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Work from home and collective creativity: Exploring the experiences of IT professionals

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Abstract: This study explores collective creativity in a work from home (WFH) context. A phenomenological approach is adopted to describe and understand employees´ experiences of the phenomenon. Based on in-depth interviews with 10 Norwegian information technology (IT) professionals in the mature phase of the COVID-19 pandemic, the essence of the experience is captured and described as the "collective creativity paradox". The paradox suggests that while the absence of informal face-to-face (FTF) interaction in the WFH context hinders collective creativity, it is concurrently promoted through well-facilitated digital sessions. However, complex problem-solving is generally preferred to be conducted FTF. Perceived digital barriers inhibit knowledge sharing beyond strong-tie relations, which limits access to diverse perspectives and ideas. Moreover, the findings indicate that a supportive creative climate is crucial for fostering collective creativity in the WFH setting. The study offers scholars and managers a deeper understanding of collective creativity in digital work environments and provides valuable insights into employees' WFH experiences.

Øystein Tønnessen

ABOUT THE AUTHORS

Øystein Tønnessen is currently an Industrial PhD Candidate at the University of Agder (UiA) in Kristiansand, Norway. Additionally, he serves as an advisor at Egde Consulting. Tønnessen's research focuses on creativity and innovation within the contexts of remote and hybrid work arrangements. His scholarly work includes publications in journals such as Technological Forecasting and Social Change and European Journal of Workplace Innovation.
Bjørn-Tore Flåten holds the position of Associate Professor and Vice Dean at UiA School of Business and Law. His area of expertise lies in strategic knowledge work management, entrepreneurship, and virtual teams. His research contributions are featured in journals including Information and Organization, Technological Forecasting and Social Change, Journal of e-Business, and the Norwegian Journal of Geography. Tønnessen and Flåten's collaboration in the current study informs ongoing and future endeavors related to creativity in remote and hybrid work settings.

PUBLIC INTEREST STATEMENT

In the wake of the COVID-19 pandemic, remote work has become widespread among employees, raising questions about how it affects creativity and innovation. This study explores collective creativity in a work-from-home (WFH) context. Through interviews with Norwegian IT professionals during the pandemic, a phenomenon termed the "collective creativity paradox" was identified, revealing a dual nature of remote collaboration. On one hand, the absence of face-to-face (FTF) interaction hinders collective creativity. On the other hand, well-facilitated digital sessions promote it. However, the findings highlight a preference for conducting complex problem-solving in FTF settings. Perceived digital barriers, which limit knowledge sharing beyond close social relations, hamper access to diverse perspectives and ideas. In practical terms, this study offers valuable insights to managers in designing and implementing effective flexible work models. By fostering informal interactions, promoting knowledge sharing, and nurturing a supportive creative climate, organizations can cultivate collective creativity in WFH settings.

Subjects: Social Aspects of Human Computer Interaction; Digital & Wireless Communication; Work & Organizational Psychology; Innovation Management; Organizational Change; Creativity; Work; Management & Organization;

Keywords: collective creativity; creative climate; informal interaction; phenomenology; work from home

1. Introduction

Creativity is crucial for organizations to innovate, adapt and thrive in a dynamic and digitalized business environment (Shalley & Gilson, 2017; Zhang et al., 2022). Workplace creativity involves the generation of original and useful ideas, products, processes or solutions to complex problems (Amabile, 1996; Mumford & Gustafson, 1988). Previous research has predominantly studied workplace creativity at the individual level (Kurtzberg & Amabile, 2001). However, more attention has recently been paid to group creativity (Reiter-Palmon et al., 2012). This is important because group creativity plays a crucial role in driving innovation, given that groups are increasingly involved in innovation processes in organizations (Curşeu et al., 2022).

It is argued that creative ideas always emerge from individuals, while the actual source of ideas and solutions is mostly interactions between people (Paulus & Nijstad, 2003). Hence, *collective creativity* is essential to produce creative outcomes (Cirella, 2021). Collective creativity has been defined as creative actions and processes arising from social interactions (Hargadon & Bechky, 2006; Parjanen, 2012). When individuals engage in social interactions, their diverse experiences, knowledge, and perspectives enable them to analyse problems from different angles and generate novel solutions (Paulus & Nijstad, 2003).

Scholars have recently shown interest in the social aspect of creativity in digital or virtual work environments. Remote work, commonly understood as employees working outside the employer's physical premises mediated by digital tools, has evolved significantly during the last decades enabled by technological advancements (Gandini & Garavaglia, 2023; Klemsdal & Clegg, 2022; Messenger & Gschwind, 2016). In their bibliometric analysis of creativity research in the European Union, De Marchis and Shchebetenko (2022) propose that collective creativity within remote work environments is a promising area for future research.

Much of the existing literature on digitally mediated creativity refers to virtual teams (Chamakiotis et al., 2013; Nemiro, 2002; Ocker, 2005; Reiter-Palmon et al., 2021). However, the distinct work from home (WFH) modality that abruptly became dominant due to the COVID-19 pandemic (Gandini & Garavaglia, 2023) constitutes a key context in which collective creativity is largely unexplored. The practice of employees carrying out work from their private homes continues in various forms in the post-pandemic era (Smite et al., 2023). Accordingly, to enable facilitation of collective creativity in modern organization, it is critical to better understand how workers experience social interaction and creativity when WFH.

The COVID-19 pandemic entailed a dramatic disruption of social interactions because of the sudden imposed social distancing measures and enforced WFH arrangements (Anderson & Kelliher, 2020; Bhat et al., 2023). Hence, the pandemic constitutes a unique empirical context to study the phenomenon of collective creativity in the large-scale and experimental WFH setting (Brynjolfsson et al., 2020; Gandini & Garavaglia, 2023). Currently, there are limited empirical studies on WFH and creativity during the pandemic, with some exceptions (Babapour Chafi et al., 2021; Mercier et al., 2021; Michinov & Michinov, 2021; Tønnessen et al., 2021). Common to these studies is the focus on the individual level, i.e., the impact of enforced WFH on individual creativity. Moreover, most research is still based on data collected in the early phase of the pandemic when the situation was characterized by shock and anxiety (Akkermans et al., 2020; Brodeur et al., 2021).

On the contrary, the present study relies on data from the mature phase of the pandemic (i.e., May 2021). The WFH regulations included IT professionals, described as the people developing, selling, maintaining or supporting IT systems (Holtgrewe, 2014). IT professionals were chosen for the present study given their experience in using digital tools for collaborative work tasks (Kinsella et al., 2021). Nevertheless, during the rapid shift caused by the COVID-19 pandemic, IT professionals did not have any established shared understanding in terms of how social relationships and interpersonal interaction should be maintained in the WFH setting (Lal et al., 2021) and, subsequently, how collective creativity might be carried out in a WFH context. Based on the above account, the following research question guided the present study: *How do IT professionals experience collective creativity when they work from home in the mature phase of the COVID-19 pandemic?*

To address the research question, in-depth interviews with 10 IT professionals were conducted to capture the shared essence of their lived experience of working from home (WFH) and collective creativity. The aim was to extract wider meaning, illuminate what is not obvious, and explore the structure of the experience along with the underlying conditions (Giorgi, 2009; Willig, 2007).

The study contributes to the literature on collective creativity by showcasing the successful use of digital means to enhance group creativity, while also emphasizing the pivotal role of informal FTF interaction. Secondly, the paper advances the research stream on digital creativity by providing a deeper insight into employees' experiences of creative collaboration in the WFH context. Thirdly, the study expands the range of methodological approaches to studying creativity in remote work settings by applying descriptive phenomenology.

2. Background literature

The role of theory within descriptive phenomenology is intricate, given that phenomenology serves as an approach for philosophical as well as scientific investigation (Mitchell & Cody, 1993). According to (Moustakas, 1994, p. 13), theory should facilitate a "return to experience", enabling structural analysis that describes participants´ lived experience. Theoretical frameworks and prior literature provide context and meaning to the findings, helping the researcher in gaining a deeper understanding of the studied phenomenon (Giorgi, 2009; Husserl, 1931). In the present study, theoretical concepts are also applied to inform the development of themes and inspire the discussion. In the following, we position the study within theoretical within theoretical perspectives on collective creativity, the WFH context, and social information processing.

2.1. Collective creativity and work from home

The current study is grounded in the research domain of organizational behavior (OB), which investigates behaviors and attitudes demonstrated by employees across individual, group, and organizational levels of analysis (Robbins & Judge, 2017). From an OB viewpoint, researchers have defined creativity as the activity of generating ideas that are both novel and valuable within a workplace setting (Amabile, 1988; Shalley et al., 2004). According to the interactionist framework by (Woodman et al., 1993), organizational creativity is a complex function of personal characteristics (e.g., relevant knowledge), social influences (e.g., social facilitation), and contextual factors (e.g., physical work environment and organizational culture). Furthermore, group creativity includes of individual creative behavior, social interaction, group characteristics, as well as contextual influences (Woodman et al., 1993).

Similarly, collective creativity involves creative behavior that rely on multiple participants (Glăveanu, 2011). It occurs through interpersonal interaction in small groups of individuals which can give rise to new ideas, discoveries and solutions that a single employee would not have achieved alone (Cirella, 2016; Hargadon & Bechky, 2006; Parjanen, 2012). Contrary to individual and organizational creativity, limited research from the OB standpoint has paid attention to collective creativity despite its significant importance for fostering innovation (Lua et al.,

2023; Taggar, 2002). Furthermore, studies have shown that collective creativity has a direct positive impact on customer satisfaction and economic results (Cirella, 2016). In the present study, collective creativity refers to collaborative creative behaviors and interactions among employees.

The conventional OB perspective, which predominantly focuses on creative behavior in physical work environments, could potentially limit our understanding of the diversity and complexity in modern work settings (Amigoni, 2021; Klemsdal & Clegg, 2022). Recently, flexible, dispersed and digitally mediated work forms have expanded (Maurer et al., 2022). Accordingly, the research field of flexible work arrangements (FWA) has emerged, encompassing alternative spatial and temporal dimensions of work arrangements. FWA commonly refers to a flexibility in terms of where and/or when employees conduct their work tasks (Rau & Hyland, 2002). As a remote work mode, WFH is a widely adopted practice within the field of FWA. WFH refers to employees carrying out work from their private home (i.e., home office) instead of a traditional office (Allen et al., 2015; Garrett & Danziger, 2007).

In a WFH environment, the lack of social proximity may have a profound impact on interpersonal interaction and sharing of knowledge and ideas (Allen et al., 2015; Golden & Raghuram, 2010). Unlike the office environment, WFH reduces informal communication and minimizes social interactions other than communication mediated by technologies (Cooper & Kurland, 2002; Naotunna & Zhou, 2018). A digital workforce risks losing spontaneous FTF conversations that facilitate the generation and sharing of ideas (Oldham & Da Silva, 2015). Moreover, Chamakiotis and Panteli (2017) observed that the artificial nature of digital tools itself could have a constraining effect on creativity. On the contrary, research suggests that digital technologies can effectively stimulate creativity (Cai et al., 2020; d'Ovidio & Gandini, 2019). Competent use of digital platforms may foster collective creativity by supporting the development of creative ideas (Cirella, 2021). As an example, Chamakiotis and Panteli (2017) found asynchronous collaboration software (e.g., SharePoint and Huddle) to enhance creativity in a remote work setting. However, we lack a deeper understanding of employees' experience of social interaction and creativity in the WFH context due to enforced social distancing (Manroop & Petrovski, 2022; Waizenegger et al., 2020).

2.2. Collective creativity and social information processing theory

The theoretical rationale for studying collective creativity in the digitally mediated WFH context is supported by the social information processing (SIP) theory (Walther, 1992). SIP theory suggests that individuals adapt to the absence of FTF nonverbal social cues by relying on digitally mediated cues (e.g., language style and rate of responses). Social cues are essential in the current study context, as they are found to shape creativity (Goncalo & Duguid, 2012). Prior literature indicate that collective creativity draws on the ability to select and encode social cues (Mouchiroud & Bernoussi, 2008). Additionally, scholars suggest that the ability of social cues to improve creative performance also applies to online environments (Bourgeois-Bougrine et al., 2022; Guegan et al., 2017).

Walther (2015) advocated that extended time and optimized use of digital channels are required to achieve the same closeness in social relationships as in co-presence. In the COVID-19 pandemic context, Terason et al. (2022) noted that despite limitations in delivering or interpreting certain nonverbal cues, virtual meetings demonstrated themselves as an essential replacement for in-person interactions. However, video meetings are typically scheduled with a strict agenda, which hinders spontaneous conversations (McGloin et al., 2022). Moreover, scholars have also demonstrated that informal interaction is a more effective driver of idea generation and sharing than formal interaction, which is dominant in video meetings (Baumeister et al., 2016; McAlpine, 2018). It remains unclear whether the absence of creativity-enhancing informal interaction also applies to IT professionals, who have the expertise to optimize their use of digital tools when working from home.

3. Methodology

3.1. Research design

To describe and understand IT professionals' experience of collective creativity in the WFH context, an appropriate research design is one that provides participants the opportunity to extensively share their thoughts, feelings, and perceptions. The phenomenological approach was selected for the present study as it allows a comprehensive exploration of conscious experiences of participants who are similarly and directly involved in the phenomenon being studied (Creswell, 2007). Rich descriptions of real-life experiences prepare the ground for a reflective structural analysis that portrays the central underlying meaning of the perceptions shared by individuals, identified as the *essence* of the experience (Giorgi, 1985; Patton, 2002). Given the present study's aim to describe IT professionals' experience of collective creativity when working from home, descriptive phenomenology is considered a suitable strategy, as it enables a comprehensive description of *what* was experienced and *how* it was experienced (Creswell, 2014). Morrow et al. (2015) argue that descriptive phenomenology is particularly valuable in underexplored research domains, which applies to collective creativity when working from home, as well as digitally mediated creative collaboration in the extraordinary COVID-19 pandemic situation. In line with the methodology, the bias-suspending technique known as "bracketing" was applied to gain a more accurate understanding of the participants' experiences and uncover the underlying meaning of collective creativity in the distinct WFH setting. Furthermore, the research procedure included collecting subjective data through in-depth interviews, analyzing the data by reducing the information following systematic phenomenological steps and, finally, capture the culminating essence of the participants´ experience.

In descriptive phenomenology, it is crucial for researchers to have personally experienced the same phenomenon as the study participants, establishing a connection between their own experiences and those of the participants. Accordingly, the researchers practiced bracketing before collecting data (Colaizzi, 1978). This technique involves setting aside one's own viewpoints, assumptions, and feelings to be more open to the phenomenon (Moustakas, 1994). Both authors practiced WFH during the COVID-19 pandemic and experienced digitally mediated social interaction and to some extent collective creativity within that context. Their perceptions of the phenomenon closely align. In the early phase of the pandemic, they experienced how the extraordinary situation provided fertile ground for new thoughts and ideas emerging from collaboration through digital platforms.

However, as the pandemic entered its mature phase (i.e., Spring 2021), both researchers felt that the lack of FTF interaction and informal communication, and consequently inhibited creative collaboration. On the other hand, having the opportunity to work concentrated on problem-solving tasks which required creative ways of thinking, was beneficial in a more well-established WFH environment. Fewer distractions enabled both the authors to focus better on problem solving as a contribution to collective processes. Overall, recognition of the complexity and contradictory facets of collective creativity in the unique WFH situation and awareness of personal experiences provided useful insights underpinning the research approach of the present study.

3.2. Sample and data collection

As the source of phenomenological data, a Norwegian IT consultancy with approximately 100 employees was selected owing to their extensive WFH practice throughout the pandemic and their high degree of both individual and collective creative work tasks. Norway was chosen as the geographical setting as it is considered a technologically advanced country (Breene, 2016) with a high-trust society, which seems to facilitate workers' compliance to COVID-19 measures (Christensen & Lægreid, 2020). The IT company operates within business and technology consultancy, software development, data analysis and machine learning, digital security, user experience and design and project management. It has a comprehensive and interdisciplinary approach to creatively solving problems and assisting customers in complex processes across various sectors.

Prior to the pandemic, the employees were usually distributed across three office locations: main office, satellite office and shared office (i.e., a workspace shared with employees from other companies). However, most of the participants in the study had also worked at customers' physical office premises. This implies that the respondents had experience with various work locations and digitally mediated interactions with colleagues and customers even before the pandemic.

Purposeful intensity sampling was used to recruit participants who had the capacity and willingness to provide comprehensive and rich information (Patton, 2002). To enable the informants to convey their current experiences considering their past physical co-presence, it was a requirement that their main workplace prior to the pandemic was situated within the company's office premises. The other recruitment criteria were as follows: various positions and team affiliations, regular onsite work location, internal versus customer focus, seniority, gender, and age. Without the authors' involvement, the general manager of the company prepared a list of 17 potential interviewees following the above criteria. The researchers proceeded to arrange the candidates in a prioritized sequence, taking into consideration how closely the individual profile aligned with the selection criteria and the research objective. Furthermore, the researchers took proactive measures to prevent unintended biases in the sample selection and carefully considered factors that could influence the outcomes. The final number of participants in the study was not predetermined. However, scholars recommend up to 10 participants to reach saturation in a phenomenological study (Boyd, 2001; Creswell, 2007). Likewise, the current study ultimately resulted in a final sample size comprising 10 IT professionals representing various backgrounds, experiences, and perspectives. The average age of the participants was 39 years, with a gender distribution of 70 percent men and 30 percent women. It is worth noting that the representation of women in the study sample was slightly higher than the actual percentage within the firm. Table A1 (see Appendices) provides a more detailed description of the anonymized participants.

In phenomenological research, semi-structured interviews are commonly employed as the primary method for investigating lived experiences (Creswell, 2007). In the present study, data were gathered by conducting individual interviews that involved the use of broad, open-ended questions. A flexible interview guide was developed with interview questions that met the descriptive phenomenological criteria (Englander, 2012). Sample questions include "How do you feel about creativity when you work from home?" and "Tell me about informal interaction and your experience of how it applies to creativity". The guide was a dynamic support to tap more deeply into the participants' experiences and help keep the relatively informal conversation grounded in the research topic (Kvale & Brinkmann, 2009). As more and more participants were interviewed, overlapping experiences and perceptions were gradually noticed. Saturation was considered reached after 10 interviews as the discovery of new opinions, patterns and themes responding to the research question discontinued. Furthermore, conducting a smaller number of interviews enabled collecting in-depth and detailed information from each participant. This led to a richer understanding of the complex interplay between individual experiences and the distinct WFH context in which they occurred.

The interviews were conducted in May and early June 2021. At that point, the pandemic had been ongoing for more than a year, and WFH had become a standard practice for IT professionals. However, certain restrictions had been eased, leading participants to work partially from the company's office premises during specific periods. Nevertheless, WFH remained the prevailing work practice, and the interviews were conducted with both participants and the interviewer situated in their respective home offices. Consequently, the data were consistently collected within the pertinent WFH setting. All interviews were carried out using a digital dictaphone for audio recording. The first author conducted all the interviews, and observational notes were made throughout the whole process.

The individual interviews lasted slightly less than an hour, which is relatively brief compared to the typical duration in the phenomenological tradition. Several factors contributed to this time

efficiency. Firstly, participants were provided with comprehensive information regarding the purpose and research topics beforehand. Secondly, the utilization of online interviews, renowned for their time efficiency compared to in-person interviews, contributed to the shorter duration (Termini et al., 2021). Thirdly, the context of the ongoing COVID-19 crisis intensified the interviews, prompting participants to willingly share profound thoughts and feelings. Despite the concise nature of the individual conversations, they allowed for a deeper exploration of each participant's experiences and perspectives, leading to a richer understanding of the phenomenon under investigation.

Immediately after each interview, the audio recordings were transcribed by the authors assisted by the transcription feature in Microsoft Word with Azure AI technology. Furthermore, the transcriptions were manually translated from Norwegian to English by the researchers. This comprehensive process provided a thorough overview of the data which constituted a beneficial starting point for further analysis.

3.3. Data analysis

The data analysis process started with both authors carefully reading and re-reading the interview transcripts together with the information provided by the observational notes to obtain an overall impression. Further, the data were analyzed utilizing a descriptive phenomenological procedure, that is, the modified Stevick-Colaizzi-Keen method developed by Moustakas (1994) and adapted by Creswell (2007). This specific analysis method was chosen as it fits the research question and gives a unique voice to the participants. The approach involves a pragmatic step-by-step procedure with a clear description of each step. This systematic method holds promise for achieving the goal of exploring and understanding collective creativity in the WFH setting as described by the 10 IT professionals. Microsoft Excel was used to organize and structure the data when the analysis process was carried out.

With the modified Stevick-Colaizzi-Keen method adopted, the analysis was undertaken as follows. First, bracketing was performed as described above. Second, a list of significant statements was developed containing expressions of how the participants experienced the phenomenon. Third, after carefully examining the material and removing repetitive and overlapping data, the remaining significant statements highly relevant to the research question were clustered into larger "meaning units" (i.e., themes). Fourth, a "textural description" was formulated to express *what* the participants experienced with the phenomenon. Fifth, a "structural description" of *how* the experience occurred was created by reflecting on the setting and context. Finally, a comprehensive and synthesized description of the phenomenon was written incorporating both textural and structural descriptions. The culminating paragraph represents the essence of the experience. Following Moustakas (1994) guidance for quality and rigor, the analysis process involved continually engaging with the data, writing reflections, re-reading and re-writing until the ultimate reduction and description of the essence of the lived experience were consistent for the IT professionals.

3.4. Ethical considerations

The ethical guidelines of voluntary participation and possibility of withdrawal at any point, were followed. A written informed consent was sent to the individuals to clarify the purpose of the study, interview procedures, confidentiality, and data storage and processing, which was confirmed by each participant. All data were anonymized during the transcription process. The results are presented in a way ensuring the participants' anonymity and integrity. Hence, exact age, job title and educational background are not included in the detailed overview of the study participants (Table A1). Furthermore, all participants have been assigned identifiers (i.e., P1, P2, etc.) for anonymity. The Norwegian Centre for Research Data (NSD) assessed and approved the research project (Ref. 542231).

4. Findings

In the search for significant statements in the interview transcripts, 194 individual verbatim statements shared by the participants were identified. These expressions of experience regarding

collective creativity when working from home were subject to the descriptive phenomenological reduction process (Creswell, 2007). In response to the research question, five overall themes emerged from this process: social relations, informal interaction, sharing of knowledge and ideas, creative climate, and digital collective creativity. Table A2 (see Appendices) shows an excerpt of the findings structured in line with the methodological procedure, including significant statement samples as expressed by the participants. In the presentation of the main findings below, statements were carefully chosen to encompass the experiences shared by multiple participants, thereby complementing the themes and descriptions. The individual participants' statements are referenced using participant identifiers.

4.1. Social relations

The IT professionals agree that social relations and interaction are essential factors influencing collective creativity in the company. However, they share perceptions of significant social barriers because of the WFH situation, including threshold of contacting people and challenges in developing new relationships. P1 expresses her experience of how social relations unfold in the distinct situation as follows:

> It's very exciting to discuss with people you don't really know. But currently, the barrier to contact people is greater, unless you know them quite well. You are afraid of disturbing. The conversation doesn't flow as easily in a video meeting. You may not get to know new people that well, so you interact with those you have worked closely with before. (Strategic advisor, female, employee)

This experience aligns with recent empirical findings on social relations in remote work settings (Yang et al., 2022). The present data indicate that social network ties have an impact in this regard (Granovetter, 1973). Strong social ties (i.e., close and trusting relationships) that existed prior to the COVID-19 pandemic are transferred into the remote work environment. In the WFH setting, participants engage in interactions that are primarily limited to their close connections, typically individuals within their own team. On the other hand, weak ties constituted by distant colleagues and customers seems more challenging in the WFH situation. P9 confirms this experience:

> Now, it is rare that you contact people outside the team. But within our team, we are very closely connected. There is a very low barrier to contact other team members when we are working from home. (Designer, male, employee)

Although digital communication platforms provide efficient tools for internal communication, the IT professionals feel that approaching colleagues and managers beyond scheduled video meetings is more demanding in the WFH setting than on-site. P3 recognizes that when trying to contact individuals directly through digital means, there are significant obstacles that require more meticulous planning and coordination. Consequently, the respondents experience a distinct digital barrier which limits their access to new perspectives, knowledge, and ideas.

4.2. Informal interaction

The participants hold diverse perceptions regarding the occurrence of creativity in their daily work. Nevertheless, in the analysis process an intriguing pattern arises, highlighting the pivotal role of unplanned and informal social interactions in fostering collective creativity.

Similarly, previous research emphasizes the importance of informality for fostering creativity in remote work environments (Kohonen-Aho & Tiilikainen, 2017; Naotunna & Zhou, 2018). P4 supports the finding by reflecting upon his own experiences:

> I get a little stressed by hearing the word creativity, because it typically doesn´t work when you want. It is difficult to just decide that "now we are going to be creative". Perhaps it works best by the coffee machine when it is not planned. (Team manager, male, employee)

Digital platforms seem to offer effective tools for regular internal communication and routine interactions as well as video conferences. Furthermore, digital tools hold promises for facilitating various formal procedures, including document management, and sharing. However, participants feel that approaching colleagues and managers informally beyond scheduled online meetings is more difficult. The respondents commonly perceive a reduction in social cues and the challenging absence of informality and spontaneity in the WFH setting. P6 expresses a longing for serendipitous encounters and eye contact with colleagues. According to his opinion and that of several other participants, replicating these experiences virtually is difficult, if not impossible. This perception is consistent with the findings from studies on WFH conducted prior to the pandemic. (Cooper & Kurland, 2002)

The IT professionals express concern about the lack of informal interaction and how this may inhibit collective creativity in the WFH setting. They frequently express a sense of longing for the casual conversations that used to occur around the coffee machine, in the lunchroom, or in the office corridors. Additionally, participants mention the absence of chance encounters and informal meetings with individuals at physical events and conferences. A common perception is that impromptu interpersonal interactions using digital platforms never reach the same level of quality and richness as FTF communication, as P9 articulates:

> Digitally, you lose so much of the social interaction and communication. You're not able to read body language properly. It's about basic human needs. Face-to-face can never be replaced virtually. I mean it. That's just a fact. (Designer, male, employee)

This statement, which essentially captures a common experience among tech experts, is somewhat unexpected given the IT professionals´ typical optimistic outlook on technological advancements and the continuous advancement of digital collaboration tools.

4.3. Sharing of knowledge and ideas

The third identified theme refers to activities through which employees share ideas, knowledge, and insight digitally with actors within or outside the company (Lin, 2007; Luo et al., 2021). Participants hold partially divergent views on these activities in the WFH situation. P8 puts it this way:

> In the consulting sphere that we are in, we have a lot of available expertise. When I need inputs on a creative task, I address everyone in the company and use the communication channels that we have available. But I guess there are many who think that someone else should respond. (Software developer, male, employee)

This experience is notably different from what P3 expresses. He informs that he primarily shares knowledge with only one colleague when working from home. From this one person with whom he has strong social ties, he feels that he gets a sufficient inputs and feedback on his ideas. The latter is in line with the finding that interaction in the WFH context is essentially limited to strong tie relations for many of the study participants. Moreover, challenges regarding external knowledge sharing are being emphasized by several of the IT professionals, including P9:

> At the start of the pandemic, everyone seemed eager to share. Webinars were popping up all the time, and it honestly got a bit overwhelming. Some knowledge-based forums emerged that were more reliable, but it feels like the industry itself has become less visible. We're missing out on those conferences and meetups that used to be essential for sharing insights and ideas. (Designer, male, employee)

P8 also expresses his experience of digitally sharing expertise and delivering feedback, encompassing an interdisciplinary aspect. He perceives an implicit expectation of expert status within the IT sector, which is deemed necessary to obtain inputs or feedback from credible external sources during a creative problem-solving process. Some participants find that they need to exert more

effort in the WFH setting to obtain inputs from professionals who offer diverse perspectives. Such experts serve as valuable sources of heterogeneous knowledge. Scholars agree that sharing heterogenous knowledge internally and externally is conductive to creativity (Carmeli et al., 2013; Rese et al., 2020). This also applies to the WFH environment (Tønnessen et al., 2021; Van der Meulen et al., 2019). Consequently, the WFH context can be inhibiting for the acquisition of different perspectives in the creative work.

4.4. Creative climate

Most of the respondents highlight the crucial role of organizational culture and the creative climate in fostering collective creativity within the WFH context. According to Ekvall (1996), creative climate describes employees' perceptions of an organizational environment that promotes creativity, including idea support, openness, trust, challenge, risk taking, playfulness and time available. IT professionals share their experiences regarding social cues that indicate a creative climate within their company. P1 perceives that supervisors encourage initiative and respond positively. She feels that there is a high degree of openness for new ideas within the company, and rarely any competitive atmosphere among colleagues. P2 enjoys the freedom to experiment within the company:

> You can try new ways of doing things without anyone asking why you spend time on this. There are no strict rules. I feel that our company encourages experimentation and allows failure along the way. (Project manager, male, employee)

This perception of creative climate may cultivate both individual and collective creativity, in line with prior study findings (Curşeu et al., 2022; Ekvall & Ryhammar, 1999). However, some participants believe that there is room for improvement, as they perceive the initiative and responsibility to be solely assigned to individual employees. P7 shares her opinion as follows:

> I think the way it works suits many of us, but certainly not all. I think some [employees] need more structure and leadership to be able to suggest new ways of doing things. (Middle manager, female, manager)

P8 notices a tendency within the organization to attribute certain avoidance of offering support and feedback to being excessively busy. However, he detects a potential within the company's norms to foster a more conducive environment for creativity. It often becomes convenient to apologize for prioritizing work with customers or other obligations. He suggests that perhaps the existing norm should have provided clearer guidance on the importance of mutual commitment and actively supporting one another.

Furthermore, the respondents indicate that management's individual follow-up occur less frequently in the mature phase of the pandemic. Some interviewees share the feeling of being left to themselves. When the barrier for direct contact is heightened due to digital platforms, colleagues with strong ties are perceived as even more critical for providing feedback and support in creative endeavors.

4.5. Digital collective creativity

P7 is one of the participants who experience the benefits of using digital tools for collective creativity. She speaks enthusiastically about an increased engagement, energy and creative flow in her project team and her experience of almost having to "step on the brakes". The exciting mixture of diverse skills and approaches is highlighted by Teams and Miro as enabling digital platforms for creative sessions.

> What triggers me the most about creativity is when you really manage to work interdisciplinary and not just talk about it. It is a completely different way of solving problems when working interdisciplinary. In our last project a bit of magic has happened because people have really managed to play on each other's strengths. (Middle manager, female, manager)

Others highlight the drawback of being unable to work with complex problem solving FTF in a meeting room. Video meetings are considered an effective format, but at the same time, they are not equally convenient for everyone. P6 faces constraints when it comes to digitally enabled collective creativity:

> In the early phase of the pandemic, we were very clear that we wanted to postpone difficult topics which required more creativity, but in the end, we had to carry it out on Teams, and that's not the same. Many are much less active, although the digital platform is okay. All creative sessions are being shortened, typically from full day to two-three hours. At the same time, video meetings have worked for the development and implementation of ideas. It has also been a proper platform for brainstorming with digital whiteboards, but we have not been creative enough to find new and better ways to solve complex problems together. (Senior consultant, male, employee)

The participants' perceptions of a complex problem align with established literature, in which key characteristics of the problem include dynamics of the situation, absence of clearly defined goals, and need for nonconventional solutions (Dörner & Funke, 2017; Frensch & Funke, 1995). Moreover, complex problem solving is considered particularly challenging in a social context (Badke-Schaub & Buerschaper, 2001). However, participants perceive digital platforms as suitable for brainstorming and believe that they have the potential to enhance creative outcomes when the sessions are well organized and effectively facilitated. According to respondents, criteria for well-facilitated creative sessions include thorough preparation, a structured agenda that is distributed in advance, a clearly defined topic and goals that are commonly understood, the use of suitable digital tools that are shared among all participants, active inclusion of all participants, and a structured approach to handling the outputs of the session. Similar characteristics of efficient creative sessions online have been discussed in recent literature (Gaggioli et al., 2020). The collective creative potential of well-facilitated digital sessions corresponds with what P7 experiences:

> A year ago, when we returned to the office for a short while, we organized a traditional workshop where we got lots of notes on the board. In my experience it is easier to facilitate workshops digitally because you have more freedom on a Miro board than having too many notes to manage. However, I would probably choose face to face, especially when it comes to discussions on complex problems. Then, it is better to be physically together. But I would digitize the outcome afterwards! (Middle manager, female, manager)

Overall, the IT professionals consistently experience a duality in that creativity can be promoted by using digital tools, yet simultaneously hindered by the absence of FTF interaction. This indicates a perceived complex paradox of collective creativity which the participants share in the WFH context in the mature phase of the COVID-19 pandemic.

4.6. Essence of the experience

Table A2 illustrates the participants' expression of what they experience (textual description) and how or in which situation these experiences occurred (structural description). Following Moustakas (1994), the last step of the analysis process is to merge these common descriptions into a cohesive essence of the experience of collective creativity while working from home. The textual description of social aspects demonstrates a common perception of struggling with weak-tie relationships and the absence of informal and spontaneous idea exchange. Combined with the structural description of the WFH situation where interpersonal contact depends on digital communication tools, the IT professionals share this experience relevant to collective creativity. The data clearly and consequently indicate that the absence of informal FTF interaction inhibits collective creativity. Concurrently, the respondents experience that well-planned and well-facilitated creative sessions tend to work better digitally than FTF. Consequently, the essence of the IT professionals' lived experience in the WFH context can be described as the *collective creativity paradox*. The paradox implies that the absence of unplanned informal FTF interaction hinders creativity, while well-facilitated digital sessions promote creativity. Additionally, the participants experience that the

more complex problems to be solved, the greater the need to meet FTF. The study findings suggest that idea sharing is limited to pre-existing strong tie relations. Digital barriers block weak tie interaction and constrains the diversity of new ideas and viewpoints. Finally, participants' perception of the company's creative climate appears to be even more crucial when employees WFH compared to onsite.

5. Discussion

Based on the shared lived experiences of the participants, five themes are identified to respond to the research question of how IT professionals experience the phenomenon of collective creativity in the WFH context. The discussion of the findings is structured according to these themes. Firstly, respondents express their emotions of how the full-scale WFH situation inhibits social relationships and interaction. Contrary to Walther's SIP theory (Walther, 1992, 2015), long-term digital interpersonal interaction and online social cues does not seem to strengthen social relationships. Certainly, withdrawal from the office space and absence of proximity have diminished the frequency of ad-hoc meetings during the COVID-19 pandemic (Waizenegger et al., 2020), a finding still valid in the mature phase of the pandemic. Spontaneous informal interaction is considered problematically poor by the interviewees in the distinct context. Previous research has demonstrated correlations between informal, unplanned interactions and collective creativity. Scholars argue that impromptu meetings and serendipitous encounters boost idea generation (Anderson et al., 2014). Unstructured interpersonal interaction is proved to be essential in creating shared context remotely, especially for creative performance (Kohonen-Aho & Tiilikainen, 2017). Similarly, Oldham and Da Silva (2015) emphasize the potential risks associated with digital platforms, specifically in reducing the occurrence of spontaneous casual conversations that play a vital role in fostering ideas sharing.

However, current research suggests that virtual coffee breaks or lunches may create psychological proximity while being physically isolated (Manroop & Petrovski, 2022). This sense of co-presence and informal interpersonal interaction could be expected to stimulate creativity. However, the IT professionals do not experience this outcome of the online interaction. Rather, the common perception is that the virtual space can never replace the physical "coffee machine effect" with its associated creative energy. One possible explanation is the experience of greater social distance and the major digital barriers concerning interaction with weak tie relationships. Additionally, the shortcoming of social FTF cues (i.e., body language and physical proximity) are components that seem to weaken idea exchange among the participants. Morrison-Smith and Ruiz (2020, p. 9) advocate that "existing tools and infrastructures have limitations that are preventing communication technology from fully supporting informal interactions". Nevertheless, Gibson (2020) argues that the key is in understanding which digital tool is most effective in a given circumstance and for a given purpose. Thus, IT experts obviously have a competence advantage of being able to develop and implement new technological solutions for spontaneous interaction and sharing of ideas virtually. In that regard, it is somewhat surprising that digital experts and "tech optimists" categorically reject the possibility of virtual interaction for collective creativity reaching the level of FTF, not even in the future.

As an extension of the experiences related to social interaction, the respondents' perceptions of sharing knowledge and ideas also seems to be strongly affected by the WFH situation. The IT professionals experience challenges with knowledge sharing in the full-scale WFH setting, especially external sharing (e.g., with customers or stakeholders). The participants experience disruption and decrease in their weak tie interactions caused by the WFH situation. For example, a developer expresses that he shares ideas mostly with only one close colleague. Hence, it is reason to believe that collective creativity is negatively affected by the limitation of wider knowledge sharing, both internally and externally. Especially, the notion of external knowledge sharing characterized by weak social ties being crucial to creative problem solving, supports the study findings (Carmeli et al., 2013). However, the abovementioned developer experiences having more time to acquire new insights and perspectives from external online forums in the WFH setting.

According to previous findings, this experience may enhance individual creativity because the integration of diverse insight and expertise from multiple digital sources fosters creativity in the WFH context (Van der Meulen et al., 2019). This complexity supports the idea of the paradoxical nature of digitally mediated creative work.

The participants experience a stimulating creative climate in the company and consider this to be particularly important given the distinct work practice. The perceived prominence resonates with prior research showing that creative climate fosters collective creativity (Amabile et al., 1996; Anderson & West, 1998; Somech & Drach-Zahavy, 2013). Similarly, Curşeu et al. (2022) note that the social information processing perspective recognizes that a perceived open and supportive work environment offers employees cues for role expectations and shared positive attitudes toward collaborative creative tasks. However, Tønnessen et al. (2021) found no association between creative climate and creative performance in the WFH setting during the early phase of the pandemic. In the present study, the participants share the feeling of openness to experimentation and new ideas as well as supervisor support for individual initiatives. Amabile et al. (1996) suggest that creative climate is a culturally determined perception regardless of time and place of work. However, the study findings indicate that perceived creative climate is even more critical in the full-scale WFH context, which can possibly be explained by the social distance.

The study findings suggest a certain difference in experiences and approaches to digitally enabled collaborative creativity. Some participants explain the perceived constraints of digital platforms to solve complex problems collectively. Drawing on media richness theory (Daft & Lengel, 1986), Yang et al. (2021) argue that in-person interaction is best suited for sharing fine-grained ideas and solving complex problems. Several interviewees sense a lack of effort to fully bring in divergent perspectives in digital creative collaborative work. One possible explanation is provided by Waizenegger et al. (2020), who find that an overwhelming amount of video meetings during the pandemic affects creative collaboration negatively due to exhaustion and disengagement outside the online meetings. Similarly, in a study across five countries during the pandemic, Brucks and Levav (2022) found that videoconferencing inhibits idea generation. However, the IT professionals primarily experience effective and inspiring online collaboration across disciplines, which drive creative behavior. This observation corresponds with prior research as well. For instance, Lee (2018) noted that individual creativity was improved through the use of digital tools. Likewise, at the group level, scholars suggest that online platforms can promote collaborative creativity (Hewett, 2005; Oldham & Da Silva, 2015). The overall perception in the present study is that digital collaboration technology is feasible for digital collective creativity to flourish in the WFH context, given accomplished facilitation, insightful inclusion, and matching tools. Accordingly, the theme of digitally enabled collaborative creativity illustrates a shared experience in the present study, which is supported by existing literature.

However, the essence of the IT professionals' experience of WFH in the mature phase of the COVID-19 pandemic is described as the collective creativity paradox. Specifically, the absence of FTF interaction decreases collective creativity, while well-planned digital creative sessions lead to the opposite. Studying hybrid work environments, McAlpine (2018) observed that remote work reduced informal and spontaneous FTF interaction and that this communication style had a more substantial impact on collective creativity than formal and planned communication. Accordingly, she underscores the unique effect of FTF informal interaction on collective creativity and idea generation. Conversely, several scholars emphasize the advantages of carefully planned and well-facilitated creative meetings and brainstorming sessions (Isaksen, 2023; Isaksen & Gaulin, 2005; Oxley et al., 1996). Isaksen (2023) pointed out that highly-trained facilitators not only strive to overcome barriers, but also focus on the benefits of groups comprising diverse members for creative problem-solving. Moreover, Nunamaker et al. (1996) suggested that technology may improve well-planned meetings. This dual perspective in prior literature underscores the complexity of creative group work within fully and partially remote work settings, thereby reinforcing the concept of the collective creativity paradox.

6. Conclusion

This study explores the phenomenon of collective creativity when IT professionals work from home in the mature phase of the COVID-19 pandemic. The essence of the experience is described as the "collective creativity paradox". The paradox implies that the study participants experience both impeded and improved collective creativity simultaneously in the distinct WFH context. In particular, the absence of informal FTF interaction hinders collective creativity, while well-facilitated creative sessions on digital platforms promote collective creativity. Furthermore, idea sharing is limited to strong social ties, while the experience of digital barriers blocks weak tie interaction and curbs diverse perspectives. In addition, the respondents highlight the significance of perceived creative climate when working from home. Finally, the IT professionals express that the more complex the problems to be solved creatively, the greater the need to meet FTF.

The study findings add to creativity research by exposing the successful use of digital means for fostering collective creativity while emphasizing the critical role of informal FTF interaction for complex creative problem solving and spontaneous idea sharing. Thus, the study contributes to a better understanding of the dynamics between physical and digital environments for collective creative work. Secondly, the study advances the FWA and WFH literature by providing a deeper and more nuanced insight into the experiences of knowledge workers in an unprecedented WFH context. According to Waizenegger et al. (2020), understanding knowledge workers' experience of carrying out work exclusively from their home office during the pandemic is essential in contributing to the WFH literature. Thirdly, the inquiry expands the range of methodological approaches to studying creativity in remote work settings by applying descriptive phenomenology and systematically following a phenomenological analysis procedure.

One practical implication of this study is that it provides a deeper understanding of employee experiences and perceptions, which can play a crucial role in effectively managing remote and hybrid organizations. By gaining insights, leaders are better equipped to design, implement, and adapt flexible work models that facilitate and foster collective creativity. Recognizing the collective creativity paradox allows for a more suitable allocation of human resources and various creative tasks in a physical-digital work environment. Furthermore, the findings emphasize the critical importance of encouraging informal interactions and internal as well as external knowledge sharing to promote creativity in a WFH context.

The study findings also highlight the significance of fostering a creative climate that cultivates collective creativity in organizations. To achieve this, companies should develop a culture that values and supports creative thinking, risk-taking, and experimentation. Managers should encourage celebrating both successes and failures for learning and new approaches. A routine of regular check-in meetings and feedback sessions is an intervention for addressing concerns and sharing creative ideas. Clearly defining project goals can stimulate collective creativity by providing a distinct direction. Moreover, effective use of virtual collaboration tools may bridge gaps among remote workers, facilitating real-time creative collaboration. Finally, this study encourages knowledge workers not to disregard the full-scale WFH experiences. Instead, they should be motivated to use these experiences as valuable insights when collaborating to shape flexible work arrangements in the post-pandemic era.

There are several study limitations that should be acknowledged. The purposeful sampling technique and the sparse number of participants limits the generalizability of the study findings and increases the risk of researcher bias. The researchers´ pre-assumptions and extensive personal experience with the phenomena may have influenced the data collection process, analysis, and interpretation, potentially impacting the objectivity of the results. Setting aside all perceptions and personal views to focus entirely on the study participants' experiences has not been fully achievable. Secondly, the essence articulated can only reflect a particular time and place and the experiences of individuals with different backgrounds and preferences (Moerer-Urdahl & Creswell, 2004). Another sample could have given different results. Moreover, critical analyses of

various digital tools used for creative work would most likely have provided a richer understanding of the results. Finally, the research focuses solely on employees from a single IT consultancy, but creative processes may be dissimilar in other organizations, contexts, and industries.

The suggested collective creativity paradox emphasizes the complexity of creative processes in general and particularly the intricate ambiguity of collective creativity in the WFH context. Given the crucial role of creativity and innovation for companies' competitiveness, the phenomenon is worth further scholarly attention. Future work could address the issue of collective creativity when working from home in other businesses and in the public sector. Comparative studies may be conducted across disciplines, organizations, and countries. Scholars are encouraged to use different theoretical perspectives to investigate the phenomenon. Similarly, future studies should utilize different research designs, including quantitative methods, which can lead to statistically generalizable results. A new research agenda is evolving as knowledge workers have returned to office, either fully or partially, and organizations endeavor to develop and implement new work practices. This gives rise to pivotal questions: How will a hybrid workforce, characterized by alternating periods of onsite and remote work, influence creativity at the individual, group, and organizational level? What implications will the adoption of new technologies such as artificial intelligence (AI) and virtual reality (VR) have for employees' experience of collective creativity? How can managers effectively facilitate informal interaction, knowledge sharing, and creative collaboration given the diverse preferences for remote work among their employees? Amplified scholarly attention is needed to investigate how to foster collective creativity in the rapidly changing world of work.

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Appendices

Table A1. Details of study participants

Participant identifier	Gender	Age range	Education level	Tenure	Position/Job role
P1	Female	40–44	Master	1,5 years	Strategic advisor
P2	Male	30–34	Master	2 years	Project manager
P3	Male	30–34	Master	3 months	Developer
P4	Male	40–44	Master	5 years	Team manager
P5	Male	45–49	Bachelor	1,5 years	Advisor
P6	Male	30–34	Master	2 years	Senior consultant
P7	Female	30–34	Master	2 years	Middle manager
P8	Male	35–39	Bachelor	1 year	Software developer
P9	Male	35–39	Master	1,5 years	Designer
P10	Female	55–59	Bachelor	5 years	Supervisor

Table A2. Statements, themes, and descriptions

Significant statement example	Theme	Textual description	Structural description
You may not get to know people that well. The conversation and interaction doesn´t flow easily in a video meeting. Everything is so formal and set. (Strategic advisor, female, employee)	Social relations	Difficulties in building social relations and lack of informal meetings	Interpersonal interaction using digital communication platforms
Digitally, little happens by chance. It is rare that you just stumble across someone. Standing coffee chat, eye contact, having lunch together… I really miss those things. It´s difficult to replace virtually. (Senior consultant, male, employee)	Informal interaction	Lack of spontaneity and unplanned encounters	Absence of interpersonal FTF interaction
In the office, it's easy to ask someone around you who you know has the knowledge needed for solving the problem. When working from home, I mostly share ideas with only one colleague. But I also learn new things online. (Developer, male, employee)	Sharing of knowledge and ideas	Digital platforms are effective for sharing ideas internally, but external knowledge sharing is hampered by WFH	Internal and external digital knowledge sharing

(*Continued*)

Significant statement example	Theme	Textual description	Structural description
I really like that it´s allowed to experiment, to try and fail. In my current project, I sense that they give me enough time and freedom for that. (Developer, male, employee)	Creative climate	Openness to experimentation and individual initiatives	Voicing creative ideas in the WFH context
I'm not very creative now when I´m alone. I need to be together with others. The absence of the informal physical arenas is really hampering. But in a good digital meeting, creativity can flourish just as well as in a physical meeting room. (Team manager, male, employee)	Digital collaborative creativity	Well-facilitated online sessions drive creativity, but complex problem solving depends on FTF interaction	Creative sessions using video conferencing and digital collaboration tools