

Corona pandemic and embodied way of working as boundary dynamics/management

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“The challenge is to reduce the pandemic’s boundless expanse, but the virus scorns isolationist illusions. We should therefore not rely on old borders, but on sustainable border crossings, supported by an understanding of the real conditions”
(Becker, 2022).

Introduction

A theater actor with disabilities reported how physical closeness was important to him to be able to work as he “took hold” of his colleagues who moved him across stage. He agreed with disinfectant and masks at rehearsals but asked “virologists to explain how touch itself is dangerous”. The same actor praised streaming and video meetings for being barrier-free, although he criticized the lack of closeness in digital realms. These mixed reactions are typical for the boundary dynamics between close and distance work that had to be managed under conditions of Corona policies. An important reason for this is compatibility issues. However, location-independent work now seems to work well for many people. Are there shifts in the closeness-distance relationship in virtual work that support this and counteract the above criticism?

When the Corona pandemic kept the world in suspense, economies experienced the greatest shock in decades (Tooze, 2021, p. 1). Pandemic policies abruptly changed the world of work. Physical distancing and digital work together with testing and vaccination were major strategies to reduce infection rates. Distance and digital work pose differentiated challenges to the world of work. Whereas remote work or home office was easy and beneficial for some, it was a major issue for other oc-

cupations. The limits of advancing digitalization have often been ignored in professional and academic discussions during the Corona crisis, as a significant proportion of work requires physical co-presence. Where is co-presence necessary and which other occupations are possible in virtual work environments? How can workers navigate between direct bodily contact of in-person work and digital work which is often formalized? What improvements are possible to bridge the shortcomings of personal contact in online formats?

These are questions we will address by investigating dynamics around boundaries. Various social theories employ some conceptualization of boundaries, for example Niklas Luhmann's system boundaries or Anselm Strauss's boundaries between social worlds/arenas. How boundaries are set depends on the theory: for Luhmann system boundaries depend on system logic, for Strauss drawing boundaries is rather a decision of the researcher. On the contrary, in sociology of science (namely in STS) boundaries are understood as divisions set by actors themselves (Gieryn, 1983, 1999; Jasanoff, 1987). Actors are doing demarcation by practices including in and excluding from discourse, organizations, or regulations. Characteristic studies of boundary work illustrate these ideas with a geographic metaphor of an "ever changing arrangement of boundaries and territories and landmarks, always contingent upon immediate circumstances" (Gieryn, 1999, p. 11).

In the Corona crisis, dynamic adaptation of policies was necessary. International bodies, national governments, and organizations adapted their policies to the fluctuation in confirmed cases, deaths, numbers of vaccinated or even to responses by the population. The boundary between work and life, as well as that between closeness and distance in work and in relation to work objects, has begun to shift, and with it the boundaries between formal and informal "embodied" knowledge. The dynamics during the pandemic required rigorous boundary management.

Classical studies of boundary management address the practices to separate or combine different institutional settings (Miller, 2001; Beck, 2009). Further studies address boundaries in organizations in open innovation processes (Porschen-Hueck, Weihrich and Huchler, 2018; Capurro *et al.*, 2021), or even popular and high literature (Matzner and Wieser, 2024). With boundary management, we refer to a concept of managing the demarcations between opposing institutions, spheres, or sets of practices.

Our article begins by presenting the dynamics in the Corona pandemic as boundary management and discusses the dynamics and management of closeness-distance relationships in work activities in detail. To this end, we present concise results from empirical research in various sectors: software development, small and medium-sized industrial companies, hospitals, and theaters. The empirical sections show how closeness-distance boundaries have shifted due to the distancing measures in the pandemic at work on site, but especially in virtual work. We

conclude the article by placing the results in the context of current discussions on flexibilization.¹

Corona pandemic measurement as a story of boundary management

The coronavirus pandemic originated in China in 2019 and subsequently spread over the world. It forced all governments to take measures to protect the population (Altıparmak *et al.*, 2021; CoronaNet, 2021). Countries handled this in very different ways. This article focuses on developments in Germany. Here, national characteristics such as federalism and a relatively high level of social consensus were relevant during the pandemic (Jasanoff and Hilgartner, 2021).

The first COVID-19 infection in Germany was officially registered on January 27, 2020. After the Robert Koch Institute (RKI), as the responsible national health institute, published the National Pandemic Plan on March 4, 2020, extensive countermeasures were taken, which changed over the course of the pandemic (Expert Committee pursuant to Section 5 (9) of the Infection Protection Act, 2022). Germany responded in March 2020 with an initial lockdown, which met with approval and greater risk awareness among the majority of the population, although the economic hurdles were noticeable.

Early analyses of German coronavirus reactions showed that “the lockdown measures feed back into the political process by changing political attitudes and public risk perceptions” (Naumann *et al.*, 2020, pp. 199–200). This interdependence between political measures and changing risk perceptions is one reason why boundaries had to be dynamically redrawn. With the *setting of new boundaries and the blurring and shifting of boundaries as well as boundary conflicts*, the history of the coronavirus pandemic can also be told as a story of boundary dynamics or boundary management.

Decision makers reacted to the pandemic by *setting new boundaries* against infection risks by employing the notion of ‘safe distance’ (Büthe, Messerschmidt and Cheng, 2020; Frevel and Heinicke, 2021). Specifically, these included the closure of national borders, the partial shutdown of businesses and educational institutions, the obligation to wear masks in buildings, public spaces and on public transport, the installation of glass screens and mandatory quarantine. The government measures included tests for arriving travelers and the development of a tracing app

1 This article was written as part of the DFG-funded project WorkPanRisk (no. 458412033). We dedicate this article to our colleague Georg Jochum, who passed away on January 29, 2022, and who shaped the research project with his ideas during the application phase. We would like to thank Markus Stöhr for his empirical contributions to the hospital, Prof. Dr. Fritz Böhle for the constructive discussion of the article and Frank Seiss for the careful editing.

called Corona Warn App (Jasanoff *et al.*, 2021). While rapid tests for SARS-CoV-2 and vaccinations became available in the end of 2020 and took some time to be translated into a full testing and vaccination campaign, the initial Corona measures were predominantly physical distancing measures. Bodies thus became the main target of the coronavirus measures (Klein and Liebsch, 2020).

New boundary settings may be the result of political decisions concerning hospital capacity, vaccination status, or priorities for relevant sectors. These boundaries have symbolic dimensions manifested in “the lines that include and define some people, groups and things, while excluding others” (Lamont *et al.*, 2015, p. 850).²

The people that were included by these lines had to maintain operations, which sometimes involved an increased risk of infection, while the people excluded were subject to restrictions. In Germany, after a few weeks of a complete lockdown, essential services such as schools and kindergartens reopened, while non-essential businesses such as fitness studios, bars, theaters, and concert halls remained closed (Posaner and Nöstlinger, 2020), which held considerable potential for boundary conflicts.

The strategy of distinguishing “systemically relevant” companies and institutions from others and keeping them open while restricting all others led to these *boundary conflicts*. Affected companies in various sectors had to accept limited options for action and deal with the resulting consequences. Hospitals operated at full capacity and theaters were closed completely. “Relevance for life” seemed to be given higher priority to “relevance for a system” resp. “the system”. Functional systems, usually operating along their inherent logic, temporarily seemed to be subjected to a single imperative, i.e. survival of the individuals (Kaldewey, 2022).

As part of the distancing measures in the world of work further conflicts arose in connection with the boundaries of flexibility or, in other words, the limits of flexibilization of different work types. In sectors such as manufacturing, where workers were divided into those who could do planning and administrative work from home and others who were unable to do manual work due to strict physical distancing, such boundary conflicts became manifest in terms of injustice. Workers criticized a two-tier society, both in terms of distancing options for maximum infection control and in terms of systemic relevance and options for action on-site. The boundary between work that can be done from home and work that cannot be done from home has become increasingly relevant during the coronavirus pandemic.

Various regulations adapted to the dynamics of the pandemic, such as the SARS-CoV occupational safety and health standard or the SARS-CoV-2 occupational safety and health regulation, which required companies to permit “home office”, promoted

2 The example of the COVID-19 pandemic also illustrates this, even in the form of an interplay of ethnicization practices and (nation-state) border demarcations and their institutionalization (Höfler and Klessmann, 2021, p. 356).

working from home as an essential component of pandemic response (Backhaus, 2022, p. 2). The term “working from home” encompasses both largely unregulated forms of work, such as mobile work, and regulated forms of work, such as telework (for further details, see Backhaus, 2022, pp. 2–4; Bao *et al.*, 2022, Harfiana and Matzner, 2026). Remote work refers to working outside the office. Interaction purely via digital media without physical contact between people is referred to as virtual collaboration (Becker, 2024) which is often used synonymously with digital communication. In Germany, the obligation to work from home expired in March 2022 (Carter, 2022).

Working from home (or from anywhere) has been under discussion since the 1970s, especially in the context of information-based work. With the spread of location-independent, portable technologies (e.g. smartphones, laptops, tablets) and faster mobile networks, working from home has evolved into working “from anywhere” or mobile working (Messenger and Gschwind, 2016). Cloud-based collaboration options (Brechlin, 2021) and the widespread use of high-quality video conferencing by large proportions of the workforce played a significant role (Volmar, Moskatova and Distelmeyer, 2023, pp. 99–101).

As a result, *boundaries between work and life were blurred. This discussion about the dissolution of boundaries between the spheres of life is not new, but in the wake of the coronavirus pandemic and the home office regulation, it has come up again with renewed force.* The increase in remote work, accelerated by the pandemic, has fundamentally changed how people work and structure their professional and personal lives. As Voß emphasized, structure is in effect only another term for boundary and vice versa (Hausinger, 2005). Kratzer and Sauer are dealing with the blurring of boundaries concerning working hours through flexibilization, which affects the relationship between working time and leisure time. Another central moment of change is the blurring of boundaries in the spatial separation of the spheres of workplace and private household. Historically, these spheres had to be separated, and now the separation of work and life is tending to be dissolved again (Kratzer and Sauer, 2003). This does not only occur in the temporal and spatial relationship between work and life, space and time, but also functionally and emotionally. When the spheres of work and life merge, it is no longer clear that work is the sphere of “sober emotions” and that “social emotions” only have their place at home. For employees who work at home, for example, it is often difficult to distinguish when they are sitting at their laptop whether they have sobered work-related feelings or more family-related feelings when the child knocks on the door and expresses a need (Voß in Hausinger, 2005).

This shift highlighted the critical issue of boundary management, particularly how individuals navigate the blurred lines between work and home life. As the trend towards home office continues, effective boundary management is becoming increasingly important and requires more effort to navigate through remote environ-

ments. Meanwhile this is even being taken up as an issue by health insurers (Barmer, 2024).

Virtual collaboration in the context of home offices, mobile work, etc. has changed the world of work and has consequences that go as far as creating new stresses and strains, which can be traced back, among other things, to the *limited opportunities for interaction*. In many cases, the lack of informal encounters and personal exchange, including the generation of ideas, was missed. On the other hand, virtual collaboration has experienced a triumph with the increasing popularity of new, especially cloud-based communication and collaboration tools and the spread of video conferencing, suggesting changes in virtual work and interaction. What is the reason for this triumph? Does it ultimately create closeness despite physical distance?

The question of how (situated) closeness to the objects of work and interaction partners can be established in distanced working relationships has so far been little studied. This article addresses the question of *interaction boundaries in virtual interaction* that have arisen during and after the pandemic, drawing on the body and action-expanded concept of subjectifying work action. The concept can be used to interpret deficits that have arisen because of physical distancing measures with regard to work activities, especially joint work activities. This subjectifying approach, which aims at closeness, touch, empathic access to work and interaction, is contrasted with an objectifying approach to action and interaction based on distance.

We take a closer look at whether and how the developments outlined here lead to a boundary dynamic between closeness and distance in work actions. In doing so, we particularly look at virtual collaboration, which has become (even) more widespread since the coronavirus pandemic and assume a shift in the boundary between objectifying work and interaction towards subjectifying work actions.

The consideration of this shifting and blurring of boundaries has significant impact on company policy. The recognition of such “other” forms of knowledge in work, technology and organization has been examined in the context of the theory of reflexive modernization and described as a dissolution, redrawing and transgression of boundaries of socially recognized knowledge (Böhle *et al.*, 2004; Böhle and Porschen, 2012). This can be taken up and used to ask how far the recognition of informal forms of knowledge goes. Surprisingly, it has been emphasized for some time as a necessary on-site competence that is missing in remote work, but it is not discussed in virtual space.

The role of the body for work action and interaction

Physical distancing measures during the Corona pandemic have affected forms of work and knowledge that are close to the body, whether in production, interaction

or knowledge work. It is not just about no longer being able to act physically “on site” without further ado, but above all about no longer being able to do so “with all one’s senses”. Bodily knowledge based on sensual perception has hardly been discussed in the context of the challenges of the pandemic. This approach can serve as a key to understanding experienced deficits, but also opportunities. The latter relates to questions of embodied virtual interaction.

From the simple to an extended body concept in work contexts

According to a conventional view of the role of the body in the industrial organization of work, it has long been reduced primarily to the function of a physiological basis of instrumental action. In contrast, the physicality of knowledge has taken on a new significance since the mid-1980s with the change in the rationalization of work. Nevertheless, physicality in work is still subject to a stigma in “cognitive-cultural” capitalism in which value creation is based on cultural knowledge goods (Reckwitz, 2019; Böhle, 1989).

Against the background of the broad spectrum of human work abilities (Pfeiffer, 2016), the prerequisites of human work activity have become visible. Studies in industrial work and, later, also studies on interaction work (Böhle and Glaser, 2006; Böhle and Weihrich, 2020) and cooperative work (Böhle and Bolte, 2002; Bolte and Porschen, 2006) have identified specific modes of dealing with and performing work actions that can be captured with the concept of subjectifying work action (Böhle, 2017). This approach, informed by action theory, builds on the concepts of implicit knowledge (Polanyi, 1985), embodied knowledge (Merleau-Ponty, 1966) and bodily cognition (Böhle and Porschen, 2010). The *subjectifying* mode of action highlights experiential knowledge that cannot be readily categorized according to the premises set for scientific knowledge or according to the criteria of right and wrong or valid and invalid knowledge. Subjectifying work action is thus directed towards the non-objectifiable forms of knowledge and their connection with behavioral and perceptual forms of thinking. Subjective feeling plays just as important a role here as complex sensual-physical perceptive ability. Subjectifying work behavior also finds expression in an explorative, dialogic-interactive approach – not only with people, but also with objects. It thus describes a special mode of cognitive and practical accomplishment of work demands and, in addition to sensual-perceptual approaches, is characterized by sensing and associative thinking. For instance, skilled metalworkers recognize problems of the machinery from changes of its whirring noise intuitively, faster than any analysis mechanism. In the chemical industry, plant operators can tell from the smell in the plant whether everything is running correctly. Information brokers have a special flair for intuitively filtering relevant clues and information. Accordingly, it is closely related to experience-based (implicit) embodied knowledge.

Objectifying action, by contrast, describes the ideal-typical and classical approach to work as a planned procedure, as an exact and objective registration of work content with the help of sensual perception, as analytical thinking with a high value of expertise, and a distanced, objective relationship to work objects. The objectifying mode of action is compatible with the fundamental premises on which the claim of validity and superiority of scientific knowledge is based. Accordingly, it is closely related to theory-based (explicit) disembodied knowledge.

Objectively planned work might be adequate for many tasks; however, in unpredictable situations experience-based subjectifying work action is indispensable. In those unclear situations it is difficult to proceed in a planning-oriented manner, concentrating on exact and objective information, considering this information in a logical-analytical way, and relating to tasks and work objects fact-bound and impersonally. The concept of subjectifying work action highlights creativity and emphasizes the fact that work processes lead to unpredictable situations that must be solved on a case-by-case basis with a holistic-sensory perception and empathic reference.³

The boundary between these two modes of action is fluid. Their distinction helps us to understand the following aspects:

The subjectifying mode of action based on closeness in work activities, in contrast to the conventional objectifying mode of action based on distance, is one approach to explain the problems that arise with the physical distancing measures. This distinction provides insights into the limits of the formalization and digitalization of work. For example, the Taylorist production model already ignored the fact that errors in practical work often must be rectified in a spontaneous and creative way. This kind of work, characterized by subjectifying work action, is a response to the fact that the interaction of a multitude of parameters cannot be fully grasped, predetermined, or represented in theoretical or empirical models. Subjectifying work action plays a role in cooperation (Böhle and Bolte, 2002; Bolten and Porschen, 2006), knowledge exchange (Porschen, 2008) and interaction work (Böhle and Weihrich, 2020) regarding the qualities that are important for them, such as closeness, resonance, and points of contact.

The importance of these qualities became clear to the broader working population (and not only to them) during the pandemic lockdown.

The pandemic raised the limitation of physical closeness, as it is predominantly necessary in production or service work, because it entailed the risk of infection. Measures for social distancing have been taken for production-related activities and

3 Empirical investigations repeatedly demonstrated that work involves unexpected situations especially in person-related service work, innovation work, and artistic work but also in areas such as the monitoring and regulation of technologically sophisticated industrial production facilities (overview in Böhle, 2017).

personal services, such as the expansion of shift work, the avoidance of common meeting points for handovers and in break rooms, as well as hygiene measures such as the wearing of masks. This has presented challenges to these fields of activity that are physically and materially bound (Adam *et al.*, 2021).

For intellectual – disembodied – activities, the solution of physical distancing, on the other hand, lay in the home office arrangements described above, in remote work and in video meetings, which became part of the daily work routine. One question that urgently arises during and after the pandemic is whether working in a virtual space with physically absent interaction partners per se must mean distanced work with restrictions for the subjectifying of work actions. Online meetings have often been described as a working framework that objectifies and increases efficiency, but limits creativity and innovation. What is at issue here is whether there are other possibilities or forms of closeness or subjectifying working action here, in contrast to physical and materially bound activities. We will discuss this below based on our initial thesis: *During appropriation processes in virtual space (with functional and appropriate technical equipment) a change can take place from an objectifying mode, which is attributed to digital work and virtual interaction, to a subjectifying mode.* There is a controversial discourse on this, which will be addressed below.

Distance and closeness in virtual interaction – discussion insights

Tendencies to objectifying work action

Numerous indications, including the prominent study by Brucks and Levav (2022), suggest that there are deficits in the virtual world of work regarding creative processes and output compared to analog experience spaces. The researchers argued with eye-gaze and recall measures, as well as latent semantic analysis, to demonstrate that video conferencing hampers idea generation because the communicators are forced to focus on a screen, which prompts a narrower cognitive focus. Their results suggest that virtual interaction comes with a cognitive cost for creative idea generation (ibid., 2022, p. 1).⁴ This corresponds to the objectifying mode of work action. In a study on the effects of the COVID-19 pandemic on agile software development, Neumann, Bogdanov and Sager (2022) found that teams quickly adapted to the new virtual setting, but that communication within the team also became more objective. Hence, it is considered even more important to create a shared atmosphere in the virtual (or hybrid) workspace through rituals (Bernhardt, 2022).

Tendencies to subjectifying work action

Klein and Liebsch (2022) illustrate how “touch” in digital everyday life is accompanied by transformations of perception as a social and physical-corporeal process.

4 This is also a cause of “zoom fatigue” (Rump *et al.*, 2022).

They trace configurations of contact in the digital realm and show how images, signs and symbols acquire greater significance and what role the shift in meaning from the place of physical presence to the virtual space of communication plays. Klein and Liebsch also speak of the establishment of new temporal conditions of simultaneity and the pluralization and fragmentation of social atmospheres. The shift in meaning between physical and sensual presence in social interaction appears central (Klein and Liebsch, 2022, p. 16). According to the authors, touch in virtual interaction comes about through sensual presence rather than intercorporeal sensing. They emphasize the importance of fictional feeling, of imagination, and speak of an affecting touch (without resonance; *ibid.*, pp. 122–123). This means that experience and affective contact are possible in virtual interaction but are more fragmented than in analog interaction.

Beyond work relations, James and Leader (2023) state that re-embodiment and hugs are possible in social lives online. In their study, they reconstruct hugging as a social practice and make assumptions about the nature of our embodied social interactions and their digital mediation: “(1) all social interaction is mediated; (2) all virtual experiences are embodied; (3) technology has become richer and more supportive of embodiment; and (4) expertise plays a role” (*ibid.*, p. 1). For the authors, the quality of social connections online is substantially dependent upon the dynamic skillful resourcing of multiple mediating components, termed digital tact by them (James and Leader, 2023, p. 1). According to the authors, “the digital tact helps us to embody online places in ways that are sensitive to the needs of the people and interactions that help comprise them” (*ibid.*, p. 2). They point out that the quality of our online interactions is the result of much more than just the quality of camera transmission, audio device or the availability of haptic interactions. “It is about what happens before, in and around those interactions, how they are facilitated, how the magnifying and reducing mediations they depend upon are leveraged, and ultimately, how the mediating components that survive virtualisation are resourced” (*ibid.*, p. 12). It is about more than just enabling inter-physical sensori-motor coupling and affective resonance, as is also represented in the concept of subjectifying work action through the levels of approach, sensual perception, thinking, relationship, and type of knowledge.

Overall virtual collaboration can easily lead to formalization and mental exhaustion caused by dealing with the loss of sensory qualities and the necessity of permanently assigning meaning to data (Böhle, 2023, p. 86). Face-to-face video conferencing, however, can establish a sensual connection across spatial distances. In a sense, it is a sensually perceptible equivalent of analog representation and thus accessible to subjectifying work actions (*ibid.*).

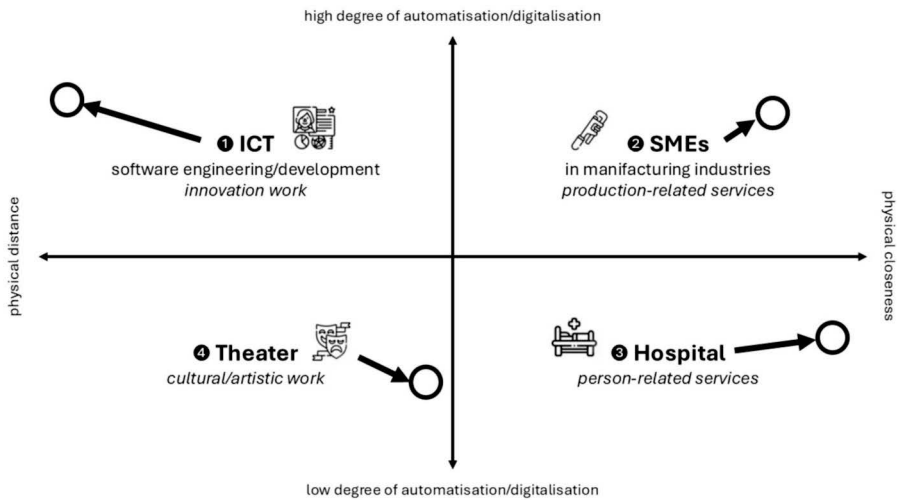
Distancing measures in four different fields of work

To draw a differentiated picture of the boundary management between closeness and distance in different work fields and practices in the context of the Corona measures, we used a comparative case study design based on sector-specific differences in work organization and work processes.

This study investigates four empirical fields of work: (1) development and support – ICT, (2) production-related services – SME in manufacturing industries, (3) person-related services – hospitals, (4) cultural and artistic work – theater. At least 15 semi-structured interviews in each area were conducted during and after the coronavirus pandemic (Gläser and Laudel, 2010), qualitatively analyzed and processed in case studies (Pongratz and Trinczek, 2010). Against this background, this article mainly introduces emerging empirical trends and exemplary statements.

Figure 1 shows that the four empirical fields assume different positions on a horizontal axis between physical distancing and closeness as well as on a vertical axis between high and low levels of automatization and digitalization.⁶ The initial assumption was that these fields differ significantly with regard to the distancing strategies possible and practiced, hence in the respective organizational and individual boundary management with its implications.

Figure 1: Physical bond and digital localization of the empirical fields of work.



On-site work includes (2) production-related services in small and medium sized enterprises (SME) in manufacturing industries, (3) person-related services

in hospitals and (4) cultural and artistic work in theater. The degree of automation or digitalization decreases across the three empirical fields, in accordance with the order in which they are introduced. In the field of (1) development and support in Information and Communication Technology (ICT) companies, remote work was carried out most directly and extensively. Compared to the other fields of investigation, this field exhibits the highest degree of digitalization and the greatest level of physical distancing. In all four fields, administrative, planning and conceptual work was carried out remotely.

In the case of physically and materially bound activities in SME (2), hospital (3), theater (4), digitalization also plays a role regarding work coordination, alignment and exchange, as it does in ICT (1), largely reducing physical encounters on site. Other measures such as the expansion of shift schedules in SME (2), the avoidance of shared meeting places (e.g. for breaks) in ICT (1), SME (2), hospital (3), theater (4), and the partial closure of areas in hospital (3) and theater (4), partly compensated by short time working in theater (4), also played a role.

Avoiding physical contact was central to all areas, but it had negative consequences for work and the economy in general. A central finding in all areas during and after the pandemic was the growing awareness that the quality of work benefits from a mode of working that refers to the objects of work and the interaction partners (compare remarks on subjectifying work action). We will consider whether and to what extent in the four fields, under Corona conditions and under virtual working conditions, shifts have occurred from distance to closeness, or from an objectifying to a subjectifying mode of work.

Closeness in 'distanced' work settings: Empirical insights into boundary dynamics/management

In the following, we will take a brief look at the various possibilities and ways of dealing with distancing in physical and mental work. We will then turn our attention to the subjectifying work action unfolding in the process of work and appropriation in virtual space, especially in the context of video conferencing, whereby the boundary between distance and closeness is shifted in favor of the latter.

Distancing measures and challenges for occupations with physical closeness and low degree of automatization/digitalization

In theaters and hospitals, where personal contact is essential to large parts of the work, several distancing measures imposed severe problems. One theater producer said that rehearsals with masks are just "stupid". Further, live streams of theater plays would miss the "aura" of the theater. A nurse in palliative care complained that

her work thrives on long, personal contact times and physical touch, which were drastically reduced during the pandemic. Although some work practices could be digitalized, person-related practices were difficult to manage in a sufficient way.

Workers in theaters and hospitals value in-person work much higher than any type of distant work or home office. For these occupations, working from home questions the purpose and identity of their jobs. They value being in direct contact with colleagues, clients or audiences (cf. subjectifying work). Being in physical contact is seen as authentic communication, whereas digital communication lacks certain qualities for many of the workers.

Work in production industry like circuit board production, hardware control, and system testing continued to be carried out on the site of the companies. It was impossible to remove the necessary equipment from the company premises for these tasks, and this pushed the material and logistical requirements to their limits.⁵ Material bound tasks exist in many fields, for example theater tailors had to test and deliver outfits to actors and nurses had to work with medical equipment and patients. For employees in SME visiting other departments was no longer possible and a quick familiarization with other (simple) work areas was hardly feasible. It was also no longer possible to take customers to a production site and give them insights, which subsequently led to a loss of assembly expertise. In shift work, the lack of handovers was problematic in that information got lost, which probably ultimately led to additional work when things had to be redone. Interviewees point out that regarding the organizational obstacles and limitations, the small batches and the high diversity of work activities require local and embodied knowledge.

This brief insight suggests that in different fields of work and professional cultures, very different conditions for digitalization as a possible physical distancing strategy exist (see Matzner, 2024). These include institutional, professional group ethical, and material reasons, as they are also critically noted in the example of industry for the discussion about Industry 4.0 (Pfeiffer and Huchler, 2018). Recent research by Stöhr and Matzner found that resistance against digitalization led to a rollback towards analog solutions after the pandemic (Stöhr and Matzner, 2026).

In crises such as the Corona pandemic, employees on site can only manage physical distancing with the support of the organization. This has led to considerable limitations – also regarding subjectifying work and interaction – and consequences in the form of compensation approaches up to and including short-time work when work is suspended.

5 Examples from empirical research include order entry (shipping documents) and documentation, the control of incoming and outgoing goods, as well as picking, the processing of components, assemblies or similar.

Distancing measures and challenges for occupations (and parts of it) with physical distance and high degree of automatization/digitalization

Let's first look at how the pandemic has catalyzed digital opportunities for location-independent work.

Location-independent work for a wide range of work activities

Unsurprisingly, digitalization has progressed most consistently across the various fields of activity in the software industry. Almost all core activities in IT companies (development, sales, product management, academy) can be handled from home. The employees use video conferencing, personal chat, whiteboard and agile working tools and/or conference as a wiki. Cloud solutions in general have become established.

The picture in production-related SMEs was similar, albeit on a smaller scale. Customer care and customer service were organized as "remote services" and front as well as back-office activities, e.g. customer acquisition, parts of programming and testing, as well as the writing of system software, complaint processing, quotation creation and recording, supplier ordering, deadline monitoring or accounting and administrative personnel management were processed in the home office.

Theaters as public institutions had to establish home office solutions in collaboration with the city mayor. Administrative personnel had to update software and learn skills to be able to work remotely in harmony with data protection standards. Several technical and artistic occupations had to work short time, which resulted in great restrictions on doing the work itself. Distancing and mask regulations made acting and dancing "incredibly hard" – according to performer reports – and digital solutions for rehearsals did not work out for most of the theater groups.

Like other fields of work, hospital administration was sent to home office during the pandemic. Management felt the need to be on-site to represent the functioning organization.

Step-by-step and explorative digitalization of collaboration

Before the pandemic, the management of the medium-sized software company placed a great deal of emphasis on presence and campus culture. Videoconferencing and collaboration tools were only used to a limited extent and not consistently. The virtual space had to be appropriated. A well-functioning technical infrastructure that was fully integrated became a task for which IT-related companies were already better equipped than most other companies. Nevertheless, even here – as in the example of the medium-sized software company examined – the employees experimented with a wide range of tools until the appropriate digital support emerged. At the same time, the need for training and guidance in remote teams was also expressed.

Even regarding activities in production-related areas, our research found that it was possible to make a relatively quick transition to location-independent work due to the good technical equipment of the companies with the key technologies for remote work (VPN, MS Teams, Teamviewer etc. but also WhatsApp groups, use of Skype, Webex or Zoom) and initial experience with home office before Corona. Our empirical evidence shows how small and medium-sized production companies are naturally making their way towards comprehensive digitalization, despite having fewer resources than large companies have. The affinity for digital technologies runs across the entire workforce, from highly qualified employees and skilled workers to semi-skilled workers.

For remote work in home office, video conferencing has proven to be an essential tool for meetings, information events, training, workshops and personal exchange. However, there are differences in the acceptance and use of video meetings (collaboration tools) between the fields examined: Video interaction had rarely occurred in theaters and hospitals but had to be established during corona and was continued afterwards. All in all, digital infrastructure for location-independent work was introduced experimentally and at a rapid pace, and the ability to adapt work processes to work in a home office was enormous in ICT and SMEs.

Some institutions and companies did not manage to offer digital or distanced solutions for their workers. Especially but not only SMEs, hospitals and theaters primarily relied on bottom-up digitalization in the crisis – i.e. the operational know-how of their employees. Sometimes a WhatsApp group between nurses on their private phones was the workaround for the in-person meeting. Ad hoc solutions often were dropped after the pandemic. Video conferencing was sustained for many tasks in all fields.

Previous *limits to work regulations* like determining the place of work, working hours, work equipment, occupational safety, etc. *were redefined* in this situation. At the same time, the limits of digitalization and the relocation of activities to the home office became apparent in this context.

Most workers in these fields with great closeness of work objects and interaction partners felt that their work is either not possible with distancing measures or at least loses the inter-personal dimension. Workers in these fields often rely on physical collaboration with their colleagues and customers. Some exceptions are digital theater projects that work with virtual reality (VR) technology. VR lets theater visitors experience theater literally right in front of their eyes instead of on a distant stage. These examples are rare, as most of the time digital theater and health care are perceived as more distant, although this perception does not hold true for all applications.

Boundary dynamics and boundary management between distance and closeness: From objectifying to subjectifying work and interaction?

In the following, the shift from an objectifying mode of virtual interaction to a subjectifying mode is demonstrated using examples from the case study in the software industry, where virtual work and interaction was most pronounced. However, the descriptions can also be applied in a graded form to the other fields of work SMEs, theater, hospital for the activities that could be carried out in remote work.

Tendencies to objectifying interactions

Against the background of the critical discussion about the connection between digitalization or digitality and formalization (see Jungtäubl, 2024, p. 116) as well as empirical insights, we assume that digital communication and thus videoconferencing tends to formalize work and interaction. Our empirical findings show this because of the design of online meetings with invitations, fixed times, schedules, agenda and protocol that defines the possibilities. The online procedure is in many cases designed to be more disciplined and goal-oriented, with less free exchange, because otherwise chaos and fatigue quickly set in. Digitally supported interaction can also be recorded and reused. This is associated with potential for efficient documentation and risks such as surveillance: “[...] we always have the issue of data protection, that we don’t want to record and release things” (Software company, management, corporate culture).

Interviewees also speak of a “surprising” efficiency gain through not having to “walk into the other room” and have “a bit of small talk again beforehand”. An executive at the software company notes that efficient virtual appointments with external people allow for more appointments. Over time, however, more creativity is needed for the meetings: “I’m sure I’ve made this year a bit more varied.” The increased focus during online meetings is repeatedly emphasized:

“What actually works quite well is not to let the meetings get out of hand. [...] So it’s very focused to discuss exactly one problem. That works when both know what they are talking about. If there are misunderstandings, then it’s difficult again. But if you are working on something specifically, then it usually works” (software developer).

Often, online meetings are more precisely prepared, leading to better communication on topics. A senior manager notes that you have to make an agenda and to make sure that the people are more aware of the agenda: “Because you say, I would like to discuss the following points in these 40 minutes and possibly document and take minutes directly or together. Of course, this makes the topic very good. Because I am active online, virtually active, I also document virtually. For specific topics and occasions, I find it more efficient online.”

The senior manager notes, however, that “difficulties of preparation and follow-up, of reaction, etc.” remain, because they “quickly jump back to a different topic”.

According to one software manager, it is still difficult to get input on challenging topics in the online event. The issue was the satisfaction survey in the company during the Corona period, with the aim of developing suggestions for improvement: “Because you have 30 small tiles in front of you, a slide that you share and you’re just talking to no one in particular. And then you only reach 5 people” (product manager).

Statements like these show tendencies towards objectification and distancing in the virtual space, as has been described many times. Just like analog interaction, virtual interaction relies on various conditions, but it is also different. In the interviews, conditions such as technical functionality, the number of participants, and the corporate/control culture were mentioned in this regard.

Tendencies to subjectifying interactions

An employee from Human Relations points out the increasingly *common use* of the online format: “You get so used to just working on certain things together online, working together on the presentation!” (HR software). From software development, it is said: “[...] But now you simply have the medium that you can do this video telephony quickly and also show the screen.” This makes it possible to look at the object of work together, regardless of location, and to talk about it visually and with *reference options*. One product manager sees a general improvement in meetings: “Well, some of them, we have a big department meeting that has really improved a lot during the Corona pandemic.” People would exchange ideas but not digress so much. He points out that offering breakfast on site can help people to take time to look at each other, have time to find their bearings and develop a sense of community for each other. The *sense of community* that results from such closeness on-site is valuable, but it doesn’t have to be limited to the analog world. In the virtual world, too, employees are feeling their way in this direction, as reported in the software company: “That’s actually how it started in the company, too, with all the teams having their virtual coffee breaks or playing some games remotely in the evenings.” The interview partner also reports: “At some point, there was a back-to-campus movement [laughs]. So, can you maybe have coffee on campus and come to the campus? That didn’t really work out.” To boost the sense of community, in addition to coffee and gaming sessions, there were also reports of morning warm-up talks, quizzes, geocaching, and other creative ideas in the digital world during the pandemic (software manager). Many people appreciated this as a way of *strengthening the relationship*, although it was also noted that: “In my opinion, it doesn’t necessarily serve productivity either” (Software Sales Consultant).

It is precisely this productivity, made possible by informal encounters and on-site exchanges, that companies cite as a reason for calling back to the office, as

in the prominent example of Amazon. Is a *dialogical and explorative approach* (process) possible online? According to one employee, the online format even enables new forms of *dialogical interactivity*, for example, questions from different people can be taken up directly online by another person during the presentation and the answers can be worked on together after the presentation. About documents, the question is whether these per se support objectifying action. From software product management, it was reported that entering where the journey is going and what comes next in the Jira program (project management tool used in an agile work context) creates *transparency* for the teams, based on which the development teams can work object-relatedly. *In conclusion, objectifying and subjectifying strategies are often very close to each other.*

In addition, the importance of *situated, spontaneous, informal communication* is highly valued, but not a matter of course even on site. In a group discussion, it was pointed out that although you can no longer knock on the door of the boss or colleague directly, you can quickly write and receive answers using the chat system. In response to this, it was commented: “[...] so I don’t know if that makes that much of a difference.” One manager at the software company found that *online* meetings were more focused, faster and that *colleagues were more readily available*. With the return to campus, the problem of colleagues being harder to reach has, in his opinion, intensified again. In principle, there are different positions on which topics can be discussed or realized online, and which are better discussed in person. One Scrummaster pointed out that discussing difficult and personal topics depends not so much on the tools overall, or whether the exchange takes place on-site or off-site in virtual interaction. She emphasized the topic of trust: “*If the team works well together and trusts each other, then you can definitely address things remotely*, so talking, that works. I would not focus so much on the setting, but rather on how the team works and how much trust the team has in each other.” To do this, some employees – especially if they are new – must first be actively involved. During the coronavirus pandemic, the companies surveyed emphasized that this was a particular challenge. In the case of the software company, the training and development department also created guidelines for this. However, it was found that an exchange between managers was particularly important on this topic. The other issue here is trust in the company with a view to the possibilities of controlling digitalized communication (see objectifying work action).

Different atmospheres are reported in connection with on-site or off-site work. When asked whether this leads to a different kind of interaction in face-to-face communication compared to video meetings, a software developer commented: “Now I’m just thinking, in terms of communication, *it certainly makes a difference whether I’m communicating with someone via video or in person. Although I don’t feel it... somehow I don’t perceive it.*” It has been established that remote working is now handled confidently and that people “get on” with it. *The associated challenges are almost no longer noticeable:*

“I have a colleague who is actually in his home office all the time and it doesn't make any difference somehow.” (Developer Future Lab). And what about *associative thinking*, which differentiates subjectifying work and interaction from the objectifying analytical-logical approach? The interplay between opportunities for intense concentration and distraction through access to numerous parallel information channels represents a cognitive challenge that was introduced as both enriching (quickly generate a larger image on the topic) and as a burden (interruption). An important bridge is object-mediated work. Here, virtual and analog meeting cultures cross-fertilize each other in a new way: Some of the tools from the virtual working world were so well received and so practical that they even found their way into analog meetings.

Video meetings offer the opportunity for direct interaction with people, even if, as is often noted, only a small part of them is displayed. The level of relationship and connection can be quite successful. There was talk of generations and digital affinity, of the general mood in the team or company, how well the technology works in each case, which skills are available for collaborative work, etc. Overall, the demand and the claim to organize contacts and communication via video conferencing is due to the possibility of digitally mediated closeness. Video meetings go some way to creating this by reproducing the analog situation, albeit in a fragmented way. This does not replace direct interaction, but it enables interaction at a level that permits certain types of subjectifying action. In the words of a product manager with staff responsibility:

“I think it's a basic need that we used to fulfill locally and now that this completely new world has been opened up, or we are in the process of opening it up, we have to transfer this need for closeness, for exchange, for relationship here as well and it is only now slowly growing and starting.”

In technical-commercial companies, the managing director emphasizes that proximity does not necessarily have to be associated with video conferencing when working at a distance: “It has become firmly established here that we all meet once a month on Mondays. We then do everything online for the rest of the week. But we also do it so that we don't talk online so much but rather write each other e-mails. And we have an e-mail program in which you can also chat.” It is easy to forget that this form of ‘more abstract’ communication has also only been established for a relatively short time (for comparisons on the critical examination of e-mail communication, see, for example, Klippert, 2007).

Embodied way of working and challenges for boundary management

We began this article by reconstructing the distancing measures in the coronavirus pandemic as boundary dynamics and management. In our view, this is a good way to summarize the dynamic changes in structures and actions in connection with the Corona measures. So far, boundary dynamics have been little addressed in the discussion: During the further development of location-independent working, a boundary shift away from “distanced” to “close” working in virtual space can be seen, especially in the example of video meetings/workshops – despite interaction partners physically working in other locations. We describe this development as a shift from an objectifying mode of work and interaction to a subjectifying mode of work and interaction in virtual space that seems to be possible.

Despite remaining technical and skills-related challenges, employees have adopted digitally supported exchange via collaboration tools, in particular video conferencing, and expanded it with informal strategies. By imitating analog conversation and dialog situations, albeit only to a limited extent, working in virtual space based on closeness has become tangible.⁶ Nevertheless, there are different assessments of its success. It is not surprising that the use of virtual work and interaction in the theater and in personal service activities, such as in hospitals, is assessed differently than in administrative, planning and development work.

Against the backdrop of the post-pandemic discussion about the end of working from home, the debate about this unquestionably contradictory development is explosive. The limitations of virtual work and interaction and the associated deficits in creative collaboration and informal subjective performance are now being emphasized. During the phase of working from home prescribed by infection control regulations, companies have obviously increasingly recognized that more than formal work and organization is necessary for well-functioning work and organization. Against the backdrop of the experience of deserted offices during the pandemic, companies seem to be showing a new appreciation for situational, informal collaboration and communication. Companies justify their decision to call employees back to the office by claiming that remote work would erode the corporate culture and lead to a loss of innovative capacity. Well-known tech companies such as Amazon have been at the forefront of this debate. CEO Andy Jassy repeatedly wrote a newsletter to employees on September 16, 2024, in which he referred to the need to strengthen culture and teams by being present in the company: “[...], we’ve observed that it’s easier for our teammates to learn, model, practice, and strengthen

6 More advanced approaches such as virtual and augmented reality (VR/AR) can also be seen as an attempt to create closeness in virtual space. However, they are far less widespread than video switching. For the potential and challenges of experience-based learning in virtual reality, see Huchler *et al.*, 2022.

our culture; collaborating, brainstorming, and inventing are simpler and more effective; teaching and learning from one another are more seamless; and teams tend to be better connected to one another. If anything, the last 15 months we've been back in the office at least three days a week has strengthened our conviction about the benefits" (Jassy, 2024).

So, if companies are now demanding on-site presence again, it could be concluded that they are taking its situational and personal potential seriously and recognizing it. However, this should not be taken for granted, nor was it really the case in most companies before the coronavirus pandemic. Rather, the recognition of informal and subjective potential must be seen as ambivalent and the organization of the informal as still challenging (Böhle and Bolte, 2002; Porschen and Bolte, 2006). Moreover, in times of advancing digitalization and the new possibilities for work and interaction in virtual space (including VR/AR), this argument is astonishing and worth a closer look. Is it really about the recognition of embodied (implicit) knowledge, which is different in analog space and in virtual space? Our studies also show differences in terms of the development of closeness in virtual versus analog work and interaction. Nevertheless, our empirical insights support the shift in boundaries described above. This allows for the assumption that the company's need for control is not met when working remotely (if data is not collected improperly by the company). One interviewee expresses this as follows: "I have the feeling that we have found a way that works. But somehow, I also keep noticing tendencies from management levels that, although it is being pushed forward, it still doesn't feel like it's wanted on the other side" (software development, product management). In the context of the discussion introduced at the beginning of the article regarding the limits of the recognition of "other knowledge", we can state because of our research: The Corona experience of empty offices has made companies aware of the importance of embodied tacit experiential knowledge. However, a new boundary can be seen in the acceptance of this knowledge: in virtual work and interaction, this informal knowledge resource continues to be ignored. At the same time, enormous efforts are being made in various disciplines and companies to further develop virtual work and interaction, which in turn require critical observation.

Our studies also underline the well-known fact that the potential of virtual work cannot be exploited to the same extent in all fields of work. In the case of interaction work on and with the "living work object" of humans, the necessary physical processing or reference sets limits, whether in the creative or care sector. There are also physical and material limits to the flexibilization of work in production and production-related work. Here, tangible work objects must be processed, shift schedules must be adapted to machine or process-related requirements and safety requirements must be met.

Regarding the fact that some interviewees from all the empirical fields examined welcomed the need to work at the workplace during the pandemic for various

reasons, but others did not, the question of flexibility for everyone has arisen after the pandemic. The desire for compatibility and freedom of design currently plays a greater role here than the desire for physical distance as a means of preventing infection as it was predominant during a crisis such as the coronavirus pandemic. Unequal opportunities in this regard have the potential to be thematized as social inequality in the company. The description of a female technician who prefers to go to work and separate it from her private life is representative of this. As a technician, she had to work on site anyway. But also to have peace and quiet when there are children in the house. The many people around her who work from home no longer have mountains of laundry at the weekend like she does. These friends go hiking at the weekend. She wonders whether they work just as concentrated and efficiently at home. So she understands the call back to the office. Such subjective assessments are contrasted by studies on productive work in the home office, which, on the contrary, critically point out the more extensive boundary transgressions of working from home (Alipour, 2023; Harfiana and Matzner, 2026).

Such demarcations between fields of work and occupational groups bring the discussion about opportunities and scope for flexibility for online and offline work on the employee side into focus. In production, in production-related areas and in service, new scope for flexibility has obviously emerged that was unthinkable before the coronavirus pandemic and is being discussed under the heading of innovative hybrid forms of work in production (Industry 4.0 platform). There is a need to continue this discussion about new scope for shaping various occupational fields through digitalized work and beyond, as it is being conducted by trade unions and others.

Regarding employees with lower thresholds for location-independent virtual work and interaction, questions also arise about work design in the changing world of work. From our perspective, the hybrid work that has become familiar with the new mix of face-to-face and remote work presents itself not only as boundary management between work and life, but also as an opportunity for boundary management between different physical and virtual distance and close relationships in work and interaction. The spectrum of sensory experience possibilities and the experience of different spatial and social atmospheres is of great importance for many interlocutors. Furthermore, the company as a place is and remains essential for encounters with a wide variety of contact people, for learning to change perspectives, for articulating and representing interests and thus for socially relevant anchors.

To sum up, it can be said that for companies, successful boundary management of closeness and distance, with a suitable range of analog and virtual spaces for experiences and their combination, is now on the agenda. The expanded body concept presented here raises awareness of aspects of closeness in work action that should be

taken into account. This is also an important contribution to avoid the “non-contact society” (von Thadden, 2018).

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