establishing the implications of our research. Therefore, recognizing these different approaches and shedding light on the assumptions on which they are based facilitates future theorizing by enabling researchers to better position their research in relation to those assumptions.

The next section identifies three directions for future theorizing that the literature on physical space in organizational studies suggests are relevant. We then adopt a more holistic perspective and integrate the directions for future theorizing with the three-dimensional framework (Table 1) presented previously. This, we hope, will offer a springboard for future studies on the physical context of creativity.

DIRECTIONS FOR FUTURE STUDIES ON THE PHYSICAL CONTEXT OF CREATIVITY

Summary of the present knowledge of the physical context of creativity

Although the review presented in the previous section provides many insights on the topic, it also illustrates the point made by several scholars (De Paoli & Ropo, 2017; De Paoli et al., 2017; Meinel et al., 2017) that not many generalizable conclusions can be drawn from such insights. The first of the few points agreed upon is that the physical space needs to enable interaction and communication, which are among the central ways that creativity can be facilitated through spatial design (Ajis & Naka, 2015; Allen, 1977; Allen & Henn, 2007; Coradi et al., 2015; Haner, 2005; Lee, 2016; Martens, 2011; Oksanen & Ståhle, 2013). Second, the creativity-enhancing physical space should accommodate different types of work—private, concentrated work on the one hand and interactive, communal work on the other hand. Third, the convertibility and flexibility of the space is important (Ajis & Naka, 2015; Coradi et al., 2015; Haner, 2005; Kelley, 2001; Kristensen, 2004; Lee, 2016; Wanqing et al., 2020). Apart from these few conclusions, it is quite difficult to offer advice (grounded in research) on whether and how creativity can be enhanced with spatial design.

The difficulty in drawing conclusions might be due to several issues. First, some areas of the three-dimensional framework (Table 1) have dominated the research so far, at the cost of neglecting the others. Of the physical elements of workspace, spatial organization has clearly attracted the most interest. In contrast, the other elements—architectonic details, views, resources and ambient conditions—have been studied to a considerably lesser degree. Similarly, the instrumental perspective on space has prevailed to date, leaving symbolic, aesthetic and political perspectives somewhat neglected. The predominant view considers the physical space as separate from its users; although it does not believe in a direct or unidirectional relation between space and creativity, but in the capacity of physical space to influence various antecedents of creativity, such as communication or encounters. Studies viewing the relation between space and creativity as more complex, co-constitutive or even entwined are still relatively uncommon.

Second, our review reveals that it is quite usual for the position in terms of the three-dimensional framework

adopted by the respective studies to often not be expressly stated in the study. While the first two dimensions of the framework—the elements of space targeted and the social dynamics selected for analysis—often become evident when reading a study, the assumptions concerning the relation of space and creativity are often more implicit, and thus problematic. As discussed earlier in this paper (see Table 2), the different approaches that can be taken concerning the relation of space and creativity vary significantly in terms of their ontological assumptions. These differences have profound implications for the conduct of research and its results.

Third, some difficulties might arise owing to differences in understanding of the two research topics. While creativity is traditionally regarded as an individual skill or capacity, the contemporary literature often conceptualizes it as a process (see e.g. Sailer, 2011; Stierand et al., 2019). As the literature to date typically treats physical space as a fixed and static entity (see e.g. Dul & Ceylan, 2014; Haner, 2005; McCoy, 2005), the inconsistency between the predominant ontologies on which the two literatures are based can create issues. Our review confirmed that the research on the physical context of creativity is dominated by the conception of physical space as a fixed entity, separate from its users, while recent literature on physical organizational spaces emphasizes a more dynamic conception, one that perceives it as socially produced and socially producing (Dale & Burrell, 2008; Lefvebre, 1991). Beyes and Steyaert (2011) even suggest replacing the concept of space with that of *spacing*.

Similarly, while the instrumental perspective on space has attracted the most interest among researchers, organizational space researchers have begun to acknowledge that people's relation to space is not only rational but also sensual, affective and corporeal (Lefebvre, 1991; Strati, 1996; Vesala & Tuomivaara, 2018). A considerable body of research assumes that objective space is the same as the subjective interpretation of it (cf. Cairns, 2002; Kristensen, 2004). That assumption thus ignores the subjectivity and situatedness of spatial experiences, especially the collective level of interpreting and negotiating such spatial experiences (Crevani, 2019; Katila et al., 2019).

Conducting the review illuminated the above-mentioned gaps in the literature on the physical context of creativity. To bridge those gaps, we suggest three directions for future studies and discuss them below.

Three directions for future studies on the physical context of creativity

Drawing inspiration from the literature on physical space in organization studies, we suggest three directions for

future studies. We hope the directions facilitate future theorizing on the physical context of creativity.

Space as confining or enabling

The first direction for future theorizing, labelled here 'space as confining or enabling', refers to the traditional approach to physical space and is interested in spatial arrangements that enable certain actions, movements and sensory experiences while restricting others (Clegg & Kornberger, 2006; Kristensen, 2004). This stream of research can be summarized as follows: *What kinds of creative processes does space enable or hinder?* This question has dominated research on creative physical space so far, which is understandable because of its central importance to many organizational processes—the reason why it provides interesting avenues for future research as well. However, while the focus of extant studies has been on spatial organization, other elements of space, such as views or resources, could also be fruitful topics of study.

Thus far, this direction has tended to be dominated by the instrumental perspective on physical space and should thus be open to other perspectives. Particularly, the *politics of space as either confining or enabling* is relevant in terms of creativity, as spatial solutions effectively organize power relations (Brown et al., 2010; Clegg & Kornberger, 2006; Dale & Burrell, 2008). As is well known in research on organizational space, the physical environment produces power effects that can also have consequences for creative processes (Baldry et al., 1998; Cairns, 2002; Dale & Burrell, 2008; Lefebvre, 1991; Zhang & Spicer, 2013). Physical space encompasses symbolic spaces, where different rules, hierarchies and practices apply. These 'spaces of possibles' in relation to creativity have been discussed by Moeran (2009, p. 15) in the context of Japanese advertising production, while this perspective on space as enabling or hindering could also open other possibilities for studies.

In creativity research, it is relatively well established that having sketches, visual illustrations and models on hand facilitates creative processes (Carlsen et al., 2012, pp. 147–155) and that creativity emerges from the relation between human actors and artefacts (e.g. Stierand, 2014). Thus, future research could explore spatial elements as *resources for creativity*. Future research could look at physical environments as cognitive artefacts (cf. Norman, 1991, p. 17), embodying knowledge and assumptions that either facilitate or hinder creativity (cf. Slavich & Svejenova, 2016). Similarly, as cognitive artefacts may carry meanings that encourage traditional ways of thinking and acting, they may also encourage creative ways of thinking and doing. Artefacts and physical designs contain institutional

information (Katila et al., 2019) that could shed light on how physical space conditions creative processes.

Space as a lived experience

The second direction for future theorizing is interested in space as a 'lived experience'. It refers to subjective, situated and affective experiences of space and the everyday reality of the people occupying it (e.g. Cairns, 2002). An embodied experience of space consists of primary aesthetic responses and reactions to material things (van Marrewijk, 2010), and the lived experiences of those occupying or visiting the space (e.g. de Vaujany et al., 2019; Van Marrewijk, 2010; Vesala & Tuomivaara, 2018). This stream could be summarized in the question: *How does it feel to work in the space?* In the contemporary mobile world, organizations increasingly consist of the 'experiences that constitute and re-constitute' organizational spaces, making embodied experiences of space and materiality important areas of focus of organizational research (de Vaujany et al., 2019).

The experience of space is not an effect of the physical on those experiencing it, or even separable from them, but is embodied and situated. An aesthetic experience is an 'intertwinement between the affective, the spatial and the embodied' and thus does not pertain to generalizable or universal rules (Berti et al., 2018, p. 171; see also Cairns, 2002; Strati, 1996). While the experience of space is derived from the users' actions, movements and residency in the space, the space also has productive power (Dale & Burrell, 2008). Physical space has the capacity to articulate individuals' interests, desires and identities, and 'to move us deeply' (Dale & Burrell, 2008, p. 45; see also Clegg & Kornberger, 2006). Therefore, the experiences of space also constitute the subjectivities and identities of people and the relations between them. This stream of research could focus on the space's *capacity to articulate* many issues, as well as the *users' experiences of space*. From this perspective, future research could explore the complex relation of physical space and individual identities and subjectivities, how the ideologies, interests and agendas behind the design of creative spaces are experienced, and how the spaces constitute their occupants. Creative work can also affect workspaces, for instance, by transforming a workspace into something else, by changing a space's use or by changing the look and feel of the space. These types of *processes entwined with creative work* could provide new insights into spatiality and creativity.

The collective conception of space

In contrast to the primary aesthetic responses, the second-order effects of spontaneous aesthetic reactions result from cognitive processing and often stem from symbolism (Rafaeli & Vilnai-Yavetz, 2004), and acquire their meaning in and through the social context, which takes us to the third direction for future theorizing. This stream focuses on collective meaning-making concerning the physical space and is summarized in the question: *What kinds of collective meanings are attached to the space?* While the previous stream acknowledged that individuals experience a space in various ways owing to their backgrounds and experience (Cairns, 2002; Zhang & Spicer, 2013), this stream is interested in *collective* meanings and interpretations, either by those occupying the space or those observing it from the outside. The collective meanings refer to the intersubjective level of subjective space (Kristensen, 2004), labelled the *intersubjective space*. The intersubjective space is the collective conception of the subjective interpretations of the physical space, which is collectively negotiated and builds on, combines and incorporates various individual interpretations (cf. Katila et al., 2019).

This stream of research is the most explicitly connected to symbolism because intersubjective space is always rooted in culture and interpreted through the framework provided by the social environment (cf. Musson & Tietze, 2004; Rafaeli & Vilnai-Yavetz, 2004). Creative spaces are often designed with the intention of creating a sense of community with a somewhat established identity (Moultrie et al., 2007; Osario et al., 2019; Stang Våland & Georg, 2019). Brown and Humphreys (2006) pointed out how a group's shared understanding of its physical environment can act as a resource for identity construction and how the group's interpretation of the space may influence its identity narratives.

Further, creating the appearance of creativity is a central motive for designing creative offices (Crawford, 2018). Accordingly, future research might investigate *space as a symbol of creativity*. Many elements of physical space, such as visibility and architectonic details, play an important role as they function as signals of this desirable organizational capacity—creativity. Besides the intent of the space's designers, the signals may include elements of fetishism, commodification or performativity, which may offer interesting insights into the meanings attached to the space (Dale & Burrell, 2008; Lefebvre, 1991). More research would be required to understand how the occupants of a space and visitors to it interpret these signals, and especially how they relate to them.

Future theorizing on the physical context of creativity

To integrate the directions for future studies presented in the previous section with our three-dimensional framework (Table 1), we offer the illustration in Figure 1.
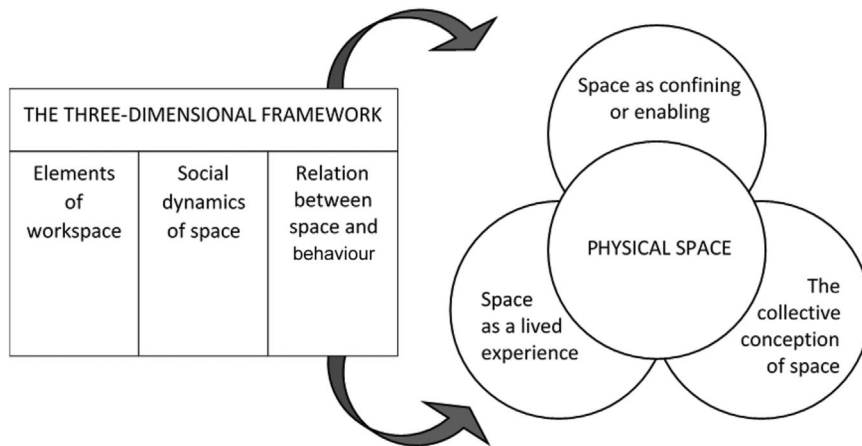
FIGURE 1 A three-dimensional framework for investigating the physical context of creativity and directions for future theorizing

This illustration includes the three-dimensional framework for analysing the physical space that researchers should take a stance on before proceeding with their study. The dimensions encompass: what *elements of workspace* are targeted, which *social dynamics* are analysed and how the *relation* between physical space and creativity is conceived. This framework can be conceptualized as an analytical lens through which to consider the three directions for future theorizing.

The directions for future theorizing are positioned slightly differently in terms of the framework and its dimensions. From the viewpoint of the first dimension of the framework, *elements of workspace*, all the elements can be equally relevant (Figure 1). Spatial organization is relevant in all three directions for future theorizing, although it is particularly evident from the viewpoint of 'space as confining or enabling'. However, architectonic details, views, resources and ambient conditions are likely to be of interest, particularly from the viewpoint of the two latter streams of research: 'space as a lived experience' and 'collective conception of space'. Regarding the second dimension of the framework, the *social dynamics of space*, 'space as confining or enabling' can be approached from any of the four perspectives, while the political, symbolic and aesthetic have been less studied. Regarding 'lived experience of space' and 'collective conception of space', the instrumental perspective may include a risk of generating one-size-fits-all rules of thumb for productivity or efficiency that might have controversial effects. The aesthetic perspective is the most explicitly connected to 'lived experience of space' and the symbolic to 'collective conception of space', while the political dynamics could offer interesting opportunities in all directions for future studies. Moreover, looking at how these dynamics are interconnected and evolving jointly might offer new insights into understanding physical space regarding any of the suggested directions for future theorizing.

Concerning the third dimension of the framework, the *relation* of space and creativity, any of the approaches (Table 2) could (at least theoretically) be used in the three directions for future theorizing. However, to overcome the ontological inconsistencies between the two streams of literature—organizational creativity and physical space—we suggest adopting a broader conception of space in the study of the physical context of creativity. This broader conception of space would be more aligned with the conceptualization of creativity as a process (see e.g. Sailer, 2011; Stierand et al., 2019) and move away from treating physical space as an immobile, fixed entity separate from its occupants. The literature on organizational spaces has introduced broader conceptions of space, highlighting its nature as a social construct that 'tells us narratives, stories of ourselves and the societies we live in, and it simultaneously influences what we do or do not do' (Dale & Burrell, 2008, p. 43).

This broader conception of space has consequences when thinking about the relation of space and creativity. It moves away from seeing that relation as unidirectional and thus challenges the study of direct—or any unidirectional, for that matter—effects of space on creativity in a traditional sense. The proposed conceptualization of space challenges the idea that space has 'effects' and encourages scholars to see the relation between space and creativity as more multifaceted and complex. Consequently, although the broader conception of space incorporates more multidirectional and dynamic relations of space and creativity (thus hinting at the relevance of a co-constitutive or even entwined view of space and creativity), it does not deny the possibility of adopting other approaches to investigate the relation. Whereas the two latter directions for future theorizing—'lived experience of space' and 'collective conception of space'—favour a co-constitutive or entwined relation of space and creativity, the first direction for future theorizing, 'space as enabling or confining', offers more

freedom concerning thinking about the relation of space and creativity.

While being based on a broader understanding of physical space, these three directions for theorizing (Figure 1) allow for a variety of perspectives within the three dimensions (Table 1). We, however, suggest that the physical context of creativity should no longer be perceived as having a unidirectional effect or being part of a causal connection, but as a thing per se that is both produced and producing, lived, experienced and collectively mediated.

CONCLUSIONS

This paper examines the intersection of two streams of research: creativity and physical space. We discussed the common difficulties related to studying the physical context of creativity and provided an overview of the extant studies and their findings. To make sense of current literature on the physical context of creativity and facilitate future studies, we constructed a three-dimensional framework for understanding physical space. That framework comprises the elements of workspace, the social dynamics of space and the relation of space and behaviour. The three-dimensional framework was used to structure our review of the literature on the physical context of creativity.

Our review suggests that most studies examine the influence of space on creativity as mediated by some of its antecedents, such as communication, encounters or culture. However, we also found studies assuming a direct effect, an indirect effect through intra- or interpersonal variables, or an interaction effect. We identified a few studies that assume a co-constitutive relation of space and creativity. In extant research, spatial layout is the most recurrent element of physical space, which is understandable given its power to set boundaries and guide flows of movement and interaction, thus influencing creativity via many of its antecedents. The instrumental perspective is the most popular among the reviewed studies, although they do also investigate symbolic, aesthetic and political aspects.

The review identified certain gaps in the literature relating to the physical context of creativity. To bridge those gaps, we suggested three directions for future theorizing inspired by our analysis of organizational space research. These directions revolve around three questions: (1) *What kinds of creative processes does a space enable or hinder?* (2) *How does it feel to work in the space?* (3) *What kinds of collective meanings are attached to the space?* The first direction represents the traditional view, which will likely remain relevant in the future. It centres on physical space, conceived of as physical, sensual, mental or political barriers and borders, and views space as enabling or hindering creativity-related processes. The second direction focuses on the lived and embodied experiences of the users of a space, and considers experiences of a space as inseparable from the space itself and space as having the capacity to influence individuals' inner processes. The third direction focuses on the collective level of meaning-making related to space. It concentrates on the intersubjective conception of space—that is, the collective negotiation of meanings attached to space—and also the symbolism used to signal creativity. The three directions for future studies lean on a broader conception of physical space that departs from treating it as a fixed entity separate from its users. That approach aligns more closely with the conceptualization of creativity as a process (see e.g. Sailer, 2011; Stierand et al., 2019).

As a consequence of the broader conception of physical space, the relation of creativity and physical space is not unidirectional or effect-like but complex and multidirectional. Several issues, such as identity, power, hierarchy, autonomy, freedom and equality, are actualized through spatial design (Alexandersson & Kalonaityte, 2018; Brown & Humphreys, 2006; Elsbach, 2003, 2004; Elsbach & Bechky, 2007; Stang Våland & Georg, 2019; Wasserman & Frenkel, 2011; Zhang & Spicer, 2013). That belief accords with physical space having a productive power. Physical space produces not only movement, action and interaction, but experiences, social relations, categories and identities.

This paper offers several contributions. First, we reviewed the extant literature on physical space in organization studies and discussed the variety of perspectives available when studying physical space. This enabled us to formulate a three-dimensional framework that we used to analyse the literature on the physical context of creativity. Accordingly, the second contribution of this paper is the three-dimensional framework that will enable researchers to better position their work. The third contribution is our review of the physical context of creativity literature, which offers an overview of the current knowledge of the topic and discusses the theoretical assumptions upon which the literature is based. Fourth, by suggesting the adoption of a broader conception of physical space, we facilitate the integration of studies focused on the physical organizational space and creativity in organizations. Through the alternative conceptual understanding, we seek to guide the direction of future research on the topic. Finally, by using the contemporary discussions on organizational space to seed ideas for the study of the physical context of creativity, we have presented three directions for future studies. We hope that the suggested directions will provide fertile ground for future theorizing of the physical context of creativity.

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APPENDIX 1: STEPS OF THE LITERATURE REVIEW

Step	Description	Criteria	Outcome
Step 1: Literature search	Initial literature search for articles on physical context of creativity	Databases: *EBSCO Academic search premier* • 'physical space' AND creativity • 'physical environment' AND creativity • 'physical design' AND creativity - Search terms: search in all text, limited to peer-reviewed scholarly articles published in English - Time period: no limit–March 2020 *ABI/INFORM collection* • 'physical space' AND creativity • 'physical environment' AND creativity • 'physical design' AND creativity - Search terms: search in all text, limited to peer-reviewed scholarly articles published in English - Time period: no limit–March 2020	2011 articles 2637 articles 236 articles 802 articles 1339 articles 163 articles
Step 2: Screening articles	Screening relevance of the articles identified at step 1	▪ The title, abstract and/or keywords of the article needed to indicate that the article explicitly deals with physical space and creativity in organizational contexts	35 articles
Step 3: Snowballing	Searching for articles and books that were not identified at step 2	▪ Reading through the reference lists of the 35 articles for titles that include references to physical space and creativity or that appear relevant to the topic ▪ Accessing these articles and books and screening them for relevance	34 articles or books
Step 4: Analysis of the articles	Conducting the qualitative analysis of the articles and books	▪ The articles and books selected during steps 2 and 3 were analysed from the perspective of physical elements of workspace, social dynamics of space and the relation of physical space and creativity	69 articles or books